IFATS Marseille 2019

17th Annual IFATS Conference

IFATS

International Federation for Adipose Therapeutics and Science

Palais du Pharo

December 4 - 7, 2019
Palais du Pharo
Marseille, France
www.ifats.org

REVOLVE™
Advanced Adipose System

Model, not an actual patient.

Designed for

EASE / PREDICTABILITY[1,*]

IN FAT PROCESSING

HIGH-QUALITY
ADIPOSE TISSUE[1,*]

TIME SAVINGS[2,†]

PREDICTABLE RESULTS[1,*]
Retention data based on animal model.

*Correlation between these results and results in humans has not been established.

#1

COMMERCIAL DEVICE FOR FAT PROCESSING
in the U.S. for aesthetic and reconstructive procedures[3]

For more information, please visit us at the Allergan booth

†Based on time to complete procedure (from lipoaspiration to fat injection) compared to centrifugation.

Device Description and Intended Use:
REVOLVE™ System is a sterile single-use disposable tissue canister used for harvesting, filtering, separating, concentrating, and transferring autologous tissue components for reintroduction to the same patient during a single surgical procedure for repair, reconstruction, or replacement of integumentary or musculoskeletal tissues.

IMPORTANT SAFETY INFORMATION

CONTRAINDICATIONS
Contraindications to autologous fat transfer include the presence of any disease processes that adversely affect wound healing, and poor overall health status of the individual.

WARNINGS

1. Reuse of REVOLVE™ System may result in infection and the transmission of communicable diseases.
2. If sterile packaging is damaged do not use product.
3. This device will not, and is not intended to, produce significant weight reduction.
4. This device should be used with extreme caution in patients with chronic medical conditions such as diabetes, heart, lung, or circulatory system disease or obesity.
5. The volume of blood loss and endogenous body fluid loss may adversely affect intra and/or postoperative hemodynamic stability and patient safety. The capability of providing adequate, timely replacement is essential for patient safety.

PRECAUTIONS

1. Use of this device is limited to those physicians who, by means of formal professional training or sanctioned continuing medical education (including supervised operative experience), have attained proficiency in suction lipoplasty and tissue transfer.
2. Results of this procedure will vary depending upon patient age, surgical site, and experience of the physician.
3. Results of this procedure may or may not be permanent.
4. The amount of fat removed should be limited to that necessary to achieve a desired effect.

ADVERSE EFFECTS
Some common adverse effects associated with use of the REVOLVE™ System and/or autologous fat transfer procedures are asymmetry, over- and/or under-correction of the treatment site, tissue lumps, bleeding, scarring, fat necrosis, cyst formation, allergic reaction, and infection and inflammation of various levels. If an unanticipated event occurs, alteration of surgical plan may be necessary at the surgeon's discretion.

Revolve is a class IIa medical device marked CE0344.

Refer to product Direction For Use for more information.

References: 1. Ansorge H, Garza JR, McCormack MC, et al. Autologous fat processing via the Revolve system: quality and quantity of fat retention evaluated in an animal model. *Aesthet Surg J.* 2014;34(3):438-447. **2.** Gabriel A, Maxwell GP, Griffin L, Champaneria MC, Parekh M, Macarios D. A comparison of two fat grafting methods on operating room efficiency and costs. *Aesthet Surg J.* 2017;37(2):161-168. **3.** Unpublished Data – US Plastic Surgeons Online Product Choice Survey, Fat Transfer INT-BRT-1950022 October 2019.

Allergan

Table of Contents

Executive Committee

Ramon Llull, MD, PhD
Past President 2003
Palma de Mallorca, Spain

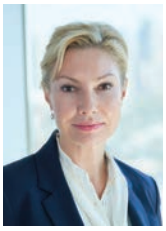
Adam J. Katz, MD, FACS
Past President 2005
Winston-Salem, NC, USA

J. Peter Rubin, MD, FACS
Past President 2004
Pittsburgh, PA, USA

Ricardo Rodriguez, MD
Past President 2016
Baltimore, MD, USA

William Futrell, MD
Pittsburgh, PA, USA

Board of Directors



Ivona Percec, MD, PhD
President-Elect 2020
Bryn Mawr, PA, USA

Guy Magalon, MD
President 2019
Marseille, France

Kotaro Yoshimura, MD
Past President 2018
Shimotsuke, Japan

Brian Johnstone, PhD
Past President 2017
Fishers, IN, USA

Bruce Bunnell, PhD
Past President 2015
New Orleans, LA, USA

Marco Helder, PhD
Past President 2014
Amsterdam, Netherlands

Kacey Marra, PhD
Past Co-President 2013
Pittsburgh, PA, USA

Sydney Coleman, MD
Past Co-President 2013
New York, NY, USA

Julie Fradette, PhD
Past President 2012
Québec, QC, Canada

Stuart K. Williams, PhD
Past President 2011
Louisville, KY, USA

Louis Casteilla, PhD
Past President 2008
Toulouse, France

Keith March, MD, PhD
Past President 2007
Gainesville, FL, USA

Jeffrey Gimble, MD, PhD
Past President 2006
New Orleans, LA, USA

IFATS
International Federation for Adipose Therapeutics and Science

On behalf of the IFATS Board of Directors, I have the pleasure to welcome you to our 17th Annual Meeting.

In 2002, IFATS was founded by four pioneers following the historical discovery of mesenchymal stem cells in human subcutaneous adipose tissue. Since then, the IFATS annual meeting has presented leading professionals in this exciting field of regenerative medicine. A wonderful array of plastic surgeons, cell biologists, research scientists and physicians in many other fields attend this meeting each year where they can exchange the most up-to-date knowledge and data on basic, translational, and clinical research in adipose-derived products, including adipose-derived stem cells (ASCs).

IFATS works closely with other leading scientific organizations and we have collaborating panels that include several of these organizations with us here in Marseille. We have brought back the Industry Showcase, a two-hour long Lunch & Learn session, and will feature a three-part symposium on Mechanical and Enzymatic Preparation of Fat and PRP.

The IFATS annual meeting provides all our attendees the opportunity to learn about state-of-the-art technology and clinical practice, see cutting-edge products developed by our exhibiting companies, and interact with the brightest minds in the field. The meeting this year includes a gala event in an exceptional location, right next to the conference center, where attendees will enjoy a memorable evening with international leaders in the field.

We are very pleased that you have joined us in Marseille and are sure that you will learn much and enjoy your time here.

Guy Magalon, MD
IFATS President - 2019

SCIENTIFIC PROGRAM COMMITTEE

Rosalyn Abbott, PhD
Katarina Andjelkov, MD, PhD
Joel Aronowitz, MD
Michael Badowski, PhD
Hazem Barmada, MD, FRCSEd, FRCSEd (CTh), FRCS
Petra Bauer-Kreisel, PhD
Torsten Blunk, PhD
Jay Bowen, DO
Robert Bowen, MD, FCCP
Bruce Bunnell, PhD
Evangelia Chnari, PhD
Bryan Choi, MS
Sherry Collawn, MD, PhD
Alexandra Conde-Green, MD, FICS
Hasim Eray Copcu, MD
Asim Ejaz, PhD
Julie Fradette, PhD
Giorgio Giatsidis, MD
Jeffrey Gimble, MD, PhD
Martin Harmsen, PhD
Jeffrey Hartog, MD, DMD
Marco Helder, PhD
LaTonya Hickson, MD
Ian Holten, MBBS, FRACS, FRCS, MD
Aaron James, MD, PhD
Susanna Kauhanen, MD, PhD
Paul Kingham, PhD
Lauren Kokai, PhD
Malgorzata Kolend, PhD
Stig-Frederik Kølle, MD, PhD
Keith March, MD, PhD
Kacey Marra, PhD
Ali Modarressi, MD
Stephen Ray, MD, FACS
Ricardo Rodriguez, MD
Nir Shani, PhD
Kris Shewmake, MD
Ewa Anna Siolo, MD, MBChB, FC
Filip Stillaert, MD
Shigeki Sugii, PhD
Dmitry Traktuev, PhD
Chloe Trotzier
Stuart Williams, PhD
Shaun Wootten, BS
Kevin Zwezdaryk, PhD

INVITED SPEAKERS AND SESSION MODERATORS

Rosalyn Abbott, PhD
Maxime Abellan Lopez, MD
Richard Abs, MD
Mohammad Al Jawad, MBBS, FRCS
Aurora Almadori, MD, MSc
Katarina Andjelkov, MD, PhD
Benjamin Ascher, MD
Alvaro Avivar-Valderas, PhD
Hazem Barmada, MD
Petra Bauer-Kreisel, PhD
Torsten Blunk, PhD
Philippe Bourin
Massimiliano Brambilla, MD
Bruce Bunnell, PhD
Louis Casteilla, PhD
Valerio Cervelli, MD
Bryan Choi, MS
Steve Cohen, MD
Sydney Coleman, MD
Sherry Collawn, MD, PhD
Alexandra Conde-Green, MD
Hasim Eray Copcu, MD
Arnaud Denis
Byung-Rok Do, PhD
Timur Veysel Dogruok
Julie Fradette, PhD
Kazuhiro Furukawa
Jeffrey Gimble, MD
Laurent Giraudo
Tracy Gu
Jean-Claude Guimberteau, MD
Ayman Haidar
Martin Harmsen, PhD
Marco Helder, PhD
Barbara Hersant, PhD
Christian Jorgensen, MD, PhD
Peter Jung
Amin Kalaaji, MD, PhD
Jens Kastrup, MD, DMSc
Adam Katz, MD, FACS
Bong-Sung Kim
Kenneth Kleinhenz
Lauren Kokai, PhD
Stig-Frederik Kølle, MD, PhD
Benoit Lengelé
Tsai-Ming Lin, MD, PhD
Marc Long, PhD
Ramon Llull, MD, PhD
Guy Magalon, MD
Jeremy Magalon, PharmD
Keith March, MD, PhD
Christophe Marquette
Juliane Meyer
Ali Modarressi, MD
Ali Mojallal, MD, PhD
Johanna Mönch
Joao Morais
Sabah S. Moshref
Norbert Pallua, MD
Ivona Percec, MD, PhD
Ricardo Rodriguez, MD
Michel Rouif, MD
J. Peter Rubin, MD, FACS
Florence Sabatier, PhD
Elias Sawaya, MD
Tanja Seeger
Nir Shani, PhD
Oded Shoseyov, PhD
Gianni Soldati, PhD
Aris Sterodimas, MD, MSc
Filip Stillaert, MD
Dmitry Traktuev, PhD
Angelo Trivisonno, MD
Thierry Van Hemelryck, MD
Julie Véran, PhD
Sophie Veriter, PhD
Alexis Verpaele, MD
Luciano Vidal, MD
N. W. Zhu, MD, MSurg, PhD, FBAPS
Michel Zocchi, MD, PhD

DISCLAIMER

Papers are reprinted as they were submitted. IFATS takes no responsibility for typographical or other errors. All papers in this Program Book are listed in numerical order.

Recording of any content presented at this educational program either by camera, video camera, cell phone, audio recorder, or any other device is strictly prohibited.

DOWNLOAD APP

SEARCH: The App Store or Google Play from your device for "IFATS Events." Download, then choose the IFATS 2019 app in the list of available shows.

For Blackberry, windows and all other phone types (including iOS and Android listed above): Point your mobile browser to http://www.core-apps.com/dl/ifats2019 - From there you will be directed to download the proper version of the app for your particular device, or on some phones, bookmark this page for future reference.

Please feel free to contact support@core-apps.com for assistance with any technical issues.

MARK YOUR CALENDAR

International Federation for Adipose Therapeutics and Science

18th Annual Meeting

IFATS FLORIDA 2020

November 19 - 21, 2020

Fort Lauderdale, Florida

ABSTRACT DEADLINE:

Midnight EST, Wednesday, June 10, 2020

The Call for Abstracts will be sent this winter. All members of IFATS and all registered attendees of the 2019 IFATS Conference will be included in the mailing list. Any others who wish to be reminded to submit papers should contact the IFATS Executive Office.

IFATS Executive Office

45 Lyme Road, Suite 304 Hanover, NH 03755 USA
Tel: 1-603-643-2325 • Fax: 1-603-643-1444
Email: ifats@conmx.net • Web: www.ifats.org

Catherine Foss – Executive Director • IFATS@conmx.net
Jodie LeBrun – Abstract Coordinator and Graphic Design • Jodie@conmx.net
Michele Nilsson, CMP – Education Specialist • Michele@conmx.net
Membership Services • IFATSmembership@conmx.net
Sean Finnell – Accounting Manager • Sean@conmx.net

WEDNESDAY 4TH DECEMBER

PRE PROGRAM IFATS COURSE- AIX MARSEILLE UNIVERSITY
Palais du Pharo, University Amphitheater Jean-Étienne Touze
Marseille, France
REGENERATIVE MEDICINE AND SURGERY: HOW TO BEGIN STEP BY STEP - BEST PRACTICES

8:00 am	Welcome
	Chairman: Ramon Lull, MD, PhD
9:00 – 9:30 am	**Ali Mojallal, MD, PhD** Adipose Tissue Harvesting and Injection Technique From Sydney Coleman to Automated Harvesting and Placement: 20 Years of Evolution
9:30 – 10:00 am	**Norbert Pallua, MD** Preparation and Description of Adipose Derived Products Fat, Microfat, Emulsified Fat (or Nanofat), Mechanical Preparation
10:00 – 10:30 am	**Ramon Lull, MD, PhD** Stromal Vascular Fraction Adipose Derived Stem Cells
10:30 – 11:00 am	Coffee Break
11:00 – 11:30 am	**Florence Sabatier, PhD** Extra Cellular Vesicles-Exosomes
11:30 am – 12:00 pm	**Maxime Abellan Lopez, MD** Fat Mixtures with PRP/SVF/Adipose Derived Stem Cells
12:00 – 12:30 pm	**Julie Véran, PhD** Application of Good Manufacturing Practice in Cell Therapy Facility Organization, Production, and Quality Control
12:30 – 2:00 pm	Lunch
	Chairman: Adam Katz, MD, FACS
2:00 – 2:30 pm	**Jeremy Magalon, PharmD** Osteoarthritis
2:30 – 3:00 pm	**Guy Magalon, MD** Scleroderma
3:00 – 3:30 pm	**Ricardo Rodriguez, MD** Injury of Ionizing Radiation
3:30 – 4:00 pm	**Barbara Hersant, PhD** Gynecology
4:00 – 4:30 pm	**Steven Cohen, MD** Rejuvenation
4:30 – 5:00 pm	**Alvaro Avivar-Valderas, PhD – Takeda Madrid, Cell Therapy Technology Center** Darvadstrocel – High Standardized Manufacturing Process, Clinical Usage and Efficacy
5:00 pm	**Panel Conclusions** The Future

THURSDAY

5TH DECEMBER

Main Auditorium

7:30 am Coffee in Exhibit Hall

8:00 am Welcome Remarks and Overview - Guy Magalon, MD - IFATS President

8:30 am **Concurrent 1: Fat Grafting Clinical**

Moderators: Sherry Collawn, MD, PhD & Filip Stillaert, MD
Presenters: Carlo Oranges, MD; Hongwei Liu, MD, PhD; Sherry Collawn, MD, PhD; Isaac James, MD; Katarina Andjelkov, MD, PhD

Discussion

9:30 am **Concurrent 3: Fat Grafting Clinical**

Moderators: Eray H. Copcu, MD & Stig-Frederik Kølle, MD, PhD
Presenters: Ramon Llull, MD, PhD; Hongwei Liu, MD, PhD; Summer Hanson, MD; Aartje Tuin, MD; Ayla Metin, MD; Sabah S. Moshref, FRSC

Discussion

10:30 – 11:00 am Coffee Break (Exhibit Hall)

11:00 am **Symposium Part I – Enzymatic Preparation of Fat**

Product analysis with company's representative
Moderator: Jeremy Magalon, PharmD
BSL – Peter Jung
Human Med – Juliane Meyer, Dipl-Biol
Lorem Vascular – Kenneth Kleinhenz
Hurim BioCell – Byung-Rok Do, PhD
APHM – Laurent Giraudo
Chemometec – Ayman Haidar & Tanja Seeger

12:00 pm **Symposium Part II – Mechanical Preparation of Fat**

Product analysis with company's representative
Moderator: Jeremy Magalon, PharmD
T-Lab – Timur Veysel Dogruok
BSL – Peter Jung
And comparison with existing devices

12:30 pm **Symposium Part III – PRP**

Product analysis with company's representative
Moderator: Jeremy Magalon, PharmD
Fidia – Luis Vidal
T-Lab – Timur Veysel Dogruok
Innovative Medical Management – Alexis Lopez

1:00 – 2:00 pm Lunch in the Exhibit Hall

2:00 pm **Industry Showcase**

Moderators: Adam Katz, MD, FACS & Marc Long, PhD
Presenters: Dermato Plastica Beauty Co. BSL Co. Ltd.; Hurim BioCell; JuvaPlus; Nordmark; Cell-Easy; Amano Enzyme; Human Med; Lorem Vascular; Allergan;

4:00 – 4:30 pm Coffee Break (Exhibit Hall)

4:30 pm **Concurrent 5: Technical Points**

Moderators: Aris Sterodimas, MD, MSc & Hazem Barmada, MD
Presenters: Aris Sterodimas, MD, MSc; Marco Helder, PhD; Afschin Fatemi, MD; Maxim Geeroms, MD; Xiaosong Chen, MD, PhD

Discussion

5:30 pm **Guest Speaker: Oded Shoseyov, PhD**

The Plant Age: Materials for the Future of Regenerative Medicine
Moderator: Guy Magalon, MD

6:30 pm Adjourn for the day

6:30 - 7:30 pm Welcome Cocktail with Exhibitors

Room 50

8:30 am **Concurrent 2: Basic Research**

Moderators: Julie Fradette, PhD & Rosalyn Abbott, PhD
Presenters: Ruipeng Jia, PhD; Celine Pierard, MSc; Natalie Khramtsova, PhD; Rosalyn Abbott, PhD; Naichen Cheng, MD, PhD

Discussion

9:30 am **Concurrent 4: Basic Research**

Moderators: Marco Helder, PhD & Ali Modarressi, MD
Presenters: Julia Bachmann, MS; Juping Yuan, MD; Jia Dong, MD; Jan Kopecky, MD, PhD; Ivona Percec, MD, PhD

Discussion

2:00 pm **Video Session**

Moderators: Eray H. Copcu, MD & Ramon Llull, MD, PhD
Presenters: Juliane Meyer, MSc; Eray Copcu, MD; Angelo Trivisonno, MD; Elias Sawaya, MD; Sophie Veriter, PhD; Jean Claude Guimberteau, MD; Tsai Ming Lin, MD, PhD

4:30 pm **Concurrent 6: Applied Research**

Moderators: Bryan Choi, MS & Torsten Blunk, PhD
Presenters: Gaëtan Thirion, MS; Nir Shani, PhD; Ran Xiao, MD; Zhujun Li, MD; Jiashing Yu, PhD; Daniele Noël, PhD

Discussion

FRIDAY
6TH DECEMBER

7:00 am — Continental Breakfast in Exhibit Hall

8:00 am — Plenary Session 1 - ISPRES- Gluteal Fat Grafting Update

Panelists: Sydney Coleman, MD; Peter Rubin, MD, FACS; Amin Kalaaji, MD, PhD, Ricardo Rodriguez, MD
Discussion

	Main Auditorium	Room 120
9:00 am	**Concurrent 7: Breast**	**Concurrent 8: Extra Cellular Vesicles-Exosomes-Secretome**
	Moderators: Filip Stillaert, MD & Stig-Frederik Kølle, MD, PhD Presenters: Filip Stillaert, MD; Chao-Chuan Wu, MD; Foissac Rémi, MD; Hiba El Hajj, MD; Michael Bezuhly, MD, MSc, SM, FRCSC; Nicolas Abboud, MD	Moderators: Martin Harmsen, PhD & Dmitry Traktuev, PhD Presenters: Jun-xian Liang, MD, PhD; Linda Vriend, MD; Mei Yu, PhD; Katarina Andjelkov, MD, PhD; YurRen Kuo, MD, PhD, FACS
	Discussion	Discussion

10:00 – 10:30 am — Coffee Break (Exhibit Hall)

10:30 am	**Concurrent 9: Radiotherapy Lesions-Burns**	**Concurrent 10: Neurology**
	Moderators: Dmitry Traktuev, PhD & Julie Fradette, PhD Presenters: Ricardo Rodriguez, MD; Alain Chapel, PhD; Christine Linard, PhD; Noëlle Mathieu, PhD; Clement Brossard, PhD; Viacheslav Vasilyev, PhD; Cyril Bouland, MD; Candice Diaz, BS; Ilya Eremin, MD; Perçin Karakol, MD	Moderators: Bruce Bunnell, PhD & Keith March, MD, PhD Presenter: Jorge Ribeiro, MS; Nicolas Serratrice, MS; Olivier Gostelie, MS; Martin Sollie, MD, PhD; Michael Carstens, MD; Paul Kingham, PhD; Johnny Huard; Hazem Barmada, MD, FRCSEd, FRCS (CTh)
	Discussion	Discussion

12:00 – 2:00 pm — Lunch & Learn

2:00 pm	**Concurrent 11: Extra Cellular Matrix**	**Concurrent 12: Wounds – Scars**
	Moderators: Lauren Kokai, PhD & Bryan Choi, MS Presenters: Lauren Kokai, PhD; Changcheng Zhou, PhD; Joris van Dongen, MD; Kevin Hopkins, MD, FACS; Qixu Zhang, MD, PhD; Xi Yao, PhD	Moderators: Martin Harmsen, PhD & Ali Modarressi, MD Presenters: Kwang Sik Kook, MD; Natsumi Saito, PhD; Eleni Karagergou, MD, PhD, MRCS, FEBOPRAS; Ali Modarressi, MD; Pauline Francois, PhD
	Discussion	Discussion

3:00 - 4:00 pm — Guest Speakers

Moderator: Ricardo Rodriguez, MD

3:00 pm — **Jean-Claude Guimberteau, MD**
Pioneering Exploration of the ECM of Living Human Fatty Tissue by Intratissular Endoscopy

3:30 pm — **Benoit Lengelé**
Bioengineering Human Hand and Face Grafts: The New Frontier of ECM-Based Vascularized Composite Engineering (VCE)

4:00 – 4:30 pm — Coffee Break (Exhibit Hall)

4:30 pm	**Concurrent 13: Orthopedics**	**Concurrent 14: Other Specialties**
	Moderators: Christian Jorgensen, MD, PhD & Torsten Blunk, PhD Presenters: Christian Jorgensen, MD, PhD; Joeri van Boxtel, MSc; Jeremy Magalon, PharmD; Alice Mayoli; Jose Miguel Catalan, MD; Chadwick Prodromos, MD	Moderators: Katarina Andjelkov, MD, PhD & Ricardo Rodriguez, MD Presenters: Katarina Andjelkov, MD, PhD; Florence Sabatier, PharmD, PhD; Alexia Mattei, MD; Angelo Trivisonno, MD; Romain Boissier, MD
	Discussion	Discussion
5:30 pm	**Concurrent 15: 3D Printing**	**Concurrent 16: Cardiology**
	Moderators: Luciano Vidal, MD & Marco Helder, PhD Presenters: Christophe Marquette; Luciano Vidal, MD; Sophie Veriter, PhD; Pierre Guerreschi, MD, PhD; Valérie Lebrun, MS; Francisco Martinez Garcia, DVM, MRes	Moderators: Jens Kastrup, MD, DMSc & Louis Casteilla, PhD Presenters: Jens Kastrup, MD, DMSc; Michael Carstens, MD; Ruxandra Sava, MD; Martin Harmsen, PhD; Tevfik Balikç, MD Michel Manach
	Discussion	Discussion

8:30 pm — Casa Delauze Gala Dinner (tickets required)

SATURDAY
7TH DECEMBER

	Main Auditorium	Room 120
7:30 am	Continental Breakfast in Exhibit Hall	
8:00 am	IFATS Members Meeting	
9:00 am	**Concurrent 17: Best Papers** Moderators: Ivona Percec, MD, PhD & Ricardo Rodriguez, MD Presenters: Dmitry Traktuev, PhD; Mads Jørgensen, MD; Aurora Almadori, MD; Mary Zeigler, PhD; Yan Zhang, MD; Evangelia Chnari, PhD Discussion	**Concurrent 18: Mechanical Preparation of Fat** Moderators: Nir Shani, PhD & Marco Helder, PhD Presenters: Timur Veysel Dogruok, BS; Tunc Tiryaki, MD; William Cimino, PhD; Yin-Di Wu, MD; Hebert Lamblet, MD; Eray Copcu, MD Discussion
10:00 – 10:30 am	Coffee Break (Exhibit Hall)	
10:30 am	**Concurrent 19: EURAPS-Extended Indications in Autologous Fat Transfer** Moderators: Norbert Pallua, MD & Guy Magalon, MD Presenters: Norbert Pallua, MD; Stig-Frederik Kølle, MD, PhD; Bong-Sung Kim; Mohammad Al Jawad; Ramon Llull, MD, PhD; Guy Magalon, MD Discussion	**Concurrent 20: PRP** Moderators: Dmitry Traktuev, PhD & Lauren Kokai, PhD Presenters: Berend van der Lei, MD; Fangyuan Lai, MD; Jeroen Stevens, MD; Nina Hassani, MD; Nevra Seyhan, MD; Flore Delaunay, MD; Amy Strong, MD, PhD Discussion
11:30 am	**Concurrent 21: Regenerative Surgery** Moderators: Pietro Gentile, MD & Michele Zocchi, MD, PhD Presenters: Michele Zocchi, MD, PhD; Pietro Gentile, MD, PhD; Antonio Graziano, PhD; Massimiliano Brambilla, MD Discussion	**Concurrent 22: SVF – Basic Research** Moderators: Martin Harmsen, PhD & Petra Bauer-Kreisel, PhD Presenters: Jingyu Liu, MS; Jian Wang, MD; Ivona Percec, MD, PhD; Luminita Labusca, MD, PhD; Sheri Wang, BS Discussion
12:30 – 2:00 pm	Lunch in the Exhibit Hall	
2:00 pm	**Plenary Session 2 – ICAST** Moderators: Gianni Soldati, PhD & Florence Sabatier, PhD Presenters: Gianni Soldati, PhD; Marco Viganò, PhD; Amanda Lindeman, BS; N. W. Zhu, MD, MSurg, PhD, FBAPS; Anais Namur, PhD Discussion	
3:00 pm	**Plenary Session 3 – SOFCEP - Use of Fat Grafting in Facial Rejuvenation** Moderators: Michel Rouif, MD & Thierry Van Hemelryck, MD Presenters: Michel Rouif, MD;Thierry van Hemelryck, MD; Jean-Paul Meningaud, MD, PhD; Alexis Verpaele, MD; Richard Abs, MD; Tsai-Ming Lin, MD, PhD Discussion	
4:00 pm	**Plenary Session 4 – IMCAS** Moderators: Benjamin Ascher, MD & Aurora Almadori, MD, MSc Presenters: Benjamin Ascher, MD; Steven Cohen, MD, FACS; Sophie Menkes, MD; Aartje Tuin, MD; Kitae Kim, MD; Joris van Dongen, MD Discussion	
5:00 pm	Closing Remarks - Guy Magalon, MD & Ivona Percec, MD, PhD	

Recording of any content presented at this educational program either by camera, video camera, cell phone, audio recorder, or any other device is strictly prohibited.

PRE PROGRAM IFATS COURSE- AIX MARSEILLE UNIVERSITY
Palais du Pharo, University Amphitheater Jean-Étienne Touze
Marseille, France
REGENERATIVE MEDICINE AND SURGERY: HOW TO BEGIN STEP BY STEP - BEST PRACTICES

8:00 am	Welcome
	Chairman: Ramon Lull, MD, PhD
9:00 – 9:30 am	**Ali Mojallal, MD, PhD** Adipose Tissue Harvesting and Injection Technique From Sydney Coleman to Automated Harvesting and Placement: 20 Years of Evolution
9:30 – 10:00 am	**Norbert Pallua, MD** Preparation and Description of Adipose Derived Products Fat, Microfat, Emulsified Fat (or Nanofat), Mechanical Preparation
10:00 – 10:30 am	**Ramon Lull, MD, PhD** Stromal Vascular Fraction Adipose Derived Stem Cells
10:30 – 11:00 am	Coffee Break
11:00 – 11:30 am	**Florence Sabatier, PhD** Extra Cellular Vesicles-Exosomes
11:30 am – 12:00 pm	**Maxime Abellan Lopez, MD** Fat Mixtures with PRP/SVF/Adipose Derived Stem Cells
12:00 – 12:30 pm	**Julie Véran, PhD** Application of Good Manufacturing Practice in Cell Therapy Facility Organization, Production, and Quality Control
12:30 – 2:00 pm	Lunch
	Chairman: Adam Katz, MD, FACS
2:00 – 2:30 pm	**Jeremy Magalon, PharmD** Osteoarthritis
2:30 – 3:00 pm	**Guy Magalon, MD** Scleroderma
3:00 – 3:30 pm	**Ricardo Rodriguez, MD** Injury of Ionizing Radiation
3:30 – 4:00 pm	**Barbara Hersant, PhD** Gynecology
4:00 – 4:30 pm	**Steven Cohen, MD** Rejuvenation
4:30 – 5:00 pm	**Alvaro Avivar-Valderas, PhD – Takeda Madrid, Cell Therapy Technology Center** Darvadstrocel – High Standardized Manufacturing Process, Clinical Usage and Efficacy
5:00 pm	**Panel Conclusions** The Future

MAIN AUDITORIUM

7:30 am	Coffee in Exhibit Hall
8:00 - 8:30 am	Welcome Remarks and Overview - Guy Magalon, IFATS President
8:30 – 9:30 am	**Concurrent 1: Fat Grafting Clinical** Moderators: Sherry Collawn, MD, PhD & Filip Stillaert, MD
8:30 am	**1** **THREE-DIMENSIONAL EVALUATION OF BREAST SURFACE: VALIDATION OF A NOVEL SCANNING PROCESS TO ASSESS FAT GRAFTING OUTCOMES** Presenter: Carlo M. Oranges, MD (Switzerland) Affiliation: Basel University Hospital Authors: Oranges CM, Madduri S, Brantner P, Msallem B, Giordano S, Benitez B, Kalbermatten DF, Schaefer DJ, Thieringer FM
8:38 am	**2** **TREATMENT OF ANDROGENETIC ALOPECIA WITH CONCENTRATE OF NANOFAT GRAFT** Presenter: Hongwei Liu, MD, PhD (China) Affiliation: The First Affiliated Hospital of Jinan University Authors: Liu HW, Chen N
8:46 am	**3** **COMPREHENSIVE REVIEW OF ADIPOSE GRAFTING: FROM VOLUMIZATION TO SCAR RELEASE** Presenter: Sherry Collawn, MD, PhD (USA) Affiliation: University of Alabama at Birmingham Author: Collawn S
8:54 am	**4** **OPTIMIZING FAT GRAFT PROCESSING: A PROSPECTIVE, CONTROLLED CLINICAL TRIAL COMPARING TELFA ROLLING VERSUS CENTRIFUGATION FOR FAT GRAFTING CRANIOFACIAL DEFORMITIES** Presenter: Isaac James, MD (USA) Affiliation: University of Pittsburgh Authors: James I, Bourne D, Minteer D, Wang S, Bliley J, Donnenberg AD, Donnenberg V, Branstetter B, Marra K, Coleman S, Rubin JP
9:02 am	**5** **SAFETY CONSIDERATIONS SURROUNDING THE USE OF FAT GRAFTING, SILICONE IMPLANTS AND COMBINATION OF BOTH FOR CALF AUGMENTATION** Presenter: Katarina Andjelkov, MD, PhD (Serbia) Affiliation: BelPrime Clinic Belgrade Serbia Authors: Andjelkov K, Atanasijevic T, Colic M, Llull R, Popovic V
Discussion	

ROOM 50

8:30 – 9:30 am	**Concurrent 2: Basic Research** Moderators: Julie Fradette, PhD & Rosalyn Abbott, PhD
8:30 am	**7** **COMPARISON OF THE EFFECTS OF ULTRASOUND-GUIDED ADIPOSE-DERIVED STEM CELLS TRANSPLANTATION AND OTHER TRADITIONAL TRANSPLANTATION STRATEGIES ON CISPLATIN-INDUCED KIDNEY INJURY** Presenter: Ruipeng Jia, PhD (China) Affiliation: Nanjing First Hospital Authors: Jia R, Zhou C, Zhou L, Ge Y, Liu J, Zhao F, Jiang N, Wu R
8:38 am	**8** **GENETIC STABILITY ASSESSMENT IN BONE TISSUE-ENGINEERED PRODUCTS** Presenter: Céline Pierard (Belgium) Affiliation: Novadip Biosciences SA Authors: Theys N, Episkopou H, Decottignies A, Pierard C
8:46 am	**9** **ADIPOCYTES AND FIBROBLAST-LIKE CELLS VIABILITY DEPENDING ON THE NUMBER OF PASSAGES THROUGH FAT FILTERS** Presenter: Natalie Khramtsova, PhD (Russia) Affiliation: Perm State University of Medicine Authors: Khramtsova N, Plaksin SA, Sotskov AY
8:54 am	**10** **SCREENING PLATFORM FOR STUDYING HUMAN OBESOGENIC MODES OF ACTION** Presenter: Rosalyn D. Abbott, PhD (USA) Affiliation: Carnegie Mellon University Authors: Abbott RD, Keyser MN, Pereira SR, Debari MK, Griffin MD

9:02 am **11**

THE INFLUENCE OF CELL CULTURE DENSITY ON THE CYTOTOXICITY OF ADIPOSE-DERIVED STEM CELLS INDUCED BY L-ASCORBIC ACID-2-PHOSPHATE

Presenter: Naichen Cheng, MD, PhD (Taiwan)
Affiliation: National Taiwan University Hospital
Authors: Cheng N, Tu YK, Wu YK

Discussion

MAIN AUDITORIUM

9:30 - 10:30 am **Concurrent 3: Fat Grafting Clinical**

Moderators: Eray H. Copcu, MD & Stig-Frederik Kølle, MD, PhD

9:30 am **13**

FAT GRAFT PULMONARY EMBOLISM (F-PES): LYMPHATIC SYSTEM PREFERENTIALLY ABSORBS, CONCENTRATES AND CENTRALLY DELIVERS MICELLAR EMBOLI FROM FAT GRAFTS FREE OIL FRACTION

Presenter: Ramon Llull, MD, PhD (Spain)
Affiliation: CellProtech
Authors: Llull R, Sese B, Matas A, Calabrese C, Montserrat J

9:38 am **14**

NOT PRESENTED **AUTOLOGOUS FAT TRANSPLANTATION FOR TREATMENT OF ABDOMINAL WALL SCAR ADHESION AFTER CESAREAN SECTION**

Presenter: Hongwei Liu, MD, PhD (China)
Affiliation: The First Affiliated Hospital of Jinan University
Authors: Liu HW, Li SH

9:46 am **15**

A PROSPECTIVE, RANDOMIZED TIME-AND-MOTION STUDY COMPARING RATE OF PROCESSING TECHNIQUES IN AUTOLOGOUS FAT GRAFTING: AN ECONOMIC ANALYSIS

Presenter: Summer Hanson, MD, PhD (USA)
Affiliation: Allergan plc
Authors: Parekh M, Hanson SE, Macarios D, Boer R, Garvey PB, Chang EI, Reece G, Liu J, Butler CE

9:54 am **16**

STERILITY AND ENDOTOXIN LEVELS AFTER MECHANICAL ISOLATION OF STROMAL VASCULAR FRACTION BY THE FAT-PROCEDURE

Presenter: Aartje J. Tuin, MD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: Tuin AJ, Van Dongen JA, Stevens HP, Harmsen MC, Spijkervet FK, Van Der Lei B

10:02 am **17**

THE EFFECT OF CENTRIFUGE DURATION ON FAT GRAFT SURVIVAL

Presenter: Ayla Metin, MD (Turkey)
Affiliation: Istanbul Bagcilar Education and Searching Hospital
Authors: Metin A, Bozkurt M, Karakol P

10:10 am **THE REGENERATIVE EFFECT OF INTRA-ARTICULAR INJECTION OF AUTOLOGOUS FAT MICRO GRAFT IN TREATMENT OF CHRONIC KNEE OSTEOARTHRITIS 10 YEARS EXPERIENCE**

Presenter: Sabah S. Moshref

Discussion

ROOM 50

9:30 - 10:30 am **Concurrent 4: Basic Research**

Moderators: Marco Helder, PhD & Ali Modarressi, MD

9:30 am **19**

SECRETORY FUNCTION OF ADIPOSE-DERIVED STROMAL/STEM CELLS (ASC) UNDER ISCHEMIA-LIKE STRESS CONDITIONS

Presenter: Julia Bachmann, MS (Germany)
Affiliation: University of Wuerzburg
Authors: Bachmann J, Ehlert E, Becker M, Radeloff K, Blunk T, Bauer-Kreisel P

9:38 am **20**

PRIMARY CILIA ARE DYSFUNCTIONAL IN OBESE ADIPOSE-DERIVED MESENCHYMAL STEM CELLS

Presenter: Juping Yuan, MD (Germany)
Affiliation: University Hospital Frankfurt
Authors: Yuan J, Ritter A, Friemel A, Kreis NN, Hoock SC, Roth S, Kielland-Kaisen U, Brüggmann D, Solbach C, Louwen F

9:46 am **21**

WITHDRAWN ~~**FAT EXTRACT IMPROVES RANDOM PATTERN SKIN FLAP SURVIVAL IN A RAT MODEL**~~

Presenter: Wei Li, MD, PhD (China)
Affiliation: Shanghai 9th Peoples Hospital
Authors: Li W, Cai YZ

9:54 am **22**
INFLAMMATORY RESPONSE INDUCED BY VARIED CONCENTRATION OF SEV-AT
Presenter: Jia Dong, MD (China)
Affiliation: Sichuan University
Authors: Dong J, Yu M, Tian TW

10:02 am **23**
HEALTHY ADIPOCYTE
Presenter: Jan Kopecky, MD, PhD (Czech Republic)
Affiliation: Institute of Physiology of the Czech Academy of Sciences
Author: Kopecky J

10:10 am **24**
NOT PRESENTED **REGULATORY ROLES OF SIRT1 IN LINEAGE DIFFERENTIATION AND PROLIFERATION OF HUMAN ADIPOSE-DERIVED STEM CELLS DURING CHRONOLOGICAL AGING**
Presenter: Ivona Percec, MD, PhD (USA)
Affiliation: University of Pennsylvania
Authors: Percec I, Shan X, Calvert C

Discussion

10:30 - 11:00 am Coffee Break (Exhibit Hall)

MAIN AUDITORIUM

11:00 am - 12:00 pm **Symposium Part I - Enzymatic Preparation of Fat**
Product analysis with company's representative
Moderator: Jeremy Magalon, PharmD

BSL – Peter Jung
Human Med – Juliane Meyer, Dipl-Biol
Lorem Vascular – Kenneth Kleinhenz
Hurim BioCell – Byung-Rok Do, PhD
APHM – Laurent Giraudo
Chemometec – Ayman Haidar & Tanja Seeger

12:00 - 12:30 pm **Symposium Part II - Mechanical Preparation of Fat**
Product analysis with company's representative
Moderator: Jeremy Magalon, PharmD

T-Lab – Timur Veysel Dogruok
BSL – Peter Jung
And comparison with existing devices

12:30 - 1:00 pm **Symposium Part III - PRP**
Product analysis with company's representative
Moderator: Jeremy Magalon, PharmD

Fidia – Luis Vidal
T-Lab – Timur Veysel Dogruok
Innovative Medical Management – Alexis Lopez

1:00 - 2:00 pm Lunch in the Exhibit Hall

ROOM 50

2:00 - 4:00 pm **Video Session**
Moderators: Eray H. Copcu, MD & Ramon Llull, MD, PhD

2:00 pm **V1**
Q-GRAFT® - A CLOSED AND SAFE SYSTEM FACILITATING THE INTRAOPERATIVE ISOLATION OF THE STROMAL VASCULAR FRACTION FROM ADIPOSE TISSUE
Presenter: Juliane Meyer, Dipl-Biol (Germany)
Affiliation: Human Med AG
Authors: Meyer J, Wolff A, Winkler K, Peters K

2:15 pm **V2**
MEST: MECHANICAL SVF TRANSFER BY USING ADINIZER
Presenter: Eray H. Copcu, MD (Turkey)
Affiliation: MEST
Author: Copcu EH

2:30 pm **V3**
DIFFERENT PRODUCTS OF THE FAT
Presenter: Angelo Trivisonno, MD (Italy)
Affiliation: Sapienza University
Authors: Trivisonno A, Toietta GT

2:38 pm **V4**
THE APPLE NEVER FALLS FAR FROM THE TREE
Presenter: Elias T. Sawaya, MD (France)
Affiliation: Institut Aquitain de la Main
Authors: Sawaya ET, Guimberteau JC

2:48 pm **V5**
A SCAFFOLD-FREE GRAFT FOR LARGE CRITICAL SIZE BONE DEFECT: PRECLINICAL EVIDENCE TO CLINICAL PROOF OF CONCEPT
Presenter: Sophie Veriter, PhD (Belgium)
Affiliation: Novadip Biosciences
Authors: Veriter S, Docquier PL, Thirion G, Lebrun V, Adnet PY, Caty C, Theys N, Dufrane D

2:54 pm **V6**
OF CELLS, FIBERS AND THE LIVING HUMAN BODY. EXPLORATION OF THE RELATIONSHIPS BETWEEN THE FIBRILLAR ARCHITECTURE AND CELLS WITHIN THE LIVING HUMAN BODY BY INTRA-TISSULAR ENDOSCOPY. 33' Video
Presenter: Jean Claude Guimberteau, MD (France)
Affiliation: Endovivo Productions
Author: Guimberteau JC

3:27 pm **V7**
THE NEW ERA OF FAT GRAFTING - MAFT (MICRO AUTOLOGOUS FAT TRANSPLANTATION)
Presenter: Tsai Ming Lin (Taiwan)
Affiliation: Dermato Plastica Beauty Co. Ltd

MAIN AUDITORIUM

2:00 - 4:00 pm **Industry Showcase**
Moderators: Adam Katz, MD, FACS & Marc Long, PhD

2:00 pm **HOW TO MAKE FAT GRAFTING SIMPLE AND RELIABLE? MAFT-GUN – A NEW WEAPON IN THE 21TH CENTURY**
Presenter: Tsai-Ming Lin – Dermato Plastica Beauty Co. Ltd

2:10 pm **ADINIZERS, A PARADIGM CHANGER OF REGENERATIVE FAT GRAFTING AND NON-ENZYMATIC SVF TECHNIQUES**
Presenter: Peter Jung – BSL Co. Ltd

2:20 pm **FULLY AUTOMATIC SVF ISOLATOR "HURICELL TM"**
Presenter: Tracy Gu – Hurim BioCell Inc

2:30 pm **LIPOPEN - WHY COMPUTER CONTROLLED INJECTIONS?**
Presenter: Arnaud Denis – JuvaPlus SA - **Presented by Xavier Magaud**

2:40 pm **TRANSLATIONAL COLLAGENASE - THE PERFECT TOOL FOR CELL ISOLATION**
Presenter: Johanna Mönch – Nordmark Arzneimittel GmbH & Co. KG

2:50 pm **FASTER, SAFER AND AFFORDABLE ACCESS TO GMP GRADE ASC FOR ACADEMIC CLINICAL TRIAL: CELL-EASY**
Presenter: Michel Manach - Cell-Easy - **Presented by Philippe Bourin**

3:00 pm Break

3:10 pm **ENZYMES FOR ADIPOSE TISSUE DISPERSION**
Presenter: Kazuhiro Furukawa – Amano Enzyme Europe Limited

3:20 pm **Q-GRAFT® - A SYSTEM FOR THE INTRAOPERATIVE ISOLATION OF REGENRATIVE CELLS FROM ADIPOSE TISSUE**
Presenter: Juliane Meyer – Human Med AG

3:30 pm **CE CERTIFIED ADIPOSE PROCESSING SYSTEM AND ENZYMES TO DELIVER SVF IN SUB Q & IV APPLICATIONS**
Presenter: Kenneth Kleinhenz – Lorem Vascular

3:40 pm **THE SCIENCE OF REVOLVE™ SYSTEM: TISSUE QUALITY, EFFICIENCY AND OUTCOMES**
Presenter: Ramon Llull, MD, PhD – Allergan- REVOLVE™ System

3:50 pm Discussion

4:00 - 4:30 pm Coffee Break (Exhibit Hall)

MAIN AUDITORIUM

4:30 - 5:30 pm **Concurrent 5: Technical Points**
Moderators: Aris Sterodimas, MD, MSc & Hazem Barmada, MD

4:30 pm **CELL ASSISTED LIPOFILLING**
Presenter: Aris Sterodimas, MD, MSc (Greece)
Affiliation: Iaso General Hospital
Author: Sterodimas A

4:42 pm **25**
SHORT CALCITRIOL PRE-TREATMENT IS FAR SUPERIOR TO CONTINUOUS TREATMENT IN STIMULATING PROLIFERATION AND OSTEOGENIC DIFFERENTIATION OF HUMAN ADIPOSE STEM CELLS
Presenter: Marco Helder, PhD (Netherlands)
Affiliation: VU University Medical Center
Authors: Helder M, Mokhtari-Safari F, Amoabediny G, Dehghan MM, Zandieh-Doulabi B, Klein-Nulend J

~~4:50 pm~~ **26**
WITHDRAWN **~~FAT EXTRACT IMPROVES FAT GRAFT SURVIVAL VIA PROANGIOGENIC, ANTI-APOPTOTIC AND PROPROLIFERATIVE ACTIVITIES~~**
~~Presenter: Wenjie Zhang, MD,PhD (China)~~
~~Affiliation: Shanghai 9th Peoples Hospital~~
~~Authors: Zhang W, Zheng HJ~~

4:58 pm **27**
WHY IT MAKES SENSE TO USE A TECHNOLOGY WITH LEAST TISSUE TRAUMA EFFECTS FOR BOTH SUCTION AND INJECTION
Presenter: Afschin Fatemi, MD (Germany)
Affiliation: S-thetic Clinic
Author: Fatemi A

5:06 pm **28**
QQ-CULTURED MNC IMPROVE THE FAT GRAFT VASCULARIZATION AND SURVIVAL
Presenter: Maxim Geeroms, MD (Belgium)
Affiliation: Universitair Ziekenhuis Brussel - Juntendo University Tokyo
Authors: Geeroms M, Orgun D, Arita K, Fujimura S, Aiba E, Nakajima Y, Ito-Hirano R, Kitamura R, Senda D, Mizuno H, Hamdi M, Tanaka R

5:14 pm **29**
DISCUSSION ON SURVIVAL MECHANISM OF TRANSPLANTED FAT
Presenter: Xiaosong Chen, MD, PHD (China)
Affiliation: Union Hospital Of Fujian Medical University
Authors: Zhang C, Chen A, Wang T, Tang S, Gao H, Weng H, Chen P, He J, Li X, Chen X

Discussion

ROOM 50

4:30 - 5:30 pm **Concurrent 6: Applied Research**
Moderators: Bryan Choi, MS & Torsten Blunk, PhD

4:30 pm **30**
THE IN VIVO IMMUNOGENICITY OF A HUMAN 3D SCAFFOLD-FREE TISSUE ENGINEERED PRODUCT FOR BONE RECONSTRUCTION: A XENOGENIC MODEL
Presenter: Gaëtan F. Thirion, MS (Belgium)
Affiliation: Novadip Biosciences
Authors: Thirion GF, Veriter S, Lebrun V, Adnet PY, Caty C, Benoit MA, Stordeur P, Nijskens C, Martin L, Dehuy M, Mottart C, Noelanders M, Torres D, Dufrane D

4:38 pm **31**
CRYOPRESERVATION OF STROMAL VASCULAR FRACTION CELLS REDUCES THEIR COUNTS BUT NOT THEIR STEM CELL POTENCY: CAN CRYOPRESERVED STROMAL VASCULAR FRACTION CELLS REPLACE FRESHLY ISOLATED CELLS IN THE CLINIC?
Presenter: Nir Shani, PhD (Israel)
Affiliation: Tel Aviv Sourasky Medical Center
Authors: Shani N, Solodeev I, Orgil M, Bordeynik-Cohen M, Meilik B, Manheim S, Volovitz I, Sela M, Inbal A, Gur E

4:46 pm **32**
FRUCTOSE 1,6-BISPHOSPHATE AS A PROTECTIVE AGENT FOR FAT GRAFTING
Presenter: Ran Xiao, MD (China)
Affiliation: Plastic Surgery Hospital CAMS PUMC
Authors: Xiao R, Lv T, Liu X, Cao YL

4:54 pm **33**
SINGLE-CELL RNA-SEQ OF CULTURED HUMAN ADIPOSE-1 DERIVED MESENCHYMAL STEM CELLS
Presenter: Zhujun Li, MD (China)
Affiliation: Peking Union Medical College Hospital
Author: Li Y

5:02 pm **34**
NOT PRESENTED **ENZYME-CROSSLINKED GELATIN HYDROGEL ENRICHED WITH ARTICULAR CARTILAGE EXTRACELLULAR MATRIX AND HUMAN ADIPOSE-DERIVED STEM CELLS FOR HYALINE CARTILAGE REGENERATION OF RABBITS**
Presenter: Jiashing Yu, PhD (Taiwan)
Affiliation: National Taiwan University
Authors: Yu J, Tsai CC, Cheng NC, Shie MY

5:10 pm **35**

MIR-29A PLAYS A CRUCIAL ROLE IN THE THERAPEUTIC EFFECT OF ASC-DERIVED EXTRACELLULAR VESICLES IN SYSTEMIC SCLEROSIS

Presenter: Daniele Noël, PhD (France)
Affiliation: Inserm
Authors: Noël D, Rozier P, Maumus M, Maria A, Jorgensen C, Guilpain P

Discussion

MAIN AUDITORIUM

5:30 - 6:30 pm **Guest Speaker: Oded Shoseyov, PhD**

The Plant Age: Materials for the Future of Regenerative Medicine
Moderator: Guy Magalon, MD

6:30 pm Adjourn for the day

6:30 - 7:30 pm Welcome Cocktail with Exhibitors

7:00 am Continental Breakfast in Exhibit Hall

MAIN AUDITORIUM

8:00 - 9:00 am **Plenary Session 1** - ISPRES- Gluteal Fat Grafting Update
Panelists: J. Peter Rubin, MD, FACS; Amin Kalaaji, MD, PhD; Ricardo Rodriguez, MD
Discussion

9:00 - 10:00 am **Concurrent 7: Breast**
Moderators: Filip Stillaert, MD & Stig-Frederik Kølle, MD, PhD

9:00 am **THE CHALLENGES OF LIPOFILLING IN BREAST RECONSTRUCTION**
Presenter: Filip Stillaert, MD (Belgium)
Affiliation: University Hospital Ghent
Author: Stillaert F

9:12 am **37**
BREAST AUGMENTATION WITH AUTOLOGOUS FAT GRAFT
Presenter: Chao-Chuan Wu, MD (Taiwan)
Affiliation: Chai-Yen Plastic and Aesthetic Clinic
Authors: Wu CC, Wu W

9:20 am **38**
HOMEOTIC AND EMBRYONIC GENE EXPRESSION IN BREAST ADIPOSE TISSUE AND IN ADIPOSE TISSUES USED AS DONOR SITES IN PLASTIC SURGERY
Presenter: Foissac Rémi, MD (France)
Affiliation: Clinique Saint George
Authors: Rémi F, Camuzard O, Chignon B, Dani C

9:28 am **39**
BREAST RECONSTRUCTION BY TISSUE ADVANCEMENT, LIPOFILLING AND LOOPS
Presenter: Hiba El Hajj, MD (Belgium)
Affiliation: Chu Tivoli
Authors: Abboud MH, Abboud N

9:36 am **40**
MURINE BREAST CANCER GROWTH AND METASTASIS IS PROMOTED BY ADIPOSE-DERIVED STEM CELLS BUT NOT AUTOLOGOUS FAT GRAFT OR CELL-ASSISTED LIPOTRANSFER
Presenter: Michael Bezuhly, MD, MSc, SM, FRCSC (Canada)
Affiliation: Dalhousie University
Authors: Bezuhly M, Gebremeskel S, Gencarelli J, Gareau AJ, Levatte T, Dugandzic A, Johnston B

9:44 am **41**
A NOVEL APPROACH IN BREAST RECONSTRUCTION: THE EXTENDED LATERAL THORACIC FLIP OVER FLAP COMBINED WITH LOOPS AND LIPOFILLING (ELT. F.O.L.L.)
Presenter: Nicolas Abboud, MD (Belgium)
Affiliation: Chu Tivoli
Authors: Abboud MH, Abboud N

Discussion

ROOM 120

9:00 - 10:00 am **Concurrent 8: Extra Cellular Vesicles - Exosomes - Secretome**
Moderators: Martin Harmsen, PhD & Dmitry Traktuev, PhD

9:00 am **42**
NOT PRESENTED **POTENTIAL OF EXOSOMES FROM ADIPOSE-DERIVED MESENCHYMAL STEM CELLS IN REJUVENATION OF THE PHOTOAGED SKIN OF RATS**
Presenter: Jun-xian Liang, MD, PhD (China)
Affiliation: The First Affiliated Hospital of Jinan University
Authors: Liu HW, Liang JX

9:08 am **43**
ASC SECRETOME-LOADED DECELLULARIZED EXTRACELLULAR MATRIX (ECM) HYDROGELS AUGMENT DIABETIC WOUND HEALING
Presenter: Linda Vriend, MD (Netherlands)
Affiliation: University and Medical Center Groningen
Authors: Vriend L, Van Dongen JA, Camargo CP, Liguori GR, Tavares TA, Moreira LF, Harmsen MC

9:16 am **44**

~~**WITHDRAWN**~~ **FOUNDATION RESEARCHES AND CLINICAL APPLICATIONS OF EXOSOMES FROM ADIPOSE-DERIVED STEM CELLS IN IMPROVING THE SURVIVAL RATE OF TRANSPLANTED FAT**
Presenter: Jiawei He, MS (China)
Affiliation: Fujian Medical University Union Hospital
Authors: He J, Chen A, Zhang C, Wang T, Tang S, Gao H, Weng H, Chen P, Li X, Chen X

9:24 am **45**

DENO ADIPOGENESIS INDUCED BY SMALL EXTRACELLULAR VESICLES DERIVED FROM XENOGENIC ADIPOSE
Presenter: Mei Yu, PhD (China)
Affiliation: Sichuan University
Authors: Yu M, Tian TW

9:32 am **46**

THE STROMAL VASCULAR FRACTION CELL SECRETOME AND ITS POTENTIAL ROLE IN HAIR REGENERATION
Presenter: Katarina Andjelkov, MD, PhD (Serbia)
Affiliation: BelPrime Clinic Belgrade Serbia
Authors: Andjelkov K, Eremin I, Soldatovic I

9:40 am **47**

THE EFFECT OF HYPOXIA-INDUCED STEM CELLS-PRECONDITIONED SECRETOME MEDIUM ENHANCED DIABETIC WOUND HEALING IN A STZ-INDUCED DIABETIC RATS
Presenter: Yur-Ren Kuo, MD, PhD, FACS (Taiwan)
Affiliation: Kaohsiung Medical University Hospital
Authors: Kuo YR, Wang CT, Chen RF

Discussion

10:00 - 10:30 am Coffee Break (Exhibit Hall)

MAIN AUDITORIUM

10:30 am - 12:00 pm **Concurrent 9: Radiotherapy Lesions-Burns**
Moderators: Dmitry Traktuev, PhD & Julie Fradette, PhD

10:30 am **UNDERSTANDING THE NATURE OF RADIATION INJURY AND ITS REVERSAL BY ADIPOSE REGENERATIVE THERAPIES**
Presenter: Ricardo Rodriguez, MD (USA)
Affiliation: Cosmeticsurg
Author: Rodriguez R

10:42 am **48**

STEM CELL THERAPY FOR THE TREATMENT OF SEVERE TISSUE DAMAGE AFTER RADIATION EXPOSURE
Presenter: Alain Chapel, PhD (France)
Affiliation: IRSN
Authors: Chapel A, Semont A, Linard C, Nathieu N, Demarquay C, Squiban C, Voswinkel J, Rouard H, Simon JM, Lataillade JJ, Martinaud C, Benderitter M, Gorin JC, Mothy M

10:50 am **49**

STROMAL VASCULAR FRACTION FOR THE TREATMENT OF THE RADIATION-INDUCED GASTROINTESTINAL SYNDROME
Presenter: Christine Linard, PhD (France)
Affiliation: IRSN
Authors: Linard C, Squiban C, Demarquay C, L'Homme B, Benderitter M, Mathieu N, Milliat F

10:58 am **50**

STRATEGIES TO IMPROVE ADIPOSE MESENCHYMAL STROMAL CELL THERAPEUTIC EFFECT: APPLICATION TO PELVIC RADIOTHERAPY SIDE EFFECTS
Presenter: Noëlle Mathieu, PhD (France)
Affiliation: IRSN
Authors: Mathieu N, Moussa L, Demarquay C, Semont A, Linard C, Chapel A, Squiban C, Milliat F, Barritault D, Weiss P

11:06 am **51**

STROMAL VASCULAR FRACTION TREATMENT OF CHRONIC RADIATION CYSTITIS IN RATS
Presenter: Clement Brossard, PhD (France)
Affiliation: IRSN
Authors: Chapel A, Brossard CB

11:14 am **52**

AUTOLOGOUS FAT GRAFTING COMBINED WITH ADIPOSE-DERIVED STROMAL VASCULAR FRACTION INJECTION FOR COMPLETE SPONTANEOUS HEALING OF RADIATION-INDUCED RECTUM LESIONS
Presenter: Viacheslav Vasilyev, PhD (Russia)
Affiliation: South Ural State Medical University
Authors: Teriushkova ZI, Vasilyev VS, Vazhenin AV, Dimov GP, Lomakin EA, Eremin II, Vasilyev YS, Vasilyev IS

11:22 am **53**
BONE REGENERATION IN MEDICATION-RELATED OSTEONECROSIS OF THE JAW WITH UNCULTURED STROMAL VASCULAR FRACTION AND L-PRF
Presenter: Cyril Bouland, MD (Belgium)
Affiliation: CHU-ST-Pierre
Authors: Bouland C, Meuleman N, Javadian R, Philippart P, Dequanter D, Lagneaux L, Philippart P, Loeb I

11:30 am **54**
SKIN DAMAGE SECONDARY TO RADIOTHERAPY: A POTENTIAL THERAPY USING ASC-BASED BIOLOGICAL DRESSINGS IN A MURINE MODEL
Presenter: Candice Diaz, BS (Canada)
Affiliation: LOEX- Laval University
Authors: Diaz C, Hayward CJ, Paquette C, Langevin J, Galarneau J, Archambault L, Pollock NW, Fradette J

11:38 am **55**
COMPARATIVE ANALYSIS OF THERAPEUTIC EFFICACY OF MESENCHYMAL STROMAL CELLS ISOLATED FROM DIFFERENT SOURCES ON RAT MODEL OF THERMAL SKIN BURN
Presenter: Ilya Eremin, MD (Russia)
Affiliation: Central Clinical Hospital with Outpatient Health Center
Authors: Eremin I, Korsakov I, Petrikina A, Chauzova T, Grinakovskaya O, Paklina O, Setdikova G, Pulin A

11:42 am **56**
PROVIDING FUNCTIONAL AND AESTHETIC HEALING WITH MATRIDERM® AND LATE FAT INJECTION IN FRONTAL ARM FLEXOR FACE BURN CONTRACTS
Presenter: Perçin Karakol, MD (Turkey)
Affiliation: Bagcilar Educaton and Research Hospital
Authors: Balikç T, Bozkurt M, Karakol P, Sezgiç M, Metin A

Discussion

ROOM 120

10:30 am - 12:00 pm **Concurrent 10: Neurology**
Moderators: Bruce Bunnell, PhD & Keith March, MD, PhD

10:30 am **57**
NOT PRESENTED **THERAPEUTIC EFFECTS OF ADIPOSE MESENCHYMAL STEM CELLS SECRETOME ON A MOUSE SPINAL CORD INJURY MODEL**
Presenter: Jorge C. Ribeiro, MS (Portugal)
Affiliation: Cibraozinho
Authors: Ribeiro JC, Monteiro S, Lima R, Serra SC, Teixeira FG, Graça JL, Silva NA, Salgado AJ

10:38 am **58**
NEUROPROTECTIVE EFFECTS OF ADIPOSE-DERIVED STROMAL VASCULAR FRACTION STEM CELLS ON ACUTE TRAUMATIC SPINE CORD INJURIES IN RATS
Presenter: Nicolas Serratrice, MS (France)
Affiliation: Hôpital de La Conception
Authors: Serratrice N, Brezun JM, Marqueste T, Vogtensperger M, Magalon J, Giraudo L, Belluco S, Magalon G, Marchal T, Fuentes S, Sabatier F, Decherchi P

10:46 am **59**
RE-NEUROLYSIS AND INFILTRATION OF AUTOLOGOUS LIPOASPIRATE AROUND THE MEDIAN NERVE IN SECONDARY RECURRENT CARPAL TUNNEL SYNDROME, A PROSPECTIVE COHORT STUDY
Presenter: Olivier Gostelie, MS (Netherlands)
Affiliation: Maasstad Hospital
Authors: Gostelie O, Jaquet J, Tellier M, Nanninga G, Paulusma P, Coert H

10:54 am **60**
AUTOLOGOUS FAT GRAFTING AS TREATMENT FOR POST-HERPETIC NEURALGIA - RESULTS FROM A PILOT TRIAL INVESTIGATING FEASIBILITY, EFFICACY AND SAFETY
Presenter: Martin Sollie, MD, PhD (Denmark)
Affiliation: Odense University Hospital
Authors: Sollie M, Sorensen JA, Thomsen JB

11:02 am **61**
TREATMENT OF PARKINSON'S DISEASE WITH TRANSPLANTATION OF ADIPOSE-DERIVED SVF CELLS TO THE FACE: A FIRST-IN-MAN CASE REPORT WITH 4 YEARS FOLLOW-UP
Presenter: Michael Carstens, MD (USA)
Affiliation: Wake Forest University
Authors: Carstens M, Martinez Cerrato J, Dos Anjos Vilaboa S, Correa D

11:10 am **62**

NOT PRESENTED **ADIPOSE TISSUE STROMAL VASCULAR FRACTION CELLS PROTECT AGAINST SKELETAL MUSCLE APOPTOSIS**
Presenter: Paul Kingham, PhD (Sweden)
Affiliation: Umea University
Authors: Kingham P, El-Habta R, Backman LJ

~~11:18 am~~ **63**

WITHDRAWN **~~THE POSITIVE EFFECT OF MECHANICAL STRAIN ON ASCS: IMPLICATIONS FOR MUSCULOSKELETAL REPAIR~~**
Presenter: Johnny Huard (USA)
Affiliation: Steadman Philippon Research Institute
Authors: Ravuri S, Mu XM, Mullen MM, Huard JH

11:26 am **64**

FAT-DERIVED STEM CELL DEPLOY,EMT IN AUTISM SPECTRUM DISORDER- ARE THE EFFECTS LONG-LASTING?
Presenter: Hazem Barmada, MD, FRCSEd, FRCS (CTh) (USA)
Affiliation: Gulf Coast Stem Cell- Regenerative Surgery
Author: Barmada H

Discussion

12:00 - 2:00 pm Lunch & Learn

MAIN AUDITORIUM

2:00 - 3:00 pm **Concurrent 11: Extra Cellular Matrix**
Moderators: Lauren Kokai, PhD & Bryan Choi, MS

2:00 pm **IMPACT OF EX VIVO CULTURING ON MATRICELLULAR PROTEIN EXPRESSION BY ADIPOSE STEM CELLS**
Presenter: Lauren Kokai, PhD (USA)
Affiliation: University of Pittsburgh
Authors: Kokai L, Sun H, Gusenoff J, Rubin JP

2:12 pm **67**

THE USE OF KIDNEY EXTRACELLULAR MATRIX HYDROGEL FOR ENHANCING THE THERAPEUTIC EFFECTS OF ADIPOSE-DERIVED MESENCHYMAL STEM CELLS FOR ACUTE KIDNEY INJURY INDUCED BY ISCHEMIA-REPERFUSION
Presenter: Changcheng Zhou, PhD (China)
Affiliation: Nanjing First Hospital
Authors: Zhou C, Zhou L, Ge Y, Liu J, Xu L, Xu Z, Zhao F, Wu R, Jiang N, Jia R

2:20 pm **68**

ADIPOSE TISSUE–DERIVED EXTRACELLULAR MATRIX HYDROGELS AS A RELEASE PLATFORM FOR SECRETED PARACRINE FACTORS
Presenter: Joris A. van Dongen, MD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: van Dongen JA, Getova V, Brouwer LA, Liguori GR, Sharma PK, Stevens HP, van Der Lei B, Harmsen MC

2:28 pm **69**

CLINICAL EXPERIENCE IN 107 PROCEDURES WITH ALLOGRAFT ADIPOSE MATRIX (AAM) GRAFTING IN THE PEDIATRIC PATIENT
Presenter: Kevin Hopkins, MD, FACS (USA)
Affiliation: Driscoll Childrens Hospital
Authors: Hopkins K, Dimas V, Pinto J, Ayezel A

2:36 pm **70**

LYMPHATIC VESSELS ENGINEERING FOR SECONDARY LYMPHEDEMA TREATMENT
Presenter: Qixu Zhang, MD, PhD (USA)
Affiliation: The University of Texas MD Anderson Cancer Center
Authors: Zhang Q, Wu Y, Schaverien M, Butler CE

2:44 pm **71**

3D BROWN-LIKE ADIPOCYTES DERIVED FROM HUMAN IPSCS FOR IN VITRO PRECLINICAL DRUG DISCOVERY AND FOR CELL-BASED THERAPY TO TREAT OBESITY
Presenter: Xi Yao, PhD (France)
Affiliation: Université de Nice Sophia-Antipolis
Authors: Yao X, Dani V, Gnad T, Carriere-Pazat A, Deschaseaux F, Pfeifer A, Dani C

Discussion

ROOM 120

2:00 - 3:00 pm	**Concurrent 12: Wounds – Scars** Moderators: Martin Harmsen, PhD & Ali Modarressi, MD
2:00 pm	**72** **INTRADERMAL INJECTION OF SVF IMPROVES THE RESULTS OF LACERATION WOUND AND SCAR REVISION AFTER PRIMARY CLOSURE** Presenter: Kwang Sik Kook, MD (South Korea) Affiation: IDEA Plastic Surgery Author: Kook KS
2:08 pm	**73** **THERAPEUTIC POTENTIAL OF HUMAN ADIPOSE-DERIVED ENDOTHELIAL PROGENITOR CELLS (AEPCS) FOR DIABETIC SKIN ULCER** Presenter: Natsumi Saito, PhD (Japan) Affiliation: Jichi Medical University Authors: Saito N, Asahi R, Mori M, Shirado T, Yoshimura K
2:16 pm	**74** **ADIPOSE-DERIVED STROMAL VASCULAR FRACTION ENHANCES CUTANEOUS WOUND HEALING IN AN ANIMAL MODEL** Presenter: Eleni Karagergou, MD, PhD, MRCS, FEBOPRAS (Greece) Affiliation: Aristotle University of Thessaloniki Authors: Karagergou E, Koliakos G, Karagiannopoulou M, Psalla D, Gounari E, Malamidou A, Dionyssopoulos A
2:24 pm	**75** **ADIPOSE-DERIVED STROMAL CELLS ENHANCE WOUND REPAIR UNDER PATHOLOGICAL CONDITIONS OF HYPERGLYCAEMIA AND ISCHEMIA** Presenter: Ali Modarressi, MD (Switzerland) Affiliation: University of Geneva Authors: Kallmeyer K, André-Lévigne D, Pittet-Cuénod B, Modarressi A, Pepper MS
2:32 pm	**76** **VALIDATION OF A GOOD MANUFACTURING PRATICES-COMPLIANT PROCESS TO PRODUCE ADIPOSE DERIVED STROMAL VASCULAR FRACTION FOR CELL-BASED THERAPY OF DIABETIC FOOT ULCERS** Presenter: Pauline Francois, PhD (France) Affiliation: C2VN Aix Marseille Univ INSERM 1263 INRA 1260 Authors: Francois P, Veran J, Giraudo L, Aboudou H, Dumoulin C, Simoncini S, Bertrand B, Casanova D, Grimaud F, Guillet B, Paul P, Dignat-George F, Magalon J, Sabatier F
Discussion	

MAIN AUDITORIUM

3:00 - 3:30 pm	**Guest Speakers** Moderator: Ricardo Rodriguez, MD
	PIONEERING EXPLORATION OF THE ECM OF LIVING HUMAN FATTY TISSUE BY INTRATISSULAR ENDOSCOPY Speaker: Jean-Claude Guimberteau, MD
3:30 - 4:00 pm	**BIOENGINEERING HUMAN HAND AND FACE GRAFTS: THE NEW FRONTIER OF ECM-BASED VASCULARIZED COMPOSITE ENGINEERING (VCE)** Speaker: Benoit Lengelé
4:00 - 4:30 pm	Coffee Break (Exhibit Hall)
4:30 - 5:30 pm	**Concurrent 13: Orthopedics** Moderators: Christian Jorgensen, MD & Torsten Blunk, PhD
4:30 pm	**UPDATE OF ADIPOSE DERIVED STROMAL CELLS APPLICATIONS IN RHEUMATIC DISEASES** Presenter: Christian Jorgensen, MD (France) Affiliation: Inserm Author: Jorgensen C
4:42 pm	**78** **PLATELET RICH PLASMA COMBINED WITH TISSUE-STROMAL VASCULAR FRACTION FROM LIPOASPIRATE AND ITS POTENTIAL EFFECT ON OSTEOARTHRITIS OF THE KNEE** Presenter: Joeri van Boxtel, MSc (Netherlands) Affiliation: University Medical Center Groningen UMCG Authors: van Boxtel J, Stevens HP, van Dijck R, van Dongen JA

4:50 pm **79**

PRELIMINARY RESULTS FROM MICROPREP STUDY: INTRA ARTICULAR INJECTION OF AUTOLOGOUS MICROFAT AND PLATELET-RICH PLASMA IN THE TREATMENT OF KNEE OSTEOARTHRITIS

Presenter: Jeremy Magalon, PharmD (France)
Affiliation: APHM
Authors: Louis M, Magalon J, Grimaud F, Jouve E, Mattei J, Rochwerger A, Dumoulin C, Aboudou H, Giraudo L, Richardet N, Jourdan E, Veran J, Sabatier F

4:58 pm **80**

REGENERATIVE MEDICINE AND WRIST OSTEOARTHRITIS: RESULTS FROM PHASE I CLINICAL TRIAL USING INTRA-ARTICULAR INJECTION OF AUTOLOGOUS MICROFAT ASSOCIATED WITH AUTOLOGOUS PLATELET-RICH PLASMA

Presenter: Alice Mayoli (France)
Affiliation: Culture and Cell Therapy Unit INSERM CBT1409
Authors: Magalon J, Mayoli A, Iniesta A, Curvale C, Kachouh N, Jaloux C, Eraud J, Grimaud F, Sabatier F, Veran J, Jouve E, Casanova D, Legre R

5:06 pm **81**

WITHDRAWN

~~**USE OF INTRA-OSSEOUS PLATELET RICH PLASMA FOR TREATING SEVERE KNEE OSTEOARTHRITIS: RETROSPECTIVE CLINICAL STUDY AFTER 1 YEAR**~~

Presenter: Jose Miguel Catalan, MD (Spain)
Affiliation: Catalan Trauma
Author: Catalan JM

5:14 pm **82**

MESENCHYMAL STEM CELL INJECTION IS AN EFFECTIVE ALTERNATIVE TO TOTAL KNEE ARTHROPLASTY FOR PATIENTS WITH MODERATE KNEE ARTHROSIS

Presenter: Chadwick C. Prodromos, MD (USA)
Affiliation: Illinois Sports Medicine and Orthopaedic Centers
Authors: Prodromos CC, Finkle SF

Discussion

ROOM 120

4:30 - 5:30 pm **Concurrent 14: Other Specialties**

Moderators: Katarina Andjelkov, MD, PhD & Ricardo Rodriguez, MD

4:30 pm **THERAPEUTIC POTENTIAL OF CELL AND CELL-FREE-CELL THERAPIES IN MEDICINE**

Presenter: Katarina Andjelkov, MD (Serbia)
Affiliation: BelPrime Clinic
Author: Andjelkov K

4:42 pm **83**

LONG-TERM SAFETY AND EFFICACY OF LOCAL MICROINJECTION COMBINING AUTOLOGOUS MICROFAT AND ADIPOSE-DERIVED STROMAL VASCULAR FRACTION FOR TREATMENT OF REFRACTORY PERIANAL FISTULA IN CROHN'S DISEASE

Presenter: Florence Sabatier, PharmD, PhD (France)
Affiliation: Hopital Nord
Authors: Serrero M, Grimaud F, Philandrianos C, Visee C, Magalon J, Veran J, Jouve E, Sabatier F, Grimaud JC

4:50 pm **84**

FIRST-IN-MAN INJECTION OF AUTOLOGOUS ADIPOSE-DERIVED STROMAL VASCULAR FRACTION IN SCARRED VOCAL FOLDS: A PROSPECTIVE, OPEN-LABEL, SINGLE ARM CLINICAL TRIAL

Presenter: Alexia Mattei, MD (France)
Affiliation: AIx Marseille University
Authors: Mattei A, Bertrand B, Jouve E, Blaise T, Philandrianos C, Grimaud F, Giraudo L, Arnaud L, Giuliani A, Revis J, Galant C, Velier M, Veran J, Dignat-George F, Dessi P, Sabatier F, Magalon J, Giovanni A

4:58 pm **85**

FLUID CARTILAGE

Presenter: Angelo Trivisonno, MD (Italy)
Affiliation: Sapienza University
Author: Trivisonno A

5:06 pm **86**

MOLECULAR AND CELLULAR SIGNATURE OF PERIRENAL ADIPOSE TISSUE REFLECTS THE VASCULAR AND INFLAMMATORY STATUS OF MARGINAL KIDNEY TRANSPLANTS

Presenter: Romain Boissier, MD (France)
Affiliation: Aix-Marseille University
Authors: Boissier R, Francois P, Gondran-Tellier B, Lyonnet L, Meunier M, Simoncini S, Magalon J, Arnaud L, Giraudo L, Dignat-George F, Burtey S, Karsenty G, Lechevalier E, Sabatier F, Paul P

Discussion

MAIN AUDITORIUM

5:30 - 6:30 pm **Concurrent 15: 3D Printing**
Moderators: Luciano Vidal, MD & Marco Helder, PhD

5:30 pm **3D BIOPRINTING IN TISSUE ENGINEERING**
Presenters: Christophe Marquette & Luciano Vidal, MD (France)

5:42 pm **3D BIOPRINTING OF SKIN AND ADIPOSE TISSUE FOR BREAST RECONSTRUCTION**
Presenters: Christophe Marquette & Luciano Vidal, MD (France)

5:50 pm **88**
AN ALLOGENIC 3D SCAFFOLD-FREE TISSUE ENGINEERED PRODUCT FOR DEEP THICKNESS SKIN REGENERATION: IN VITRO DEVELOPMENT TO IN VIVO PROOF OF CONCEPT
Presenter: Sophie Veriter, PhD (Belgium)
Affiliation: Novadip Biosciences
Authors: Veriter S, Thirion GF, Modarressi A, Lebrun V, Adnet PY, Caty C, Dufrane D

5:58 pm **89**
3D PRINTABLE BIORESORBABLE TISSUE ENGINEERING CHAMBER TO PROMOTE ADIPOSE TISSUE GROWTH IN VIVO
Presenter: Pierre Guerreschi, MD, PhD (France)
Affiliation: CHRU Lille
Authors: Guerreschi P, Faglin P, Depoortere C, Gradwohl M, Nahon C, Payen J, Danze P, Martinot V, Marchetti P

6:06 pm **90**
ALLOGENIC 3D SCAFFOLD-FREE TISSUE ENGINEERED PRODUCT FOR DEEP THICKNESS SKIN REGENERATION: IN VITRO CHARACTERIZATION AND IN VIVO BIOCOMPATIBILITY
Presenter: Valérie Lebrun, MS (Belgium)
Affiliation: Novadip
Authors: Lebrun V, Veriter S, Thirion G, Adnet PY, Caty C, Dufrane D

6:14 pm **91**
ADIPOSE TISSUE-DERIVED STROMAL CELLS MODIFY THE VISCOELASTIC PROPERTIES OF HYDROGELS: OPPORTUNITIES FOR 3D BIOPRINTING
Presenter: Francisco D. Martinez Garcia, DVM, MRes (Netherlands)
Affiliation: University Medical Center Groningen
Authors: Martinez Garcia FD, Valk MM, Van Akker BJ, Sharma PK, Burgess JK, Harmsen MC

Discussion

ROOM 120

5:30 - 6:30 pm **Concurrent 16: Cardiology**
Moderators: Jens Kastrup, MD, DMSc & Louis Casteilla, PhD

5:30 pm **ALLOGENEIC ADIPOSE-DERIVED STROMAL MESENCHYMAL CELL IN TREATMENT OF ISCHEMIC HEART FAILURE**
NOT PRESENTED
Presenter: Jens Kastrup, MD, DMSc (Denmark)
Affiliation: Rigshospitalet
Author: Kastrup J

5:42 pm **92**
CRITICAL LIMB ISCHEMIA TREATED WITH SVF CELLS: 4-YEAR FOLLOW-UP STUDY
Presenter: Michael Carstens, MD (USA)
Affiliation: Wake Forest University
Authors: Carstens M, Gomez A, Pastora I, Dos Anjos Vilaboa S, Correa D

5:50 pm **93**
INTERIM ANALYSIS OF A PILOT STUDY ADMINISTRATING LOCAL INTRAMUSCULAR INJECTIONS OF STROMAL VASCULAR FRACTION PROCESSED AT POINT OF CARE IN NONREVASCULARIZABLE SUBJECTS WITH CRITICAL LIMB ISCHEMIA
Presenter: Ruxandra Sava, MD (Ukraine)
Affiliation: The Institute of Endocrinology and Metabolism Kyiv
Authors: Bolgarska SV, Sava RI, Jaradat ZA, Williams SK, Penn MS, Rademaker B, Hadad IP, Orlenko VL, Pasteur IP, Kovzun LI, Sokolova LK, Tsimdalyuk VI, Tronko MD, Kosnik PK, March KL

5:58 pm **94**
INTRAPERICARDIAL INJECTION OF HYDROGELS DERIVED FROM DECELLULARIZED CARDIAC EXTRACELLULAR MATRIX LOADED WITH MESENCHYMAL STROMAL CELLS AND THEIR SECRETOME: A NOVEL PROPOSAL OF THERAPEUTIC APPROACH TO CYTOSTATICS-INDUCED DILATED CARDIOMYOPATHY
Presenter: Martin Harmsen, PhD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: Harmsen M, Tavares Aquina Liguori T, Liguori GR, Sinkunas V, de Jesus Correia C, Dos Santos Coutinho E Silva R, Pires Camargo C, Zanoni FL, Demarchi Aiello V, Pinho Morreira LF

6:06 pm	**95** **INVESTIGATION OF THE PERIPHERAL EFFECTS OF SVF TREATMENT IN PATIENTS WITH ISCHEMIC LIMB** Presenter: Tevfik Balikç, MD (Turkey) Affiliation: Bagcilar Educaton and Research Hospital Authors: Balikç T, Bozkurt M, Karakol P, Sezgiç M, Metin A
6:14 pm **NOT PRESENTED**	**A PHASE I CLINICAL TRIAL JOURNEY: FROM THE PROOF OF CONCEPT TO THE CLINICAL TRIAL EXECUTION (MANUFACTURING, REGULATORY AND CLINICAL ASPECT)** Presenter: Michel Manach Affiliation: Cell-Easy
Discussion	
8:30 pm	Casa Delauze Gala Dinner (tickets required)

7:00 am	Continental Breakfast in Exhibit Hall
8:00 am	IFATS Members Meeting – Main Auditorium

MAIN AUDITORIUM

9:00 - 10:00 am	**Concurrent 17: Best Papers** Moderator: Ricardo Rodriguez, MD
9:00 am	**97** **ADIPOSE STEM CELL CONDITIONED MEDIUM IMPROVES MOUSE HEART AND HUMAN IPSC-DERIVED CARDIOMYOCYTE PRESERVATION IN HEART TRANSPLANTATION CARDIOPLEGIC CONDITIONS** Presenter: Dmitry Traktuev, PhD (USA) Affiliation: University of Florida Authors: Traktuev D, Ellis B, Wang M, Merfeld-Clauss S, Can I, Zorlutuna P, March K
9:08 am	**98** **TREATMENT OF BREAST CANCER–RELATED LYMPHEDEMA WITH ADIPOSE–DERIVED REGENERATIVE CELLS AND FAT GRAFTING: AN ONGOING RANDOMIZED, PLACEBO-CONTROLLED AND DOUBLE-BLINDED CLINICAL TRIAL** Presenter: Mads G. Jørgensen, MD (Denmark) Affiliation: Odense University Hospital Authors: Jørgensen MG, Jensen CH, Sheikh SP, Sørensen JA
9:16 am	**99** **LIPOTRANSFER IMPROVES FACIAL FIBROSIS AND VOLUME LOSS IN SCLERODERMA** Presenter: Aurora Almadori, MD (Italy) Affiliation: UCL - Royal Free Hospital Authors: Almadori A, Griffin M, Ryan C, Hunt D, Hansen E, Kumar R, Abraham D, Denton C, Butler P
9:24 am	**100** **CHARACTERIZING THE CAPACITY OF ALLOGRAFT ADIPOSE MATRIX AND ADIPOSE-DERIVED FASCIA MATRIX TO SUPPORT ADIPOGENESIS FOR SOFT TISSUE RECONSTRUCTION** Presenter: Mary Ziegler, PhD (USA) Affiliation: UCI Authors: Ziegler M, Sorensen AM, Sayadi LR, Evans GR, Widgerow AD
9:32 am	**101** **NPM3 ACTIVATES THERMOGENESIS IN WHITE ADIPOSE TISSUE** Presenter: Yan Zhang, MD (China) Affiliation: Sichuan University Authors: Dong J, Yu MY, Tian TW
9:40 am	**102** **ALLOGRAFT ADIPOSE MATRIX: EXPLORING THE MECHANISM OF ACTION IN DIABETIC MOUSE WOUNDS** Presenter: Evangelia Chnari, PhD (USA) Affiliation: Musculoskeletal Transplant Foundation Authors: Chnari E, Xie P, Friedrich EE, Phipps A, Hong SJ, Galiano RD
Discussion	

ROOM 120

9:00 - 10:00 am	**Concurrent 18: Mechanical Preparation of Fat** Moderators: Nir Shani, PhD & Marco Helder, PhD
9:00 am	**103** **A NON-ENZYMATIC PROTOCOL FOR ISOLATION OF SVF. CONTROL & COMPARISON TO ENZYMATIC OUTCOMES** Presenter: Timur Veysel Dogruok, BS (Turkey) Affiliation: T-LAB Author: Dogruok TV
9:08 am	**104** **STROMAL VASCULAR MATRIX (SVM) GRAFTING: BASIC RESEARCH AND CLINICAL APPLICATIONS** Presenter: Tunc Tiryaki, MD (Turkey) Affiliation: Cellest Plastic Surgery Clinic Author: Tiryaki T
9:16 am	**105** **SVF, ECM AGGREGATES, AND YELLOW WASTE FROM WHOLE, MECHANICALLY PROCESSED, AND ENZYMATICALLY PROCESSED ADIPOSE TISSUE: ABILITY OF STROMAL CELLS TO PROLIFERATE** Presenter: William Cimino, PhD (USA) Affiliation: The GID Group Author: Cimino W

9:24 am **106**

NOT PRESENTED **PREPARATION OF NANOFAT CONCENTRATE AND ITS USE FOR TREATMENT OF HYPERTROPHIC SCAR**
Presenter: Yin-Di Wu, MD (China)
Affiliation: The First Affiliated Hospital of Jinan University
Authors: Liu HW, Wu YD

9:32 am **107**

MSC MECHANICAL DISSOCIATION SINCE 2006: THE SHIFT PARADIGMA AND THE NEW CLINICAL APPLICATIONS
Presenter: Hebert T. Lamblet, MD (Brazil)
Affiliation: UNIFESP
Author: Lamblet HT

9:40 am **108**

CREATING NEW PARADIGM IN FAT PROCESSING: ADJUSTABLE REGENERATIVE ADIPOSE TISSUE TRANSFER (ARAT)
Presenter: Eray H. Copcu, MD (Turkey)
Affiliation: MEST
Authors: Copcu EH, Oztan S

Discussion

MAIN AUDITORIUM

10:30 - 11:30 am **Concurrent 19: EURAPS – Extended Indication in Autologous Fat Transfer**
Moderators: Norbert Pallua, MD & Guy Magalon, MD

10:30 am **RECENT DEVELOPMENTS IN REGENERATIVE PLASTIC SURGERY: FROM LIPOGRAFTING TO LIPOCONCENTRATE**
Presenter: Norbert Pallua, MD (Germany)

10:42 am **CELL ENRICHED LIPOTRANSFER IN RECONSTRUCTIVE AND AESTHETIC SURGERY**
Presenter: Stig-Frederik Kølle, MD, PhD (Denmark)

10:50 am **IS AUTOLOGOUS FAT TRANSFER AN ALTERNATIVE TO FLAP SURGERY IN THE TREATMENT OF PROBLEMATIC WOUNDS**
Presenter: Bong-Sung Kim (Switzerland)

10:58 am **AUTOLOGOUS FAT GRAFTING TO THE JOINTS: IS REGENERATIVE PLASTIC SURGERY THE HOPE OF PATIENTS SUFFERING FROM ARTHROSIS?**
Presenter: Mohammad Al Jawad, MBBS, FRCS (United Kingdom)

11:06 am **MECHANICAL DISAGGREGATION OF STROMAL CELL AGGREGATES**
Presenter: Ramon Llull, MD, PhD (Spain)

11:14 am **REGENERATIVE TREATMENT OF SCLERODERMA: THE FUTURE**
Presenter: Guy Magalon, MD (France)

Discussion

ROOM 120

10:30 - 11:30 am **Concurrent 20: PRP**
Moderators: Dmitry Traktuev, PhD & Lauren Kokai, PhD

10:30 am **113**

THE ADDITION OF PLATELET-RICH PLASMA TO FACIAL LIPOFILLING: A DOUBLE-BLIND, PLACEBO-CONTROLLED, RANDOMIZED TRIAL
Presenter: Berend van der Lei, MD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: van Dongen JA, Willemsen JC, Spiekman M, Vermeulen KM, Harmsen MC, van der Lei B, Stevens HP

10:38 am **114**

NOT PRESENTED **EFFECT OF PLATELET-RICH PLASMA ON THE MIGRATION OF HUMAN ADIPOSE-DERIVED STEM CELLS**
Presenter: Fangyuan Lai, MD (Japan)
Affiliation: Kansai Medical University
Authors: Lai F, Kakudo NA, Ma YU, Kusumoto KE

10:46 am **115**

ADDITION OF TISSUE STROMAL VASCULAR FRACTION TO LIPOFILLING AND PLATELET RICH PLASMA DOES NOT IMPROVE THE FACIAL SKIN QUALITY AND PATIENT SATISFACTION
Presenter: H. P. Jeroen Stevens, MD, PhD (Netherlands) - **Presented by Joris van Dongen**
Affiliation: University Medical Center Groningen
Authors: van Dongen JA, van Boxtel J, Vermeulen KM, Willemsen JC, Harmsen MC, van der Lei B, Stevens HP

10:54 am **116**

BIOLOGICAL TREATMENT OF PLATELET-RICH AUTOLOGOUS PLASMA HEALING DISORDERS (PRP)
Presenter: Nina Hassani, MD (Switzerland)
Affiliation: CIMMRA
Author: Hassani N

11:02 am **117**
EFFICIENCY OF NANOFAT AND PRP THERAPY ON THE FACIAL SCLERODERMA
Presenter: Flore Delaunay, MD (France)
Affiliation: Centre Hospitalier du Belvedere
Authors: Delaunay F, Magalon G, Delpierre V, Menkes S, Cohen S, Mulot V, Marie I

11:10 am **118**
FAT GRAFTING TO THE FACE AND HANDS FOR THE TREATMENT OF SCLERODERMA
Presenter: Amy L. Strong, MD, PhD (USA)
Affiliation: University of Michigan
Authors: Strong AL, Cederna PS

Discussion

MAIN AUDITORIUM

11:30 am - 12:30 pm **Concurrent 21: Regenerative Surgery**
Moderators: Pietro Gentile, MD & Michele Zocchi, MD, PhD

11:30 am **REGENERATIVE SURGERY: PAST, PRESENT AND FUTURE**
Presenter: Michele Zocchi, MD, PhD (Italy)

11:42 am **REGENERATIVE SURGERY: THE BIO-ACTIVE COMPOSITE GRAFTS**
Presenter: Michele Zocchi, MD, PhD (Italy)

11:54 am **121**
THE COMBINED USE OF FAT GRAFT ENRICHED WITH STROMAL VASCULAR FRACTION CELLS, NANOFAT AND PRP IN THE TREATMENT OF FACE SOFT TISSUE DEFECTS
Presenter: Pietro Gentile, MD, PhD (Italy)
Affiliation: University of Rome Tor Vergata
Author: Gentile P

12:02 pm **122**
MICROGRAFTS DERIVED BY ADIPOSE TISSUE: INDICATIONS AND PERSPECTIVES
Presenter: Antonio Graziano, PhD (Italy) - **Presented by Giulia Silvani**
Affiliation: Human Brain Wave srl
Author: Graziano A

12:10 pm **DIODE LASER ASSISTED FAT GRAFT OF THE BREAST**
Presenter: Massimiliano Brambilla, MD (Italy)

Discussion

ROOM 120

11:30 am - 12:30 pm **Concurrent 22: SVF - Basic Research**
Moderators: Martin Harmsen, PhD & Petra Bauer-Kreisel, PhD

11:30 am **125**
NOT PRESENTED **LESW PRECONDITIONING PROMOTES HOMING OF ADIPOSE-DERIVED ENDOTHELIAL PROGENITOR CELLS TO ATTENUATE RENAL ISCHEMIA REPERFUSION INJURY VIA COX-2/PGE2 PATHWAY**
Presenter: Jingyu Liu, MS (China)
Affiliation: Nanjing First Hospital
Authors: Liu J, Zhou C, Zhou L, Ge Y, Dou Q, Xu L, Xu Z, Jia R

11:38 am **126**
ISOLATION OF HUMAN ADIPOSE-DERIVED STROMAL CELLS USING SUCTION-ASSISTED OR THIRD-GENERATION ULTRASOUND-ASSISTED LIPOASPIRATION AND THEIR THERAPEUTIC POTENTIAL IN CARTILAGE TISSUE ENGINEERING
Presenter: Jian Wang, MD (China)
Affiliation: Plastic Surgery Hospital, Chinese Academy of Medical Science
Author: Wang J

11:46 am **127**
NOT PRESENTED **INFLAMMATORY STATES OF HUMAN ADIPOSE-DERIVED STEM CELLS AND ADIPOSE TISSUE DURING CHRONOLOGICAL AGING**
Presenter: Ivona Percec, MD, PhD (USA)
Affiliation: University of Pennsylvania
Authors: Percec I, Shan X

11:54 am **128**
NOT PRESENTED **HUMAN ADIPOSE DERIVED STEM CELLS LOADED WITH MAGNETIC NANOPARTICLE AS REGENERATIVE TOOLS**
Presenter: Luminita Labusca, MD, PhD (Romania)
Affiliation: National Institite of Research and Development in Technical Phys
Authors: Labusca L, Herea DD, Danceanu C, Minuti A, Stavila C, Chiriac H, Lupu N

12:02 pm **129**
VITAMIN D3 (CALCITRIOL) IMPROVES AUTOLOGOUS FAT GRAFT RETENTION IN MURINE MODEL
Presenter: Lauren Kokai, PhD (USA)
Affiliation: University of Pittsburgh
Authors: Wang S, Desanto M, Stavros A, Patadji S, Olevian D, Gusenoff JA, Rubin JP, Kokai LE

Discussion

12:30 - 2:00 pm Lunch in the Exhibit Hall

MAIN AUDITORIUM

2:00 - 3:00 pm **Plenary Session 2: ICAST**
Moderators: Gianni Soldati, PhD & Florence Sabatier, PhD

2:00 pm **PREPARATION OF ADIPOSE-DERIVED STROMAL VASCULAR FRACTION: NEED FOR STANDARDIZATION**
Presenter: Gianni Soldati, PhD (Switzerland)

2:12 pm **132**
NOT PRESENTED **TENOGENIC DIFFERENTIATION PROTOCOL IN XENOGENIC-FREE MEDIA ENHANCES TENDON-RELATED MARKER EXPRESSION IN ASCS**
Presenter: Gianni Soldati, PhD (Switzerland)
Affiliation: Swiss Stem Cell Foundation
Authors: Mariotta L, Soldati G, Gola M, Stanco D, Caprara C, Ciardelli G, Minonzio G

2:20 pm **133**
THE PARACRINE ACTION OF AUTOLOGOUS MICROFRAGMENTED ADIPOSE TISSUE COUNTERACTS INFLAMMATION IN AN IN VITRO MODEL OF TENDON PATHOLOGY
Presenter: Marco Viganò, PhD (Italy)
Affiliation: IRCCS Istituto Ortopedico Galeazzi
Authors: Viganò M, De Girolamo L, Randelli P, Ragni E, De Luca P, Menon A, Colombini A, Perucca Orfei C, Lugano G

2:28 pm **134**
STEM CELL THERAPY FOR OSTEOARTHRITIS: A SURVEY OF FLORIDA'S UNREGULATED DIRECT-TO-CONSUMER MARKET
Presenter: Amanda A. Lindeman, BS (USA)
Affiliation: University of Florida
Authors: Lindeman AA, March K

2:36 pm **135**
STEM CELLS & CARRIER MATERIALS ON BURNS RECONSTRUCTIVE SURGERY – PROGRESS AND OPPORTUNITIES
Presenter: N. W. Zhu, MD, MSurg, PhD, FBAPS (China)
Affiliation: Fudan University Huashan Hospital
Authors: Zhu NW

2:44 pm **136**
MONITORING OF CELL CULTURE CONDITIONS AND EARLY PREDICTION OF THE QUALITY OF AN OSTEOGENIC CELL-BASED MEDICINAL PRODUCT
Presenter: Anais Namur, PhD (Belgium)
Affiliation: Novadip Biosciences SA
Authors: Theys N, Namur A

Discussion

3:00 - 4:00 pm **Plenary Session 3: SOFCEP - Use of Fat Grafting in Facial Rejuvenation**
Moderators: Michel Rouif, MD & Thierry Van Hemelryck, MD

3:00 pm **BALANCE BETWEEN FACELIFT AND AUTOLOGOUS FAT GRAFTING FOR A NATURAL RESULT**
Presenter: Michel Rouif, MD (France)

3:12 pm **137**
HIGHTLIGHTS ON FACELIFTS ANS NANOFAT TRANSFERS OUTCOMES
Presenter: Thierry van Hemelryck, MD (France)
Affiliation: La Clinique Esthetique
Author: van Hemelryck T

3:20 pm **138**
SAFETY AND LONG-TERM FOLLOW-UP OF THE USE OF PLATELET RICH PLASMA IN COMBINATION WITH LIPOFILLING ON FACELIFT
Presenter: Jean-Paul Meningaud, MD, PhD (France)
Affiliation: APHP
Author: Meningaud JP

3:28 pm **CLINICAL APPLICATION AND PERSPECTIVES OF NANOFAT**
Presenter: Alexis Verpaele, MD (Belgium)

3:36 pm **MACROFAT, MICROFAT, NANOFAT: HOW, WHERE, WHEN,WHY**
Presenter: Richard Abs, MD (France)

3:48 pm	**139** **THREE SIMPLE STEPS FOR REFINING TRANSCUTANEOUS LOWER BLEPHAROPLASTY FOR AGING EYELIDS: THE INDISPENSABILITY OF MICRO-AUTOLOGOUS FAT TRANSPLANTATION** Presenter: Tsai-Ming Lin, MD, PhD (Taiwan) Affiliation: Charming Institute of Aesthetic and Regenerative Surgery Author: Lin TM
Discussion	
4:00 - 5:00 pm	**Plenary Session 4: IMCAS** Moderators: Benjamin Ascher, MD & Aurora Almadori, MD, MSc
4:00 pm	**EYELID FAT GRAFTING COMPLICATIONS: EVIDENCE BASE AND IMCAS ALERT FEED BACK** Presenter: Benjamin Ascher, MD (France)
4:12 pm	**141** **CELLULAR OPTIMIZATION OF NANOFAT: INCREASED CELL COUNT AND VIABILITY USING LIPOCUBE NANO™** Presenter: Steven Cohen, MD, FACS (USA) Affiliation: University of California San Diego Authors: Cohen S, Tiryaki T, Womack HA, Schlaudraff KU, Scheflan M
4:20 pm	**142** **NANOFAT GRAFTING IN SKIN REJUVENATION: EVIDENCED BASED SCIENCE, PROTOCOL AND CLINICAL APPLICATIONS** Presenter: Sophie Menkes, MD (Switzerland) Affiliation: Forever Institut Author: Menkes S
4:28 pm	**143** **VOLUMETRIC EFFECT AND PATIENTS' SATISFACTION OF FACIAL FAT GRAFTING** Presenter: Aartje J. Tuin, MD (Netherlands) Affiliation: University Medical Center Groningen Authors: Tuin AJ, Schepers RH, Spijkervet FK, Vissink A, Jansma J
4:36 pm	**144** **TRINITY REJUVENATION TREATMENT (COMBINATION TREATMENT WITH SVF, FATGRAFT, AND FRACTIONAL LASER) FOR AGING FACE** Presenter: Kitae Kim, MD (South Korea) Affiliation: TAE Plastic Surgery Clinic Author: Kim K
4:44 pm	**145** **THE EFFECTS OF FACIAL LIPOGRAFTING ON SKIN QUALITY: A SYSTEMATIC REVIEW** Presenter: Joris A. van Dongen, MD (Netherlands) Affiliation: University Medical Center Groningen Authors: van Dongen JA, Langeveld M, van de Lande LS, Vriend L, Harmsen MC, Stevens HP, van der Lei B
Discussion	
5:00 pm	Closing Remarks - Guy Magalon, MD & Ivona Percec, MD, PhD

NOTES

1

THREE-DIMENSIONAL EVALUATION OF BREAST SURFACE: VALIDATION OF A NOVEL SCANNING PROCESS TO ASSESS FAT GRAFTING OUTCOMES

Presenter: Carlo M. Oranges, MD (Switzerland)
Affiliation: Basel University Hospital
Authors: Oranges CM, Madduri S, Brantner P, Msallem B, Giordano S, Benitez B, Kalbermatten DF, Schaefer DJ, Thieringer FM

Introduction: Objective evaluation of fat grafting outcome requires a precise assessment of body volumes at baseline and at each follow-up examination. To this end, three-dimensional photography is increasingly used to assess surgical changes of breast volume, tissue distribution and projection. However, the majority of methods available are still expensive or not accurate. Based on recent works from our group, we aim to present the validation of an innovative, simple and inexpensive three-dimensional scanning process [1].

Methods: The three-dimensional scanning process was performed using the newly introduced Structure Sensor 3D scanner (Occipital, Inc., Boulder, Colo.) connected to an iPad Pro (Apple, Inc., Cupertino, Calif.). A medical human female anatomy torso model of rigid plastic was employed to repeatedly capture surface images. Digital measurements of vector and surface breast distances were calculated using Mimics® Innovation Suite 20 medical imaging software (Materialise, Leuven, Belgium). Results provided by Structure Sensor were then compared with those obtained using two clinically established scanning processes, namely Vectra M5 Scanner (Canfield Scientific Inc., Parsippany, NJ, USA) and Artec Eva 3D scanner (Artec3D, Luxembourg, Luxembourg). Accuracy of data was further confirmed with Computer Tomography (CT) scan. Analysis of variance (ANOVA) was performed to identify possible statistical significant difference among the methods.

Results: For all the variables examined, there was no significant difference among vector and surface measurements calculated from three-dimensional images captured using the different scanning processes ($p>0.05$).

Conclusion: Our study was able to validate the use of Structure Sensor for three-dimensional breast photography in comparison to other clinically established scanners, demonstrating analogous practicability and reliability. This novel three-dimensional technology will allow objective and simple evaluation of breast volume and morphology changes, which represent important outcomes for procedures such as fat grafting.

1. Oranges CM, Madduri S, Brantner P, et al. Three-dimensional Assessment of the Breast: Validation of a Novel, Simple and Inexpensive Scanning Process. In Vivo. 2019 May-Jun;33(3):839-842.

2

TREATMENT OF ANDROGENETIC ALOPECIA WITH CONCENTRATE OF NANOFAT GRAFT

Presenter: Hongwei Liu, MD, PhD (China)
Affiliation: The First Affiliated Hospital of Jinan University
Authors: Liu HW, Chen N

Background: Androgenetic alopecia (AGA) is characterized by miniaturization of the hair follicles gradually causing conversion of terminal hairs into vellus hairs, leading to progressive reduction of the density of hair on the scalp. Adipose-derived regenerative cells (also known as stromal vascular fraction, SVF) have recently emerged as new therapeutic options for hair loss. Nanofat grafting improved tissue repair by the SVF of nanofat. Concentrated nanofat graft includes more SVF cells, and might be more effective for clinical use.

Objective: To evaluate injections of concentrated nanofat graft, which is rich in stromal vascular fraction (SVF) in the upper scalp as a new autologous treatment option for AGA.

Methods: Concentrated nanofat was obtained by processing nanofat with negative pressure and centrifugation. Ten male patients (age range, 23-45 years), suffering from AGA at stage II to III according to the Norwood-Hamilton scale, were treated with a single injection of a combination of concentrated nanofat and PRP in the upper scalp (3:1). The mixture (0.1 ml/cm2) of concentrated nanofat and PRP was injected in marked areas of the scalp. The injections were performed with a 27-gauge, 1-ml Luer-lock syringe. Preinjection and 1, 3, 6 and 12 months postinjection changes in hair density and diameter were assessed using ultra high-resolution photography. Additionally, the self-evaluation of patients, including the degree of hair loss and growth rate was performed during follow-up.

Results: All patients experienced hair regeneration 1, 3, 6 and 12 months after the treatment with concentrated nanofat grafting. The treatment improved hair density, and increased hair diameter. None of the patients reported severe adverse reactions. No significant differences were observed with age.

Conclusions: Our results prove the efficacy and the safety of concentrated nanofat graft, suggesting that this regenerative therapy may represent a promising alternative approach to treating AGA.

3

COMPREHENSIVE REVIEW OF ADIPOSE GRAFTING: FROM VOLUMIZATION TO SCAR RELEASE

Presenter: Sherry Collawn, MD, PhD (USA)
Affiliation: University of Alabama at Birmingham
Author: Collawn S

Introduction: Adipose grafting has been used for soft tissue volume replacement and also in the treatment of densely adherent scars. For volume replacement in the face, breasts, and body patients have had successful improvement. Impressively, patients with retracted scarring in Lupus, steroid atrophy and complex regional pain syndrome, and other adherent scars have had relief of pain with adipose grafting.

Methods: This retrospective chart review covers a total of 124 fat graft procedures performed on the face and body from February 2014 through February 2019. Of these, 37 cosmetic faces were grafted with documented amounts in 24 faces. Fifty-one of 74 reconstructive breasts had completely documented records of amounts grafted. Retracted scars in 7 patients were injected for scar release. Fat was generally harvested from the abdomen, thighs, or flanks using toomey syringes or an enclosed power-assisted system with 3.7 or 3.0mm cannulas.

Results: There was an average amount of 106ml of fat grafted in procedures involving the breasts (Fig. 1). Of the face grafts, the average amount of fat grafted was 21ml (Fig.1) (Fig. 3). Fig. 2 shows the excellent improvement in lower eyelid hollowing with periorbital fat grafting. For a patient with lupus scarring of the lower lip 5cc fat was grafted, for a patient with steroid atrophy and complex regional pain syndrome 18ml was grafted, and up to 25ml was grafted in a patient with Crohn's disease and inguinal scarring with hidradenitis suppurativa.

Conclusions: Fat grafting is a safe and reliable method for volumization and scar release. In this series there were no complications of infection or embolization.

3

COMPREHENSIVE REVIEW OF ADIPOSE GRAFTING: FROM VOLUMIZATION TO SCAR RELEASE

Presenter: Sherry Collawn, MD, PhD (USA)
Affiliation: University of Alabama at Birmingham
Author: Collawn S

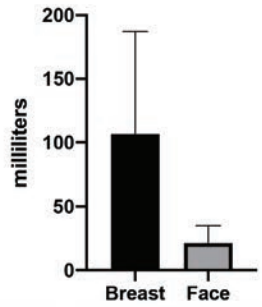


Figure 1. Fat Graft Recipient sites by volume of grafted fat.

2A 2B

Figure 2. Patient shown pre op in 2A and in 2B three months after minifacelift with periorbital and perioral fat grafting.

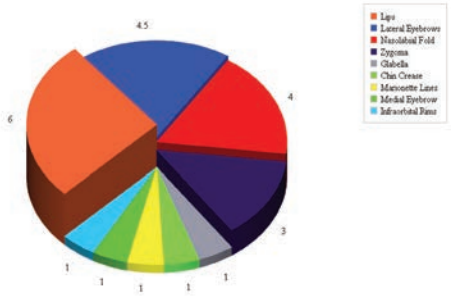


Figure 3. Volumes (cc) of fat grafted in the face.

4

OPTIMIZING FAT GRAFT PROCESSING: A PROSPECTIVE, CONTROLLED CLINICAL TRIAL COMPARING TELFA ROLLING VERSUS CENTRIFUGATION FOR FAT GRAFTING CRANIOFACIAL DEFORMITIES

Presenter: Isaac James, MD (USA)
Affiliation: University of Pittsburgh
Authors: James I, Bourne D, Minteer D, Wang S, Bliley J, Donnenberg AD, Donnenberg V, Branstetter B, Marra K, Coleman S, Rubin JP

Introduction: Fat grafting has become a powerful tool in the plastic surgeon's armamentarium. It is a safe and effective reconstructive method for craniofacial deformities. However, the usefulness of fat grafting remains tempered by variable retention which often necessitates multiple procedures to achieve desired results. The aim of this prospective, controlled clinical trial is to compare the efficacy of two commonly used fat graft processing techniques (telfa rolling and centrifugation) for the reconstruction of craniofacial deformities.

Methods: Twenty-nine patients underwent fat grafting procedures for the treatment of craniofacial deformities. Patients underwent fat graft processing by either telfa rolling (n=10) or centrifugation (n=19). Follow-up was nine months. Outcome measures included volume retention as measured by 3D CT scans, a facial volume appearance scale (FVAS) scored by a member of the surgical team, and cellular composition of stromal vascular fraction (SVF) measured by flow cytometry.

Results: Average age was 40. Average BMI was 27. BMI was stable throughout the course of the study. Sixty percent of participants were male. Average volume injected in the telfa and centrifuge groups was 22.2mL (SD 12.3) and 26.1mL (SD 12.2) respectively. Average volume retention in the telfa rolling group was significantly lower than in the centrifugation group (35% (SD 15.7) vs 63% (SD 16) respectively; $p=0.001$). Similarly, the telfa group had a significantly lower proportion of adipose stem cells (ASCs) in SVF isolates (56% (SD 35) vs 83% (SD 12); $p=0.009$). There was a significant improvement in FVAS at 9 months in both groups ($p<0.001$). FVAS outcomes were similar between centrifugation and telfa rolling groups.

Conclusions: Fat grafts processed both by telfa rolling and by centrifugation resulted in significant improvements in facial appearance. However, when compared to telfa rolling, fat grafts processed by centrifugation resulted in higher volume retention. This difference may be partly related to a smaller proportion of ASCs seen in fat grafts processed by telfa rolling.

5

SAFETY CONSIDERATIONS SURROUNDING THE USE OF FAT GRAFTING, SILICONE IMPLANTS AND COMBINATION OF BOTH FOR CALF AUGMENTATION

Presenter: Katarina Andjelkov, MD, PhD (Serbia)
Affiliation: BelPrime Clinic Belgrade Serbia
Authors: Andjelkov K, Atanasijevic T, Colic M, Llull R, Popovic V

Introduction: The calf augmentation can be done using fat grafting, calf implants, combining both procedures. The authors present comparison of these available methods, their indications, surgical techniques and ways to perform this surgery safely.

Methods: We retrospectively analyzed 175 patients who had calf implants, fat grafting or composite calf augmentation for cosmetic and reconstructive surgery in our practice. We reviewed all group demographics, complications and results and identified all pitfalls encountered in our cases. Additionally, the dissection of the calf regions in fresh cadavers was done to obtain the most accurate anatomy. Also we performed measurements of intra-compartmental pressures before and after calf augmentation with implants in 6 cases to determine pressure changes.

Results: In 95 patients (54.3%), we performed augmentation with silicone implants, composite augmentation in 44 (25.1%) and fat grafting in 36 (20.6%) patients. All cases had subfascial implant insertion. If there is a need for more than one implant, we advocate staged procedure. The staged procedure is also advised in cases of composite calf augmentation. The use of fat grafting is less popular among our patients because of its unpredictable reabsorption rates, but it can be a great tool in combination with calf implants specially in reconstructive cases. The procedure is safe when it is done in subcutaneous level. We have not had the compartment syndrome.

Conclusions: The calf surgery is safe, easy to reproduce, with short recovery period and low complication rate when done respecting specific anatomical and physiological calf features.

7

COMPARISON OF THE EFFECTS OF ULTRASOUND-GUIDED ADIPOSE-DERIVED STEM CELLS TRANSPLANTATION AND OTHER TRADITIONAL TRANSPLANTATION STRATEGIES ON CISPLATIN-INDUCED KIDNEY INJURY

Presenter: Ruipeng Jia, PhD (China)
Affiliation: Nanjing First Hospital
Authors: Jia R, Zhou C, Zhou L, Ge Y, Liu J, Zhao F, Jiang N, Wu R

Introduction: Local transplantation can increase the retention rate of adipose-derived stem cells (ADSCs), and be more precise and safe than vascular injection transplantation. However, local transplantation is often accompanied by direct injection in some open surgery of internal organs, which limits its application in many clinical applications. The present study is designed to assess the potential role of ultrasound-guided ADSCs transplantation in cisplatin-induced kidney injury.

Methods: Male Sprague-Dawley rats were randomly divided into group A (control group), group B (intraperitoneal injection of cisplatin), group C (injection of cisplatin + vascular injection transplantation of ADSCs), group D (injection of cisplatin + open local injection transplantation of ADSCs), and group E (injection of cisplatin + ultrasound-guided ADSCs transplantation).

Results: Compared with group B and C, strategies of group D and E could significantly increase the retention rate of ADSCs in kidney tissues and reduced the number of escaped ADSCs in lung and liver. Serum marker and tubular injury were obviously decreased, and cell proliferation and microvessels density in kidney tissues were remarkably reinforced in group D and E. There was no significant difference between group D and E.

Conclusions: Ultrasound-guided transplantation can achieve a same therapeutic effect as open local transplantation in cisplatin-induced kidney injury, which is more safe and applicable in future clinical setting.

8

GENETIC STABILITY ASSESSMENT IN BONE TISSUE-ENGINEERED PRODUCTS

Presenter: Céline Pierard (Belgium)
Affiliation: Novadip Biosciences SA
Authors: Theys N, Episkopou H, Decottignies A, Pierard C

Bone tissue engineering using osteoblastic differentiated adipose mesenchymal stem cells (AMSCs) is tested in clinical trials to treat critical size bone defects and bone non-unions. Manufacturing of cell-based product may be associated with accumulation of genetic instability. Our study was design to better understand the physiology of the AMSCs during expansion and differentiation steps for improving genetic stability data interpretation. After induction of osteogenic differentiation, the structural composition of the product prevents use of the conventional karyotype to assess the genetic stability of the cells. Evidence of potential abnormality and the risk of tumors were therefore evaluated with a risk-based approach that included any relevant combination of conventional cytogenetics assays during early cellular proliferation phase and molecular assays performed on biopsies collected at later stages. We performed extensive cytogenetic analysis on several cellular preparations of AMSCs. Several of them showed genetic sub-clonal and clonal abnormalities or autosomal genetic disorders in tumor suppressor gene. Our study showed that, independently of the initial genetic status and the age of the donor, the senescent rate increased for all independent preparation reaching a senescent phenotype after numerous passages. The population doubling time was also significantly increased with proliferation time. For each donor, the expression levels of tumor suppressor genes CDKN2A and p21 were gradually increasing reaching highest levels at the latest passage. Moreover, none of the cells expressed telomerase subunit. The ability of cells to differentiate and form a 3-dimensional osteogenic graft was not altered by genetic aberrations observed in initial ASCs preparation. A combined genetic molecular analysis (CGH array, Q-PCR and exomic sequencing) was performed on differentiated cells. Tumors suppressors genes were significantly more expressed than in control cancer cells and the expression of telomerase units was low. Minor genetic abnormalities observed by CGH were never associated to mutation in oncogenes and tumor suppressor genes. In conclusion, a combined approach is required to increase the likelihood of detecting genetic abnormality in cell-based products.

9
ADIPOCYTES AND FIBROBLAST-LIKE CELLS VIABILITY DEPENDING ON THE NUMBER OF PASSAGES THROUGH FAT FILTERS

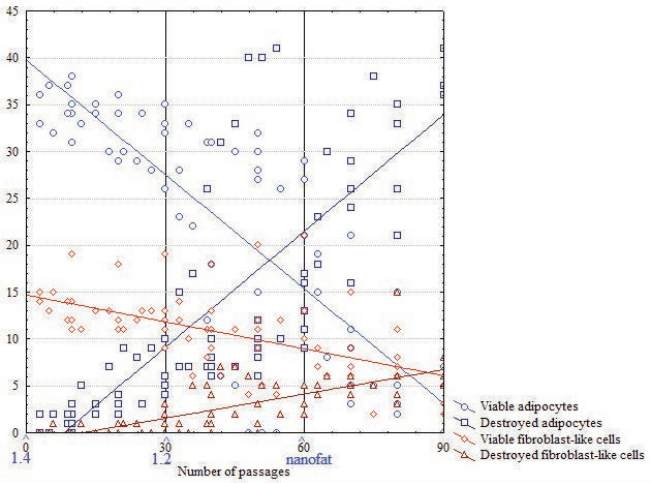
Presenter: Natalie Khramtsova, PhD (Russia)
Affiliation: Perm State University of Medicine
Authors: Khramtsova N, Plaksin SA, Sotskov AY

Introduction: There are two different approaches in autologous fat grafting. For soft tissue reconstruction and augmentation, the maximum content of viable adipocytes is preferable, while the regenerative purpose excludes viable adipocytes, instead offering progenitors and stromal stem cells. Most studies include protocols of 30-passages anaerobic fat transfer per each fat filter, but there is no unified approach. This study aimed to determine the number of viable and damaged cells, including adipocytes and fibroblast-like cells, depending on the number of passages.

Method: After infiltration with a standardized fat harvesting solution, microfat was harvested using a 2.4 mm diameter needle in six healthy women. It followed by shuffling the fat through 1.4 mm, 1.2 mm and "nanofat" anaerobic fat transfers, making 30 passages for each filter. Each 10 passages the fat samples were partially withdrawn and analyzed. Hematoxylin and eosin staining allowed assessment of viable and damaged cells.

Results: The number of viable (and damaged) cells within 10, 20 and 30 passages through 1.4 mm filter was: 35±2 (2), 33±3 (4), 32±4 (6) viable (damaged) adipocytes and 14±3 (0), 13±3 (0) and 12±4 (1) viable (damaged) fibroblast-like cells; through 1.2 mm filter: 26±8 (10), 23±10 (13), 21±7 (13) viable (damaged) adipocytes and 12±4 (2), 12±5 (3), 13±5 (3) viable (damaged) fibroblast-like cells; through "nanofat" filter: 8±7 (28), 6±6 (29), 2±3 (39) viable (damaged) adipocytes and 8±4 (5), 8±2 (7), 3±1 (6) viable (damaged) fibroblast-like cells per 50 cells.

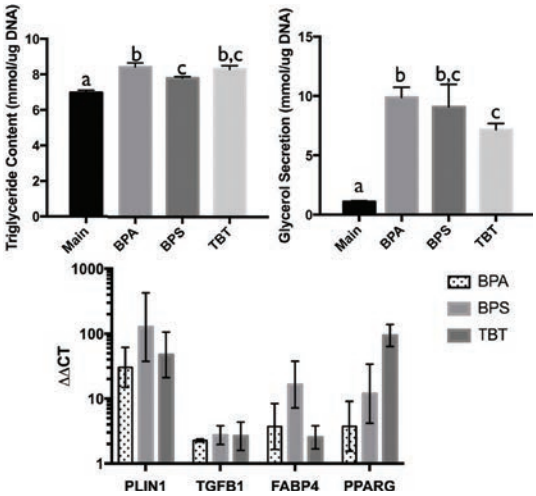
Conclusions: The number of viable adipocytes, as well as fibroblast-like cells, didn't significantly decrease even after 30 passages within each of 1.4 and 1.2 mm filters. It decreased significantly only when filter was changed. Maximum damage caused "nanofat" filter: viable cells, both adipocytes and fibroblast-like cells, decreased already after the first passage, but the next passages became overly destructive only after 20 times.



10
SCREENING PLATFORM FOR STUDYING HUMAN OBESOGENIC MODES OF ACTION

Presenter: Rosalyn D. Abbott, PhD (USA)
Affiliation: Carnegie Mellon University
Authors: Abbott RD, Keyser MN, Pereira SR, Debari MK, Griffin MD

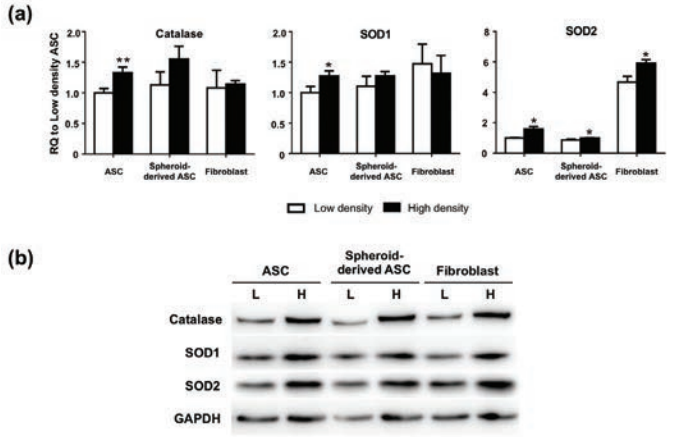
There is increasing evidence for the role of environmental contaminants as endocrine disrupting chemicals, coined obesogens, in the rising obesity epidemic. These chemicals can be found in pesticides, cleaning products, and food/beverage packaging. Although researchers have shown obesogenic chemicals can have effects on adipocyte size, phenotype, and metabolic activity, a human physiologically relevant screening platform has not been established to screen chemicals for these side effects. This will be essential for determining what chemicals in our highly industrialized environment are contributing to the rise in obesity rates. To determine if developmental stage of the cells is important for obesogenic changes, human adult stem cells (hASCs) were isolated from discarded adipose tissue and compared to human embryonic derived stem cells (hESC). 2D and 3D systems (silk matrices) were compared to determine the most physiologically relevant system. Cells were exposed to known obesogens: tributyltin (TBT) and bisphenol A (BPA) and characterized for obesogenic outcomes. The platforms were also exposed to a suspected obesogen: bisphenol S. Assays included lipid staining, intracellular triglyceride accumulation, glycerol secretion, DNA content, and qt-RT-PCR (perilipin1, transforming growth factor beta 1, fatty acid binding protein 4, peroxisome proliferator-activated receptor gamma). Comparisons of the different developmental stages indicated that hASCs did not responds to obesogenic stimuli. This finding is consistent with the obesogen hypothesis, which states that obesogens have the greatest effect on cells that are still developing in utero. While 2D hESC intracellular triglyceride data suggested that BPA promotes secretion rather than storage of lipids (inconsistent with the literature where BPA increased the size of adipocytes in mice in vivo), the 3D hESC platform showed that the addition of obesogens increased lipogenesis. This is likely due to differences between the environment provided by the 2D environment compared to the 3D scaffolds. The 3D scaffold was able to provide an environment that was more similar to an in vivo environment, allowing the adipocytes to form more spherically, accommodating the lipids. PCR results confirmed this finding.



11
THE INFLUENCE OF CELL CULTURE DENSITY ON THE CYTOTOXICITY OF ADIPOSE-DERIVED STEM CELLS INDUCED BY L-ASCORBIC ACID-2-PHOSPHATE

Presenter: Naichen Cheng, MD, PhD (Taiwan)
Affiliation: National Taiwan University Hospital
Authors: Cheng N, Tu YK, Wu YK

Ascorbic acid-2-phosphate (A2-P) is an oxidation-resistant derivative of ascorbic acid that has been widely employed in culturing adipose-derived stem cells (ASCs) for faster expansion and cell sheet formation. While high dose ascorbic acid is known to induce cellular apoptosis via metabolic stress and genotoxic effects, potential cytotoxic effects of A2-P at high concentrations has not been explored. In this study, the relationship between ASC seeding density and A2-P-induced cytotoxicity was investigated. Spheroid-derived ASCs with smaller cellular dimensions were generated to investigate the effect of cell-cell contact on the resistance to A2-P-induced cytotoxicity. Decreased viability of ASC, fibroblast, and spheroid-derived ASC was noted at higher A2-P concentration, and it could be reverted with high seeding density. Compared to control ASCs, spheroid-derived ASCs seeded at the same density exhibited decreased viability in A2-P-supplemented medium. Expression of antioxidant enzymes (catalase, SOD1, and SOD2) was enhanced in ASCs at higher seeding densities. However, their enhanced expression in spheroid-derived ASCs was less evident. Furthermore, we found that co-administration of catalase or N-acetylcysteine nullified the observed cytotoxicity. Collectively, we have demonstrated the dose-dependent effect of A2-P-induced oxidative cytotoxicity and its negative correlation with higher seeding density and smaller intercellular distance. In addition to the enhanced recruitment of anti-oxidative capabilities with more cells in high-density culture conditions, higher seeding density also exerted a defensive effect against the A2-P-induced oxidative stress by enhancing the expression of anti-oxidative enzymes. Moreover, we found that addition of another antioxidant reverted the detrimental cytotoxic effect of A2-P. The observation is important for the future use of A2-P in cell cultures, particularly the ASC-associated tissue engineering applications.



13
FAT GRAFT PULMONARY EMBOLISM (F-PES): LYMPHATIC SYSTEM PREFERENTIALLY ABSORBS, CONCENTRATES AND CENTRALLY DELIVERS MICELLAR EMBOLI FROM FAT GRAFTS FREE OIL FRACTION

Presenter: Ramon Llull, MD, PhD (Spain)
Affiliation: CellProtech
Authors: Llull R, Sese B, Matas A, Calabrese C, Montserrat J

F-PES appears as a gluteal Fat grafting complication. Fat emboli histology is described as "lipid micelles" lodged in pulmonary capillaries in the absence of intravascular extracellular matrix or stromal Cell elements. During harvest liposuction, adipocyte disruption releases free triglycerides (TGC), accounting for a raw Lipoaspirate lipocrit. This study aimed at identifying absorption and transport routes for micellar TGCs during lipo-grafting procedures.

Methods: (n=27, 20 breasts, seven buttocks) TGC fraction of total fat graft volume was recorded (lipocrit). TGC plasma concentration ([TGC]p) was measured in peripheral blood samples preoperatively, immediately and 24h postoperatively. Critical Micelle Concentration (CMC) of fat graft TGCs were analyzed when TGCs were mixed in either lymphatic (chylous, CMCc) or plasmatic (CMCp) fluids.

Results: Interstitial Pressures (IP) both intramuscular (im) and subcutaneous (sc) at recipient sites were recorded. Lipocrit ranged from 19-27%. Peripheral [TGC]p pre-, post- and at 24h displayed no significant differences among them in all cases (paired t-student). Interestingly, one buttock grafting case suffered F-PES requiring ICU support. Central venous sample taken at ICU admission yielded a [TGC]p 7-fold higher than that of the simultaneously drawn peripheral samples (900, 1402 and 821 mg/dL), returning to comparable peripheral levels 24 h. CMCp was consistently higher than CMCc (CMCc=110 mg/dL, CMCp=320 mg/dL, n=17, P<0.001) IPsc reached pressures lower than 50 mmHg and returned to baseline (x=7 mmHg) at 24 h post-grafting. However, IPim raised above 50 mmHg and persisted past 24 h.

Conclusion: F-PES follows increased [TGC]p detectable at the central venous system only, yet undetectable in peripheral samples. TGC micelle formation was thermodynamically adverse in plasma rather than in chyle, suggesting a lymphatic uptake of grafted oil at the recipient site. IPim pressures prevent venous drainage, favoring lymphatic absorption. These data may suggest that liquid TGCs are absorbed by tissue lymph ducts, concentrated in chyle, ascend the lymphatic system, drip in central veins, and lodge in the pulmonary capillary network.

14

AUTOLOGOUS FAT TRANSPLANTATION FOR TREATMENT OF ABDOMINAL WALL SCAR ADHESION AFTER CESAREAN SECTION

Presenter: Hongwei Liu, MD, PhD (China)
Affiliation: The First Affiliated Hospital of Jinan University
Authors: Liu HW, Li SH

NOT PRESENTED

15

A PROSPECTIVE, RANDOMIZED TIME-AND-MOTION STUDY COMPARING RATE OF PROCESSING TECHNIQUES IN AUTOLOGOUS FAT GRAFTING: AN ECONOMIC ANALYSIS

Presenter: Summer Hanson, MD, PhD (USA)
Affiliation: Allergan plc
Authors: Parekh M, Hanson SE, Macarios D, Boer R, Garvey PB, Chang EI, Reece G, Liu J, Butler CE

Introduction: Autologous fat grafting (AFG) is increasing every year, with 31,862 procedures in reconstructive breast surgery performed in the United States in 2017 [1]. With limited reimbursement for AFG, it is important to select an efficient processing technique to minimize the hospital economic burden.

Methods: A preliminary, hypothetical economic model was developed based on a prospective, randomized time-and-motion study comparing three AFG techniques: REVOLVE™ System [RV], an active washing-filtration system vs PureGraft™ [PG], a passive washing-filtration system, or centrifugation [C]). The primary outcome of the study was rate of fat processed (mL/minute). Volume of fat injected/patient and total AFG time was used to derive AFG rate. Standard operating room cost/minute and device cost were used to estimate the total cost for AFG. Threshold and sensitivity analyses were conducted to characterize cost uncertainty.

Results: Forty-six patients were included in the study (n=15 for RV, n=15 for PG, and n=16 for C), with comparable patient and clinical characteristics between groups. The rate of fat processing was significantly higher for RV compared with either PG or C (9.98 vs 5.66 or 2.47 mL/min, $p<0.001$, respectively) The hypothetical economic model demonstrated that the time to inject 150 mL of fat/patient was lower with RV compared with either PG or C (105.1 min vs 163.4 or 290.0 min, respectively). The estimated total cost saving with RV was $2,862.66 ($1,335.29–$4,390.04) vs PG and $6,839.25 ($4,129.11–$9,549.39) vs C.

Conclusions: This is the first randomized study of AFG techniques to demonstrate that RV had significantly faster fat processng and grafting rates, translating into potential cost savings vs PG and C. These results can aid surgeons in selecting an efficient processing method considering the absence of reimbursement in AFG.

Reference:

[1] 2017 Plastic Surgery Statistics Report. Available at: https://www.plasticsurgery.org/documents/News/Statistics/2017/plastic-surgery-statistics-full-report-2017.pdf. Accessed February 12, 2019.

16

STERILITY AND ENDOTOXIN LEVELS AFTER MECHANICAL ISOLATION OF STROMAL VASCULAR FRACTION BY THE FAT-PROCEDURE

Presenter: Aartje J. Tuin, MD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: Tuin AJ, Van Dongen JA, Stevens HP, Harmsen MC, Spijkervet FK, Van Der Lei B

Background: The increased applicability of stromal vascular fraction (SVF) of adipose tissue, such as intra-articular use, requires additional quality standards regarding the isolation procedure as well as the final product. In this current study, we assessed sterility and endotoxin levels of the fractionation of adipose tissue (FAT) procedure.

Methods: The FAT-procedure was performed following three elective clinical liposuction procedures under general anesthesia. Two aliquots of tissue (A and B) were obtained from of each of the four different FAT procedure phases per patient (n=3) (in total 24 samples) and tested for bacterial growth using agar plates (Brucella agar + 5% sheep blood/ vitamin K/hemin medium (BBA); blood agar + 5% sheep blood medium (BA); and chocolate medium (CHOC)). Additionally, in order to detect a low bacteria load, a non-selective Fastidious Bacteria (FB) broth (10ml tube) was used. The samples were incubated at 35°C for 7 days. The supernatant from the tissue samples of two different FAT procedure phases were also subjected to an endotoxin test performed with BioTekElx808 (Cambrex, NJ, USA).

Results: None of the samples yielded bacterial outgrowth on standard agar plates. In the additional FB broth, contamination was detected randomly in 4 out of 24 samples. A low endotoxin level of 1.75 EU/ml was detectable in only one sample. Endotoxin was undetectable in all the other samples.

Conclusion: Based on the aforementioned results, we conclude that the small amount of staphylococcal contamination objectified in a few samples cannot be explained by a specific phase of the FAT-procedure. Endotoxin levels were undetectable, except in one sample, but still below the FDA standards. Therefore, to our opinion, the FAT procedure can be safely applied for intra-articular use from a sterility and purity point of view.

17

THE EFFECT OF CENTRIFUGE DURATION ON FAT GRAFT SURVIVAL

Presenter: Ayla Metin, MD (Turkey)
Affiliation: Istanbul Bagcilar Education and Searching Hospital
Authors: Metin A, Bozkurt M, Karakol P

Fat graft applications have been widely used for reconstruction and aesthetic purposes. When the literature is examined, fat graft has wide range of survival rates. The centrifugation considered as an important factor in survival. Although there are many studies on the centrifugal force in the literature, experimental studies that can reveal long-term results about centrifugation duration are very limited. In our study, the effects of centrifugation duration on the survival of fat were tried to be demonstrated with long-term experimental animal model. It is thought that the study will be a guide in determining the appropriate centrifugation duration. Thirty Sprague Dawley rats were included in the study. Five groups were formed in each group. Preparation protocols administered as enbloc fat graft in group 1, minced fat graft in group 2, fat graft centrifuged in 1054g for 2 minutes in group 3, fat graft centrifuged in 1054g for 3 minutes in group 4 and fat graft centrifuged in 1054g in group 4 for 4 minutes in group 5. Fat grafts were obtained by excision from rat inguinal fat pads. After 12 weeks of follow-up, histopathological examination was performed with HE staining. Enbloked fat graft group was observed to be associated with necrosis, fibrosis, inflammation, vacuosis, alterations in adipocyte morphology. Although the best results were obtained in Group 4, there was no statistically significant difference between the other groups except of adipocyte viability and vascularity parameters. The centrifugation process may have positive effects on adipocyte survival by means of purifying the fat graft and increasing adipocyte concentration. When the centrifugal durations are compared, poorer monitoring of the results in prolonged centrifugation duration may be related to the low number of samples, the method of analysis used, physiological differences in animals, flow- rate of fat grafting and increased adipocyte damage. The use of larger groups of subjects and the use of further analysis methods may lead to more reliable results.

19

SECRETORY FUNCTION OF ADIPOSE-DERIVED STROMAL/STEM CELLS (ASC) UNDER ISCHEMIA-LIKE STRESS CONDITIONS

Presenter: Julia Bachmann, MS (Germany)
Affiliation: University of Wuerzburg
Authors: Bachmann J, Ehlert E, Becker M, Radeloff K, Blunk T, Bauer-Kreisel P

Introduction: Cell-assisted lipotransfer has been reported to improve the clinical outcome of autologous fat grafting. The secretory function of the supplemented ASC is considered to play an important role in this scenario. However, cells face severe oxidative and nutritional stress upon transplantation leading to reduced cell viability and altered cell behavior. Thus the response of ASC to models of in-vitro ischemia is of great interest in understanding their therapeutic mode of action. In this context we investigated the viability, metabolic activity and secretory function of ASC under conditions of glucose and oxygen deprivation.

Methods: hASC were cultured under different conditions of oxygen/glucose/serum deprivation for up to 7 days. Viability and apoptosis/necrosis rate was determined by flow cytometry and metabolic activity by a MTT assay. The secretion profile under deprivation conditions was analysed by a cytokine array. Secretion of selected proteins was quantified by ELISA. Expression of the corresponding genes was examined by qRT-PCR.

Results: Viability and metabolic activity of hASC were compromised mainly by glucose depletion and serum withdrawal. Under harsh ischemic conditions (0.1g/l glucose, 0.2% O2) ASC secreted angiogenic, anti-apoptotic, immune-modulatory and matrix-related factors (VEGF, Angiogenin, STC-1, IL-6, IL-8, TIMP-1, TIMP-2). Quantitative data revealed a significant increase in VEGF (3-fold), IL-6 (6-fold) and STC-1 (2-fold) secretion under combined glucose/oxygen deprivation compared to oxygen deprivation only. This effect was mirrored on the gene expression level. Ongoing work is focused on the impact of conditioned medium from glucose/oxygen-deprived ASC on endothelial cells and lipografts.

Conclusion: In an in-vitro model of severe ischemia, hASC secreted angiogenic, anti-apoptotic, immune-modulatory and matrix-related factors, although cell viability and in particular metabolic activity were compromised. Glucose starvation in combination with oxygen deprivation significantly enhanced the secretion of anti-apoptotic and angiogenic factors. These results indicate the intrinsic ability of hASC to adapt to adverse conditions and to exert their secretory function in an ischemic environment as prevalent at implantation sites.

20

PRIMARY CILIA ARE DYSFUNCTIONAL IN OBESE ADIPOSE-DERIVED MESENCHYMAL STEM CELLS

Presenter: Juping Yuan, MD (Germany)
Affiliation: University Hospital Frankfurt
Authors: Yuan J, Ritter A, Friemel A, Kreis NN, Hoock SC, Roth S, Kielland-Kaisen U, Brüggmann D, Solbach C, Louwen F

Introduction: Adipose-derived mesenchymal stem cells (ASCs) have crucial functions including tissue homeostasis/repair, immunomodulation and cell renewal. It has been reported that their functions are compromised during the development of obesity. However, the molecular mechanisms are not well defined.

Methods: Primary ASCs were isolated from subcutaneous and visceral adipose tissues of obese or normal donors. The length and functions of cilia were compared between normal and obese ASCs via multiple assays like cell viability evaluation, cell cycle distrubution, differentiation analysis, RNA extraction and real-time PCR, Western blotting, indirect immunofluorescence staining, cell motility, SAG stimulation and depolymerization assays.

Results: ASCs from obese individuals have defective primary cilia, which are shortened and unable to properly respond to stimuli. Impaired cilia compromise ASC functionalities. Exposure to obesity-related hypoxia and cytokines shortens cilia of lean ASCs. Like obese ASCs, lean ASCs treated with interleukin-6 are deficient in the Hedgehog pathway, and their differentiation capability is associated with increased ciliary disassembly genes like AURKA. Interestingly, inhibition of Aurora A or its downstream target the histone deacetylase 6 rescues the cilium length and function of obese ASCs.

Conclusion: This work highlights a mechanism whereby defective cilia render ASCs dysfunctional, worsening diseased adipose tissue. Impaired cilia in ASCs may be a key event in the pathogenesis of obesity, and its correction might provide an alternative strategy for combating obesity and its associated diseases.

21

FAT EXTRACT IMPROVES RANDOM PATTERN SKIN FLAP SURVIVAL IN A RAT MODEL

Presenter: Wei Li, MD, PhD (China)
Affiliation: Shanghai 9th Peoples Hospital
Authors: Li W, Cai YZ

WITHDRAWN

22

INFLAMMATORY RESPONSE INDUCED BY VARIED CONCENTRATION OF SEV-AT

Presenter: Jia Dong, MD (China)
Affiliation: Sichuan University
Authors: Dong J, Yu MY, Tian TW

Introduction: Cell-free therapy provides a potential approach for soft tissue defects, which effectively avoids the problem of tumorigenicity caused by cell-based therapy. Our previous studies indicated that small extracellular vesicles derived from adipose tissue (sEV-AT) could induce neoadipose formation in nude mice. So far, there is no result showed the relationship between the concentration of sEV-AT and neoadipose formation and inflammation response.

Method: Human adipose derived stem cells (hADSCs) and human umbilical vein endothelial cells (HUVECs) were treated with 0, 10, 50, 200 ug/ml sEV-AT, adipogenesis and angiogenisis were evaluated by real-time PCR and oil red O staining. Rat bone marrow-derived macrophages were co-cultured with 0, 200, 400, 600 ug/ml sEV-AT, phenotypes of M1 and M2 macrophage were detected by flow cytometry and the expression of pro-inflammatory factors (TNFα and iNOS) and anti-inflammatory factors (Arg1 and IL-10) were evaluated by real-time PCR. In vivo, 0, 1, 5, 10 mg/ml sEV-AT mixed with Matrigel in custom-designed silicone tubes were subcutaneously implanted into the back of SD rats. After 4 weeks, we analyzed neoadipose tissue formation induced by different concentrations of sEV-AT. Besides, we assessed the area of necrotic lesions, measured the number of M1 and M2 macrophages and detected the presence of proinflammatory factor TNFα around the necrotic lesions by immunohistochemistry.

Results: Adipogenesis and angiogenisis were observed in the group of 10 and 50 ug/ml sEV-AT, increasing concentrations of sEV-AT could not promote either adipogenesis or angiogenisis. The proportion of M2 macrophages and anti-inflammatory factors (Arg1 and IL-10) was the highest in group of 400 ug/ml sEV-AT treatment. However, when the concentration of sEV-AT reached 600 ug/ml, M1 macrophages and pro-inflammatory factors (TNFα and iNOS) increased. In vivo, the optimum concentration for neoadipose formation is between 1-5 mg/ml. The area of necrotic lesions, the number of M1 macrophage and the expression of TNFα increased along with the raising sEV-AT concentrations.

Conclusions: Our findings indicate that excessive sEV-AT could induce inflammation in the body. The optimal concentration should be tested in the course of application.

23

HEALTHY ADIPOCYTE

Presenter: Jan Kopecky, MD, PhD (Czech Republic)
Affiliation: Institute of Physiology of the Czech Academy of Sciences
Author: Kopecky J

It remains to be clarified why a large subgroup (10-40%) of obese people remains metabolically healthy while the others develop various diseases – namely type 2 diabetes, dyslipidaemia, cardiovascular disease, and even cancer. In accordance with the concept that the immune and metabolic systems are interconnected, the immunometabolism of white adipose tissue (WAT) and its secretory features belong to the major determinants. Human and animal studies document that beneficial metabolic effects of various life-style interventions, including physical activity, caloric restriction and dietary omega-3 fatty acids (FA), as well as the effect of some pharmaceuticals like thiazolidinediones, could reflect modulation of WAT immunometabolism to protect against adverse metabolic changes in obesity. Specifically, low-grade WAT inflammation and deterioration of WAT metabolism, which are associated with obesity, could be limited by the above mentioned interventions, reflecting the induction of "healthy adipocytes". These cells are endowed with a high activity of (i) futile metabolic cycle, which is based on hydrolysis of triacylglycerols (TAG) and re-esterification of FA in adipocytes (TAG/FA cycling), (ii) in situ FA synthesis (de novo lipogenesis; DNL), and (iii) mitochondrial citric acid cycle and oxidative phosphorylation that support both DNL and TAG/FA cycle. Sufficient activity of TAG/FA cycling in WAT is required for fast tuning of systemic lipid levels and prevention of lipotoxicity. DNL in WAT correlates with insulin sensitivity as well as resistance to obesity because it serves as a source of signalling molecules (lipokines, namely branched fatty acid esters of hydroxy fatty acids), and is required for sufficient generation of lipid fuels for thermogenesis in extra-adipose tissues. Therefore, in spite of its relatively low contribution to metabolic rate, WAT metabolism (i) is essential for adaptive thermogenesis, (ii) may affect propensity to accumulation of body fat, and (iii) may underlie the lean metabolic phenotype of some obese individuals. Although it is relatively difficult to achieve weight reduction in obesity, it might be feasible to abolish its adverse consequences on health by modulating WAT metabolism.

Supported by the Czech Science Foundation (19-02)

24

REGULATORY ROLES OF SIRT1 IN LINEAGE DIFFERENTIATION AND PROLIFERATION OF HUMAN ADIPOSE-DERIVED STEM CELLS DURING CHRONOLOGICAL AGING

Presenter: Ivona Percec, MD, PhD (USA)
Affiliation: University of Pennsylvania
Authors: Percec I, Shan X, Calvert C

NOT PRESENTED

25

SHORT CALCITRIOL PRE-TREATMENT IS FAR SUPERIOR TO CONTINUOUS TREATMENT IN STIMULATING PROLIFERATION AND OSTEOGENIC DIFFERENTIATION OF HUMAN ADIPOSE STEM CELLS

Presenter: Marco Helder, PhD (Netherlands)
Affiliation: VU University Medical Center
Authors: Helder M, Mokhtari-Safari F, Amoabediny G, Dehghan MM, Zandieh-Doulabi B, Klein-Nulend J

Objective: With increasing incidence of various bone diseases, cell-based therapies employing osteostimulative factors have been developed to effectively differentiate stem cells into osteogenic cells. This study investigated whether short stimulation (30 minutes) of human adipose stem cells (hASCs) with 1,25-dihydroxyvitamin D3 (calcitriol or 1,25-(OH)2VitD3), fitting within the surgical procedure time frame, suffices to induce osteogenic differentiation, and compared this with continuous treatment with 1,25-(OH)2VitD3.

Materials and Methods: hASCs were pre-treated with/without 10 nM calcitriol for 30 minutes, seeded on biphasic calcium phosphate, and cultured for 3 weeks with/without 1,25-(OH)2VitD3. Cell attachment was determined 30 minutes after cell seeding. AlamarBlue assay, alkaline phosphatase (ALP) assay, ALP staining, real-time PCR and protein assay was used to evaluate the effect of short calcitriol pre-treatment on proliferation and osteogenic differentiation of hASCs up to 3 weeks.

Results: Pre-treatment with 1,25-(OH)2VitD3 enhanced attachment to biphasic calcium phosphate 1.5-fold compared to non-treated cells, and increased proliferation 3.5-fold at day 14, and 2.6-fold at day 21. In contrast, continuous treatment displayed 1.7-fold increased proliferation only at day 14. ALP activity was increased 18.5-fold by 30 minutes pre-treatment after 2 weeks, but only 2.6-fold by its continuous counterpart. Moreover, after 14 days, pre-treatment resulted in significant upregulation of the osteogenic markers RUNX2 and SPARC by 3.6-fold and 2.2-fold, respectively, while this was not observed upon continuous treatment. Finally, 30 minutes 1,25-(OH)2VitD3 enhanced VEGF189 expression which may contribute to enhanced angiogenesis.

Conclusion: This study is the first to demonstrate that 30 minutes 1,25-(OH)2VitD3, not only enhanced cell attachment to the scaffold at seeding time, but also promoted proliferation and osteogenic differentiation of hASCs more strongly than continuous treatment, suggesting that employment of short 1,25-(OH)2VitD3 pre-treatment for bone tissue regeneration is a promising approach to treat bone defects in a one-step surgical procedure.

26

FAT EXTRACT IMPROVES FAT GRAFT SURVIVAL VIA PROANGIOGENIC, ANTI-APOPTOTIC AND PROPROLIFERATIVE ACTIVITIES

Presenter: Wenjie Zhang, MD, PhD (China)
Affiliation: Shanghai 9th Peoples Hospital
Authors: Zhang W, Zheng HJ

WITHDRAWN

27

WHY IT MAKES SENSE TO USE A TECHNOLOGY WITH LEAST TISSUE TRAUMA EFFECTS FOR BOTH SUCTION AND INJECTION

Presenter: Afschin Fatemi, MD (Germany)
Affiliation: S-thetic Clinic
Author: Fatemi A

We tried to find out if trauma effects to the tissue made differences in groth rates of transferred fat. Tissue trauma effects were analysed first in fresh cadaver tissue, second in live abdominoplasty tissue and third in closed tissues using endoscopes. Different technologies were used: laser-, ultrasound-, waterjet-, power-assisted technologies and traditional liposuction cannulas, also cannulas with different diameters. Clinical results after liposuction and after fat transfer were analysed and correlated to tissue trauma effects.

A clear result could be delivered: power assisted devices for both suction and fat transfer seem to deliver a good basis for good clinical results because they cause least tissue trauma.

28

QQ-CULTURED MNC IMPROVE THE FAT GRAFT VASCULARIZATION AND SURVIVAL

Presenter: Maxim Geeroms, MD (Belgium)
Affiliation: Universitair Ziekenhuis Brussel - Juntendo University Tokyo
Authors: Geeroms M, Orgun D, Arita K, Fujimura S, Aiba E, Nakajima Y, Ito-Hirano R, Kitamura R, Senda D, Mizuno H, Hamdi M, Tanaka R

Introduction: Fat grafting is a valuable technique in soft-tissue reconstruction. However, ischemia of the grafted tissue with subsequent necrosis and tissue loss impede us from having satisfying long-term results. Recently, the Quality and Quantity (QQ) culture has been established to increase the vasculogenic potential of mononuclear cells (MNC). Our experiment was designed to test whether QQ-cultured MNC (MNC-QQ) can contribute to vasculogenesis in the human fat graft and decrease the tissue loss.

Methods: Adipose tissue and peripheral blood mononuclear cells (PBMNC) were harvested from healthy subjects. Fat grafts were created with PBMNC (N=16), MNC-QQ (N=16), stromal vascular fraction (SVF; N=16) and phosphate-buffered saline as control (PBS; N=16) before grafting in BALB/c nude mice. Grafts were explanted after 1 and 7 weeks, and analyzed by weight persistence, immunohistochemistry and qPCR. PBMNC and MNC-QQ were compared in vitro for surface marker expression through flow cytometry, and for vasculogenic potential by colony-forming assay.

Results: Weight persistence after 7 weeks was significantly higher in the MNC-QQ-group (89.8±3.5%) and SVF-group (90.1±4.2%) compared to control (70.4±6.3%). With 96.6±6.5 vessels/mm², grafts in the MNC-QQ-group had the most dense vessel network and scored significantly better than control (70.4±5.6 vessels/mm²). MNC-QQ exerted a direct effect on vasculogenesis by integrating in vessels, and a paracrine VEGF-mediated effect. QQ-culture increased the expression of markers of endothelial progenitor cells (EPC) and hematopoietic stem cells, and stimulated the in vitro formation of definitive EPC colonies.

Conclusions: QQ-cultured MNC containing EPC stimulate the formation of a blood vessel network in the fat graft and enhance the graft survival, indicating its potential for clinical fat grafting.

29

DISCUSSION ON SURVIVAL MECHANISM OF TRANSPLANTED FAT

Presenter: Xiaosong Chen, MD, PHD (China)
Affiliation: Union Hospital Of Fujian Medical University
Authors: Zhang C, Chen A, Wang T, Tang S, Gao H, Weng H, Chen P, He J, Li X, Chen X

Fat transplantation technology has been widely used in plastic surgery, but the low survival rate of transplantation has become the bottleneck of this technology. There are two theories about fat graft survival: cell survival theory and host replacement theory. Both adipose stem cells and adipose stem cell-derived exosomes can effectively improve the survival rate of autologous fat transplantation, which is strong evidence for cell survival theory. There is a phenomenon of dedifferentiation of adipocytes in diseases with abnormal lipid metabolism, and immature preadipocytes are found, which also provides strong evidence for the theory of host substitution.

The exosomes derived from adipose stem cells were extracted by conventional ultracentrifugation by separating the cultured adipose stem cells from adipose tissue, and the extracted exosomes were identified by electron microscopy, WB, and NTA particle size analysis. Flow cytometry analysis and immunohistochemical analysis were utilized for the characteristic marker DLK1 of preadipocytes. By constructing transplanted fat models, we found that adipose stem cells and adipose stem cell-derived exosomes can effectively improve the outcome of transplanted fat. Dedifferentiated immature preadipocytes were found in the transplanted fat model, confirming that cell survival theory and host replacement theory play an important role in fat transplantation concurrently.

30

THE IN VIVO IMMUNOGENICITY OF A HUMAN 3D SCAFFOLD-FREE TISSUE ENGINEERED PRODUCT FOR BONE RECONSTRUCTION: A XENOGENIC MODEL

Presenter: Gaëtan F. Thirion, MS (Belgium)
Affiliation: Novadip Biosciences
Authors: Thirion GF, Veriter S, Lebrun V, Adnet PY, Caty C, Benoit MA, Stordeur P, Nijskens C, Martin L, Dehuy M, Mottart C, Noelanders M, Torres D, Dufrane D

Introduction: Large critical size bone defect remains a real challenge for reconstructive surgery. In this context, the immunogenicity of a human 3D scaffold-free graft (derived from human adipose stem cells, ASCs) was in vivo investigated in a xenogenic model of critical-sized bone defects to study the humoral and cellular immunological responses.

Methods: A 5 mm critical-sized femoral bone-defect in Wistar rats (n=36) was firstly performed 3 weeks before-implantation. The presence of bone non-union was confirmed before implantation to avoid any spontaneous bone healing. Three groups were designed: (1) Sham, (2) Hydroxyapatite/bTCP particles as negative control and (3) the human scaffold-free 3D-graft in the bone defect. The immune response was studied, at day 1/3/7/15/30 post-implantation, in terms of immune cells populations (B/T-lymphocytes, dendritic cells, neutrophils profiles) and IgM/IgG anti-HLA-1 antibodies elicitation in the sera of recipients. The graft rejection was also studied by immunohistochemistry/histomorphometry for lymphocytes and macrophages infiltration. The osteogenicity of the graft was studied, at 1 month post-implantation (in the explant), at the molecular level for genes specifically involved in the skeletal development. The transplantation of the human 3D grafts in the bone defect of nude rats served as control.

Results: The groups 1/2 did not elicited a xenogenic response but a non-foreign body reaction (non-specific inflammation) without anti-human antibody production. In contrast, the transplantation of the human scaffold-free graft in the bone defect elicited the production of anti-HLA-1 Ab especially specific IgG at day 30 post-transplantation while specific IgM were increased at day 7 post-implantation. The transplantation of the human scaffold-free graft revealed a massive macrophages infiltration at day 15 post-implantation. Although the osteogenicity was similar (for most of osteogenic genes) at 1 month post-transplantation in nude as well as Wistar rats, the immune response directly affected specific pathways of the skeletal development.

Conclusion: The human scaffold-free 3D approach, in a xenogenic model, elicit a specific anti-human immune response but can maintain the potential of in vivo osteogenicity.

31

CRYOPRESERVATION OF STROMAL VASCULAR FRACTION CELLS REDUCES THEIR COUNTS BUT NOT THEIR STEM CELL POTENCY: CAN CRYOPRESERVED STROMAL VASCULAR FRACTION CELLS REPLACE FRESHLY ISOLATED CELLS IN THE CLINIC?

Presenter: Nir Shani, PhD (Israel)
Affiliation: Tel Aviv Sourasky Medical Center
Authors: Shani N, Solodeev I, Orgil M, Bordeynik-Cohen M, Meilik B, Manheim S, Volovitz I, Sela M, Inbal A, Gur E

Background: Adipose-derived stem cells are derived from the non-fat component of adipose tissue termed the stromal vascular fraction (SVF). The use of freshly isolated autologous SVF cells as an alternative to adult stem cells is becoming more widely used. Repeated SVF administration for improved clinical outcomes is complicated by the need for repeated liposuction. This can be overcome by cryopreservation of SVF cells. The current study aimed to assess whether SVF cells retain their stem cell potency during cryopreservation.

Methods: SVF cells isolated from lipoaspirates (donor age: 46.1±11.7, BMI: 29.3±4.8) were analyzed either immediately after isolation or following cryopreservation at -80ºC. Analyses included assessment of nucleated cell counts by methylene blue staining, colony-forming unit fibroblast (CFU-F) counts, surface marker expression using a flow cytometric panel (CD45, CD34, CD31, CD73, CD29 and CD105), expansion in culture and differentiation to fat and bone.

Results: While cryopreservation reduced the number of viable SVF cells, stem cell potency was preserved, as demonstrated by no significant difference in the proliferation, surface marker expression in culture, bone and fat differentiation capacity and the number of CFU-Fs in culture, in cryopreserved versus fresh SVF cells. Importantly, reduced cell counts of cryopreserved cells was due, mainly, to a reduction in hematopoietic CD45+ cells, that was accompanied by increased proportions of CD45-CD34+CD31- stem cell progenitor cells compared to fresh SVF cells.

Conclusions: Cryopreservation of SVF cells did not affect their in vitro stem-cell potency and may therefore enable repeated SVF cell administrations, without the need for repeated liposuction.

32

FRUCTOSE 1,6-BISPHOSPHATE AS A PROTECTIVE AGENT FOR FAT GRAFTING

Presenter: Ran Xiao, MD (China)
Affiliation: Plastic Surgery Hospital CAMS PUMC
Authors: Xiao R, Lv T, Liu X, Cao YL

Introduction: Fat grafting procedures are considered to be a promising regenerative, cell-directed therapy; however, their survival is mainly influenced by ischemia condition. There is a substantial amount of evidence demonstrating the therapeutic use of adipose-derived stem cells (ASCs) to improve long-term graft survival and retention. Fructose 1,6-bisphosphate (FBP), as an intermediate in energy metabolism, has the potential to rescue cells and tissues from hypoxic-ischemic circumstances. Herein, we investigated the role of FBP in fat transplantation in nude mice and analyzed the potential influence of FBP on ASCs.

Method: Human lipoaspirates were grafted subcutaneously into nude mice followed by a daily intraperitoneal injection of FBP at different doses for 7 d. Next, the grafts were harvested at different time points till 12 wk post-implantation and were evaluated for cell viability and function, tissue revascularization and inflammatory cell infiltration using histological analysis, whole-mount living tissue imaging, GPDH activity assays and quantitative analysis of gene expression. Moreover, to analyze the cellular effects of FBP in ischemia condition (hypoxia and low nutrients), human ASCs were cultured under ischemia-mimicking conditions (hypoxia without FBS) with or without FBP treatment for 12 h and examined.

Results: Exogenous FBP administration improved volume and weight retention and mitigated the resorption of the graft post-implantation, especially at doses of 2.5 mg/g and 4 mg/g. Quantification of the number of adipocytes showed that FBP caused an increase in both central and peripheral areas from 2 wk up to 12 wk. Meanwhile, FBP enhanced adipocyte function, increased blood vessel formation and decreased inflammation. In vitro study showed that FBP could promote ASCs viability in hypoxia and low nutrient conditions.

Conclusions: Collectively, these data not only extend the application scope of FBP, which could be used to improve the efficacy of fat graft, but also provide a more thorough understanding of FBP on ASCs for cell transplantation strategy.

33

SINGLE-CELL RNA-SEQ OF CULTURED HUMAN ADIPOSE-1 DERIVED MESENCHYMAL STEM CELLS

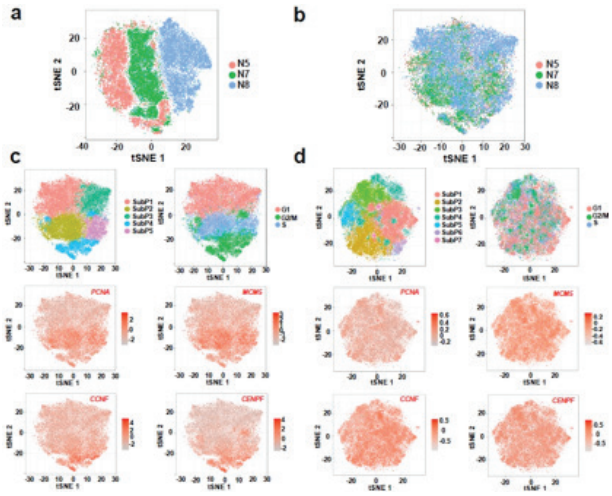
Presenter: Zhujun Li, MD (China)
Affiliation: Peking Union Medical College Hospital
Author: Li Y

Background: Adipose-derived mesenchymal stem cells (ADSCs) show considerable promise for clinical applications in regenerative medicine1,2. Cellular heterogeneity is a general feature of biological tissues and exists even within seemingly 'homogeneous' stem cell populations, which are influenced by extrinsic microenvironmental factors or intrinsic factors3. However, no study to date has dissected the heterogeneity of cultured ADSCs in a systematic manner. The lack of a thorough understanding of the cellular heterogeneity of ADSCs has hampered the development of an efficient and reproducible clinical application. The single-cell RNA-seq has shown itself to be a powerful tool to comprehensively dissect cellular heterogeneity in an unbiased manner with no need for any prior knowledge of the cell population3.

Method: We performed a large-scale single-cell transcriptomic sequencing of 24,370 cultured ADSCs.

Results: We found that the subpopulations identified by clustering generally correspond to cells inferred to be at the same cell cycle phase: 91.6% in SubP1 were in the G1 phase; 84.7% in SubP3 were also in the G1 phase; 68.8% in SubP2 were at the S phase; 99.6% in SubP4 were identified as G2/M phase cells; and 59.1% in SubP5 were identified as S phase cells. Cells expressing characteristic genes of the same cell cycle phase tended to be clustered together, as exemplified by the expression intensity distribution of the S phase marker genes (PCNA, MCM5), G2/M phase marker genes (CCNF, CENPF), which all have peak expression at the specific phases based on the database Cyclebase21. These results suggest that cell cycle represents the dominant source of transcriptional heterogeneity in cultured ADSCs, and the hidden heterogeneity may be obscured.

Conclusion: We provided a high-quality dataset, which would be a valuable resource for dissecting the intrapopulation heterogeneity as well as interrogating lineage priming patterns for any interested lineages at single-cell resolution.



34

ENZYME-CROSSLINKED GELATIN HYDROGEL ENRICHED WITH ARTICULAR CARTILAGE EXTRACELLULAR MATRIX AND HUMAN ADIPOSE-DERIVED STEM CELLS FOR HYALINE CARTILAGE REGENERATION OF RABBITS

Presenter: Jiashing Yu, PhD (Taiwan)
Affiliation: National Taiwan University
Authors: Yu J, Tsai CC, Cheng NC, Shie MY

NOT PRESENTED

35

MIR-29A PLAYS A CRUCIAL ROLE IN THE THERAPEUTIC EFFECT OF ASC-DERIVED EXTRACELLULAR VESICLES IN SYSTEMIC SCLEROSIS

Presenter: Daniele Noël, PhD (France)
Affiliation: Inserm
Authors: Noël D, Rozier P, Maumus M, Maria A, Jorgensen C, Guilpain P

Introduction: Systemic sclerosis (SSc) is a rare and potentially lethal autoimmune disease, with unmet medical need. In absence of curative treatment, mesenchymal stromal/stem cells represent a promising therapeutic approach. MSCs act primarily through the secretion of soluble factors released in large part within extracellular vesicles (EVs). Here, we investigated the effect of adipose-derived mesenchymal stromal cells (ASCs)-EV in the murine model of hypochlorite (HOCl)-induced SSc and the role of miR-29a, a known anti-fibrotic factor.

Methods: The model of SSc was induced in Balb/C mice by daily intradermal HOCl injections during 6 weeks. EV were isolated from ASCs cultures at passage 1 and characterized. Groups of 8 mice were treated at day 21 with one intravenous injection of either physiologic serum, 2.5x105 ASCs, 4x107 EV isolated from naive ASCs or ASCs transfected by miR-29a inhibitor or control inhibitor. Skin thickness was measured every week and mice euthanatized at day 42. Skin and lung samples were recovered and processed for histology, total collagen protein quantification and RT-qPCR analysis (type 1 and 3 collagens, αSma, TGFβ, MMP-1 and -9, TIMP1, IL1β, IL6, TNFα).

Results: One single injection of EV significantly reduced the clinical symptoms of SSc as evaluated by measure of skin thickness. Improvement of SSc was associated with reduced expression levels of several fibrotic and inflammation markers in the skin and lung as well as increased expression of markers involved in extracellular matrix remodeling. Histological analysis confirmed better preservation of tissue structures with low fibrosis and inflammation. Using a specific miR-29a inhibitor, we achieved a down-regulation of miR-29a in ASCs by 80%. Injection of ASCs transfected with miR-29a inhibitor in the murine model of SSc resulted in the loss of their therapeutic effect. Interestingly, the injection of EVs isolated from ASCs transfected with miR-29a inhibitor was not able to reduce the clinical symptoms of SSc.

Conclusions: Systemic injection of ASC-derived EVs exerted a similar therapeutic effect as whole ASCs in the murine model of SSc. This effect was, at least in part, mediated by miR-29a, a known anti-fibrotic mediator.

37

BREAST AUGMENTATION WITH AUTOLOGOUS FAT GRAFT

Presenter: Chao-Chuan Wu, MD (Taiwan)
Affiliation: Chai-Yen Plastic and Aesthetic Clinic
Authors: Wu CC, Wu W

Introduction: Since 2011 till 2019 We performed 34 cases of fat grafting for breast augmentation with or without cell-assisted lipotransfer.

Method: We use Vaser ultrasound-assisted liposuction for HD liposculpture and fat collection. We use Lipokit Maxstem syringes for fat washing and processing. In the cases of cell-assisted lipotransfer we use Lipokit or Cytori collagenase for digestion of fat. The process took about 90 minutes to achieve the final product of 5cc stromal vascular fraction cell pellet. Fat injection was done with 10cc syringe with a 3mm blunt cannula for pectoral intrmuscular and prepectoral spaces. Fat injection in the subcutaneous space we use 1 cc syringe and 18 gauge blunt cannula. The amount of fat graft in each breast range from 120 cc to 300 cc. The total time of operation range from 6-10 hours because multiple operations were undertaken on the same day. Intravenous anesthesia was performed by an anesthesiologist for every patient.

Result: Graft take and breasts shapes was quite satisfied to all patients.

Conclusion: Breast augmentation with autologous fat grafting can result a natural good result, in patients who recieved cell-assisted lipotransfer to the breasts, the fat graft survival rate may be even better. However strict aseptics should be followed throughout the whole procedure. Patient safety in the most important issue.

38

HOMEOTIC AND EMBRYONIC GENE EXPRESSION IN BREAST ADIPOSE TISSUE AND IN ADIPOSE TISSUES USED AS DONOR SITES IN PLASTIC SURGERY

Presenter: Foissac Rémi, MD (France)
Affiliation: Clinique Saint George
Authors: Rémi F, Camuzard O, Chignon B, Dani C

Background: Autologous fat grafting has become an essential procedure in breast reconstructive surgery. However, molecular knowledge of different adipose donor sites remains inadequate. Tissue regeneration studies have shown that it is essential to match the Hox code of transplanted cells and host tissues to achieve correct repair. This study aims to provide a better molecular under- standing of adipose tissue.

Methods: Over the course of 1 year, the authors prospectively included 15 patients and studied seven adipose areas: chin, breast, arm, abdomen, thigh, hip, and knee. The first step consisted of the surgical harvesting of adipose tissue. RNA was then extracted and converted into cDNA to study gene expression levels of 10 targeted genes by real-time polymerase chain reaction.

Results: Forty samples from Caucasian women with a mean age of 48 years were studied. The expression of PAX3, a marker of neuroectodermal origin, was significantly higher in the breast, with a decreasing gradient from the up- per to lower areas of the body. An inverse gradient was found for the expression of HOXC10. This expression profile was statistically significant for the areas of the thigh and knee compared with the breast ($p < 0.0083$).

Conclusions: Breast fat may have a specific embryologic origin compared with the knee and thigh. The reinjection of adipocytes from the infraumbilical area leads to the transfer of cells highly expressing HOXC10. This study raises questions about the safety of this procedure, and future studies will be required to examine molecular modifications of adipose cells transferred to a heterotopic location.

39

BREAST RECONSTRUCTION BY TISSUE ADVANCEMENT, LIPOFILLING AND LOOPS

Presenter: Hiba El Hajj, MD (Belgium)
Affiliation: Chu Tivoli
Authors: Abboud MH, Abboud N

Introduction: The last decade has witnessed increasing trends towards minimally invasive aesthetic surgery procedures, namely in breast cosmetic and reconstructive surgery. The authors present a novel technique in breast reconstruction based on tissue advancement, lipofilling and breast loops.

Materials and Methods: Between 2014 and 2018, 95 patients underwent breast reconstruction using the described technique. Fat harvesting is achieved under a low suction pressure using a 3 mm multi-hole cannula. Multiaxial multilayered subcutaneous tunnelization of the recipient site is performed to create a matrix for fat injection, release scar tissue and expand the recipient site. Using a number 0 PDS suture, two loops around the breast are taken. Each loop spans the superficial subcutaneous tissues at the lower inner and outer quadrants as well as the upper outer quadrant of the breast. At the upper inner quadrant, the loop is taken in the deep plane to act as an anchor for suspension. The loop is pulled to achieve the desired breast projection and to recruit skin and subcutaneous tissue from the breast surrounding. This increases the volume and the filling capacity of the breast. Fat injection to the breast is then achieved in a multiplanar multiaxial fashion. Finally, external vibration is performed using the power-handpiece to enhance diffusion of injected fat. Thus, the breast volume at the end of the operation is equal to the residual volume of the breast, the abdominal and axillary volume recruited from around the breast and the volume of fat injected.

Results: Follow up ranged from 6 to 48 months. The mean operative time ranged between 45 and 60 min. The total complication rate was 4.2%, and fat cysts that were treated conservatively and resolved at 1 year follow up.

Conclusion: The proposed technique is a simple and reproducible option to achieve safe breast reconstruction with combined tissue advancement and lipofilling.

40

MURINE BREAST CANCER GROWTH AND METASTASIS IS PROMOTED BY ADIPOSE-DERIVED STEM CELLS BUT NOT AUTOLOGOUS FAT GRAFT OR CELL-ASSISTED LIPOTRANSFER

Presenter: Michael Bezuhly, MD, MSc, SM, FRCSC (Canada)
Affiliation: Dalhousie University
Authors: Bezuhly M, Gebremeskel S, Gencarelli J, Gareau AJ, Levatte T, Dugandzic A, Johnston B

Background: Cell-assisted lipotransfer (CAL) involves enrichment of autologous fat with supraphysiologic numbers of adipose-derived stem cells (ASCs) to improve graft take. ASCs promote cancer growth, raising concerns over the safety of ASCs and CAL in postoncologic breast reconstruction. The authors compared the effect of ASCs alone, CAL, and conventional fat graft on breast cancer growth and metastasis.

Methods: Proliferation and migration of murine 4T1 breast cancer cells cultured in control medium or mouse ASC- or fat graft-conditioned media were assessed by fluorescence activated cell sorting (FACS) and scratch assay, respectively. Transcription levels of arginase-1, TGF, and VEGF were assessed in ASCs and fat graft by quantitative reverse transcription polymerase chain reaction. Breast cancer progression and metastasis were evaluated using an orthotopic mouse tumor model. 4T1 cells were injected into the mammary pad of female BALB/c mice. Six days later, tumors were injected with saline, ASCs, fat graft, or CAL ($n = 7$/group). Two weeks later, primary tumors were examined by immunohistochemistry and lung metastasis quantified.

Results: ASC-conditioned medium increased cancer cell proliferation ($p=0.03$), migration ($p<0.01$) and transcription of arginase-1, TGF, and VEGF compared to fat graft-conditioned or control media ($p<0.02$). Tumor site injection with ASCs only led to increased primary tumor growth and lung metastasis compared to control, fat graft or CAL groups ($p<0.05$). ASC injection increased CD31+ vascular density in tumors ($p<0.01$).

Conclusion: Adipose-derived stem cells alone, but not conventional fat graft or CAL, promote breast cancer cell proliferation and invasiveness in vitro and in vivo.

41

A NOVEL APPROACH IN BREAST RECONSTRUCTION: THE EXTENDED LATERAL THORACIC FLIP OVER FLAP COMBINED WITH LOOPS AND LIPOFILLING (ELT. F.O.L.L.)

Presenter: Nicolas Abboud, MD (Belgium)
Affiliation: Chu Tivoli
Authors: Abboud MH, Abboud NA

Introduction: The Thoracodorsal fasciocutaneous flaps spares the muscle and limits morbidities of the donor site when compared to a musculocutaneous flap. Our objective is to describe a new technique of breast reconstruction using a fasciocutaneous thoracodorsal flip-over flap associated with surgical loops and lipofilling to achieve a better breast remodeling.

Methods: Between 2013 and 2018, a total of 64 patients underwent breast reconstruction using a fasciocutaneous flip-over flap combined with surgical loops. The flap is designed in an elliptical transverse pattern and extends three centimeters lateral to the back midline up to the mid infra-mammary fold. It is centered on the perforators of the lateral intercostal artery identified pre-operatively with Doppler. Infiltration and tunnelisation of the breast recipient site and abdominal breast surroundings are done followed by de-epithelialization of the skin paddle. Dissection of the breast pocket and scoring of the scar tissue are performed. Flap dissection is done from distal to proximal. Once the perforators are identified, dissection is discontinued and the flap is turned over to fill the upper breast pole. The flap is inserted in the pocket and fixated to the medial part of the thoracic wall. With the patient in dorsal decubitus, breast remodeling is realized with loops passed transcutaneously, spanning the superficial subcutaneous tissues at the lower inner and outer quadrants and upper outer quadrant of the breast. At the upper inner quadrant, the loop is taken in the deep plane to act as an anchor for suspension. The loop is pulled to enhance breast projection and recruit skin from breast surroundings. Liposuction is then performed using the P.A.L.L. technique, and lipofilling is achieved throughout the thoracic cutaneous surface of the reconstructed site, especially into the lower quadrant of the breast.

Results: No complications were reported except for one infection and the shoulder function was affected at 6 weeks after the procedure with a DASH score rising from 6.53 in preoperative to 11.32 at 6 weeks.

Conclusion: The Thoracodorsal flip over flap combined with loops and lipofilling (TD. F.O.L.L.) should be considered as a simple, safe, and reliable alternative for breast reconstruction.

42

POTENTIAL OF EXOSOMES FROM ADIPOSE-DERIVED MESENCHYMAL STEM CELLS IN REJUVENATION OF THE PHOTOAGED SKIN OF RATS

Presenter: Hongwei Liu, MD, PhD (China)
Affiliation: The First Affiliated Hospital of Jinan University
Authors: Liu HW, Liang JX

NOT PRESENTED

43

ASC SECRETOME-LOADED DECELLULARIZED EXTRACELLULAR MATRIX (ECM) HYDROGELS AUGMENT DIABETIC WOUND HEALING

Presenter: Linda Vriend, MD (Netherlands)
Affiliation: University and Medical Center Groningen
Authors: Vriend L, Van Dongen JA, Camargo CP, Liguori GR, Tavares TA, Moreira LF, Harmsen MC

Introduction: Diabetic ulcers are a serious health problem with limited treatment options. Autologous fat grafting recently showed to be an effective treatment of end stage chronic diabetic ulcers. We hypothesized that the secretome (secreted paracrine factors) by resident adipose derived stromal cells (ASCs) and its ECMs' binding and release ability underlies the regenerative effect of autologous fat grafting. To test our hypothesis, we developed injectable hydrogels and loaded these with the secretome from cultured human ASCs as a controlled release platform to improve healing of dermal wounds in diabetic rats.

Methods: Decellularized pigskin was powdered as finely ECM. Controlled enzymatic digestion of the ECM yielded pre-gels that gelated at 37°C. ASCs were isolated from human lipoaspirates and cultured serumfree to collect conditioned medium (ASCcme). Prior to administration, pre-gel was mixed with concentrated ASCcme and applied to the wounds, followed by rapid gelation. Diabetes was induced in rats (10 weeks old) using 1% streptozotocin (55 mg/kg) intravascularly in the penial vein and hyperglycemia confirmed. Four 1 cm2 dermal wounds were created on the rats' back and treated: (skin ECM) hydrogel, hydrogel + ASC secretome (ASCcme), ASCcme alone and saline. At 1, 2 and 3 w, explanted wounds were assessed by H&E (general histology), Masson's Trichrome (matrix remodelling and fibrosis) and CD68 (macrophages) staining.

Results: Decellularized ECM was free of cellular and DNA remains. Thin sections' (immune) histochemical analysis of excised wounds showed that during the course of wound healing, vascularization increased in all four groups, while it was highest in the ASCcme group. At 7 days, the ECM hydrogel groups showed presence of injected material, irrespective of the presence of ASCcme, while the cellular ingrowth was not yet throughout the gels. Interestingly, macrophage influx was lowest in the ECM hydrogel group, while at 14 days the influx was highest in the saline group, followed by ECM hydrogel with ASCcme, suggesting hydrogels delay or prevent macrophage influx. In general, the ASCcme group consistently showed lower influx of macrophages at all timepoints.

Conclusion: Treatment of diabetic wounds appears to be accelerated by ECM hydrogels.

44

FOUNDATION RESEARCHES AND CLINICAL APPLICATIONS OF EXOSOMES FROM ADIPOSE-DERIVED STEM CELLS IN IMPROVING THE SURVIVAL RATE OF TRANSPLANTED FAT

Presenter: Jiawei He, MS (China)
Affiliation: Fujian Medical University Union Hospital
Authors: He J, Chen A, Zhang C, Wang T, Tang S, Gao H, Weng H, Chen P, Li X, Chen X

WITHDRAWN

45

DENO ADIPOGENESIS INDUCED BY SMALL EXTRACELLULAR VESICLES DERIVED FROM XENOGENIC ADIPOSE

Presenter: Mei Yu, PhD (China)
Affiliation: Sichuan University
Authors: Yu M, Tian TW

Introduction: Our previous results have shown that small Extracellular Vesicles (sEV) derived from rat adipose tissue could provide an appropriate microenvironment to recruit host cells and induce deno adipogenesis in nude mice.

Method: To investigate whether adipose regeneration could be promtoted by allogenic sEV under immune condition, sEV derrived from swine adipose tissue (sEV-P) were isolated, then mixed with Matrigel and implanted subcutaneously on the back of SD rat using custom-designed silicone tube. Infiltration of the host cells and neoadipose tissue formation in the silicone tube were observed for morphometric, histologic, and immune-histochemical analysis at 3d, 5d, 1w, 2w, 4w and 8w respectively.

Results: sEV derived from rat or porcine adipose were quantified by Nanoparticle Tracking Analysis and further characterized by transmission electron microscopy and presence of exosome specific marker. The results showed that sEV derived from these two species are identical in characterization and quantification. In vivo adipose neotissue formation, neovascularization, and volume stability were evaluated over a period of 8 weeks. The results showed that sEV derived from pocine adipose facilitated the infiltration of rat host cells into chamber area, reduced the thickness of capsule, significantly enhanced the formation of vessels and neo-adipose tissues. Compared to the allogenic sEV (sEV derived from rat adipose), Xenogenic sEV (sEV from swine adipose) did not increase the expression of inflammatory factors and slightly promoted the deno adipogenesis in rat.

Conclusions: Our findings indicated that Xenogenic sEV could be used for regenerative medicine applications, sEV derived from swine adipose tissue has great potential in the development of tissue engineering due to its easy acquirement in large quantities.

46

THE STROMAL VASCULAR FRACTION CELL SECRETOME AND ITS POTENTIAL ROLE IN HAIR REGENERATION

Presenter: Katarina Andjelkov, MD, PhD (Serbia)
Affiliation: BelPrime Clinic Belgrade Serbia
Authors: Andjelkov K, Eremin I, Soldatovic I

Introduction: Hair follicles (HF) strongly interact with dermal white adipose tissue (dWAT), suggesting a physiological dependence on the content of this layer. [1] The identification of paracrine factors in the dWAT secretome would be of significant value for understanding the regulation of HF regeneration and identifying potential factors for therapeutic use.

Method: Punch biopsies containing dermal adipose tissue were taken from the scalp and hairy abdominal area from male patients diagnosed with androgenetic alopecia. All patients were candidates for hair transplantation. The observed scalp areas were occipital, border (between normal hair growth and alopecia) and alopecia zone and hairy paraumbilical zone. From each area we took three samples. All samples were collected into the sterile tubes contained transport medium – DMEM\F12 supplemented with 5x anti-anti solution (all from Gibco, USA). In the laboratory all samples were enzymatically digested according to the standardized protocol and cell pellets were ceded with DMEM\F12 culture medium supplemented with 10% of FBS (HyClone, GE, USA) for 10 days in +370C, 5% CO2. After cell cultures reached monolayer, culture medium was changed for serum-free for 3 days. Following that, culture medium was collected and stored at -700C in aliquots. Cells were detached with TrypLE solution and cryopreserved.

Conditioned media samples were thawed and analyzed in doubles immediately with 41 plex kit (xMap technology, Millipore, USA) according to manufacturer protocol. Results were registred by Magpix device (Luminex platform) and calculated with xPonent software (Luminex) and statistically analyzed.

Results: We had 6 patients. Our data showed that the levels of EGF were significantly lower in abdominal area in comparison to all 3 zones in the scalp. Although not significant, the trend was observed with the levels of TGF-a (it was higher in alopecia zone) and in levels of IL-6 (it was lower in alopecia zone). The negative correlation was also noted with MCP 1 and MIP 1A levels.

Conclusion: Our data, although in small patient's group, suggest that there are changes in secretome activity within dermal adipose tissue in different zones of hair growth. These findings can be a good starting point for further researches.

47

THE EFFECT OF HYPOXIA - INDUCED STEM CELLS-PRECONDITIONED SECRETOME MEDIUM ENHANCED DIABETIC WOUND HEALING IN A STZ-INDUCED DIABETIC RATS

Presenter: YurRen Kuo, MD, PhD, FACS (Taiwan)
Affiliation: Kaohsiung Medical University Hospital
Authors: Kuo YR, Wang CT, Chen RF

Purpose: Studies indicated mesenchymal stem cells could enhance diabetic wound healing. However, clinical applications in wound healing are still concerned by FDA situation. We are interesting whether cultured secretome medium of adipose-derived stem cells (ASCs) under hypoxia-precondition (HPCM) could enhance diabetic wound healing in a STZ-induced diabetic rodent mode

Materials and Methods: Diabetes would be induced in male Wistar rats (weigh: 300-350 g) by a single injection of streptozotocin (STZ) (65 mg/kg i.p.). Rat dorsum was shaved and a 6×5-cm full thickness dorsal skin was drawn on the rats as the animal wounding model followed our previous report. Group I normal control, group II diabetes without treatment, group III diabetes with Tagaderm (OPsite) alone, group IV receive hypoxia-preconditioning (HPCM; 1 ml spray from 1x106 cell culture medium; 3 times per week) in wounding bed post-operatively. The expression levels of the growth factors and related-cytokines were evaluated.

Results: The results revealed the morphological changes of ASCs did not show obvious difference between human and rat ASCs under hypoxia and normoxia conditioning in vitro. The cytokine expressions in ELISA study revealed, VEGF cytokine was significant increase in hypoxia-preconditioning group, as compared to that in normoxia. However, the expressions of bFGF and TGF-beta1 did not show statistical difference between hypoxia and normoxia conditioning groups. HIF-1alpha expression of nuclear extracts of rat ASCs revealed significant increase after hypoxia pre-conditioning. In contrast, our in vivo animal study showed group IV with HPCM treatment could enhance diabetic wound healing as compared to that in controls. The IHC staining study showed the expression of VEGF, Ki67 and rPH were apparently increased in HPCM group.

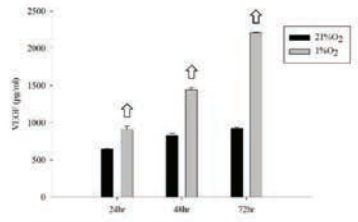
Conclusion: Hypoxia-induced ASC-preconditioned culture medium could increase diabetic wound healing. This approach could be applied as good option for enhancement of critical wound healing and future clinical application

47

THE EFFECT OF HYPOXIA - INDUCED STEM CELLS-PRECONDITIONED SECRETOME MEDIUM ENHANCED DIABETIC WOUND HEALING IN A STZ-INDUCED DIABETIC RATS

Presenter: YurRen Kuo, MD, PhD, FACS (Taiwan)
Affiliation: Kaohsiung Medical University Hospital
Authors: Kuo YR, Wang CT, Chen RF

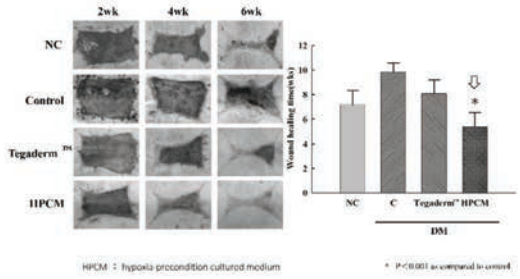
Expression of VEGF in hypoxia secretome



VEGF : vascular endothelial growth factor

15

Hypoxia secretome enhance wound healing



HPCM : hypoxia-precondition cultured medium

* P<0.001 as compared to control

Summary of IHC staining after HPCM-treatment

(D10&D17 after HPCM-treatment)

		NC	C	Tegaderm™	HPCM	*P
Ki-67↑	D10	39.92±2.85	37.33±1.65	35.70±4.81	73.59±2.64	*P<0.001
	D17	50.97±5.67	20.69±3.80	43.66±4.22	82.45±5.96	
VEGF↑	D10	46.33±1.19	18.90±4.71	33.52±4.91	75.65±4.61	*P<0.001
	D17	53.43±3.47	25.73±3.18	42.73±5.04	85.73±2.79	
rPH↑	D10	21.67±2.72	11.00±1.27	22.36±2.25	65.12±4.94	*P<0.001
	D17	36.42±2.45	24.76±1.51	29.78±2.71	79.80±4.64	
EGF↑	D10	22.39±1.86	13.29±1.30	20.35±3.51	65.39±4.70	*P<0.001
	D17	48.07±4.37	26.53~2.41	42.45±3.78	76.39±7.63	

Abbreviations: Ki-67: proliferating cell nuclear antigen, VEGF: vascular endothelial growth factor, rPH: fibroblast marker, EGF: epidermal growth factor

48

STEM CELL THERAPY FOR THE TREATMENT OF SEVERE TISSUE DAMAGE AFTER RADIATION EXPOSURE

Presenter: Alain Chapel, PhD (France)
Affiliation: IRSN
Authors: Chapel A, Semont A, Linard C, Nathieu N, Demarquay C, Squiban C, Voswinkel J, Rouard H, Simon JM, Lataillade JJ, Martinaud C, Benderitter M, Gorin JC, Mothy M

The late adverse effects of pelvic radiotherapy concern 5% of patients, which could be life threatening. However, a clear medical consensus concerning the clinical management of such healthy tissue sequelae does not exist. Our group has demonstrated in preclinical animal models that systemic MSC injection is a promising approach for the medical management of gastrointestinal disorder after irradiation.

The clinical status of four first patients suffering from severe pelvic side effects was improved following MSC injection. A quantity of 2x106 - 6x106 MSC/kg were infused intravenously to the patients. Pain, hemorrhage, frequency of diarrheas and fistulisation as well as the lymphocyte subsets in peripheral blood were evaluated before MSC therapy and during the follow-up. Two patients revealed a substantiated clinical response for pain and hemorrhage after MSC therapy. In one patient pain reappeared after 6 months and again substantially responded on a second MSC infusion. The frequency of painful diarrhea diminished from 6/d to 3/d after the first and 2/d after the 2nd MSC injection in one patient. A beginning fistulization process could be stopped in one patient resulting in a stable remission for more than 3 years of follow-up. In all patients, prostate cancer remained in stable complete remission. A modulation of the lymphocyte subsets towards a regulatory pattern and diminution of activated T cells accompanies the clinical response. MSC therapy was effective on pain, diarrhea, hemorrhage, inflammation, fibrosis and limited fistulization. No toxicity was observed. For patients with refractory chronic inflammatory and fistulizing bowel diseases, systemic MSC injections represent a safe option for salvage therapy.

We are now initiating a clinical research protocol for patients with post-radiation abdominal and pelvic. Treatment is a suspension of allogeneic MSC. Eligible patients must have a grade greater than 2 for rectoragy or hematuria. Each patient receives 3 injections of MSC at 7-day intervals. Patients will be followed up over a 12-month period. The main objective is a decrease of one grade on the LENT SOMA scale for rectorrhagia or hematuria. The secondary objective is to reduce the frequency of diarrhea and improved quality of life.

49

STROMAL VASCULAR FRACTION FOR THE TREATMENT OF THE RADIATION-INDUCED GASTROINTESTINAL SYNDROME

Presenter: Christine Linard, PhD (France)
Affiliation: IRSN
Authors: Linard C, Squiban C, Demarquay C, L'Homme B, Benderitter M, Mathieu N, Milliat F

Introduction: Accidental or intended high doses radiation exposures have serious consequences for the health of exposed people and may impact a large number of people (as well as military than civil). Exposure of a large volume at high irradiation doses induces multiple tissue lesions grouped under the name of Acute Radiation Syndrome (ARS). The gastro-intestinal tract is especially sensitive to irradiation. At dose more than 10 Gy results in diarrhea, dehydration, sepsis and intestinal bleeding with death within 10 to 15 days post-exposure. Radiation-induced gastrointestinal syndrome results from direct cytocidal effects on intestinal stem cells and crypt stromal impairing epithelial regeneration. Irradiation rapidly reduces the mucosal integrity and promotes systemic bacteria influx resulting in sepsis and death. In this context, there is an urgent need for effective, rapid and applicable therapeutic measures for a large number of victims. Adipose-derived stromal vascular fraction (ADSVF) is an easily accessible source of cells with angiogenic, anti-inflammatory, immunomodulatory, and regenerative properties. We examined whether ADSVF protect irradiated intestinal cells niche and mitigate gastrointestinal syndrome.

Methods: At the day of the abdominal irradiation (18Gy) mice were injected in systemic by the stromal vascular fraction (ADSVF) (2.5 106 cells), obtained through enzymatic digestion of inguinal adipose tissue.

Results: We found that, at 7 days post-irradiation, treatment with ADSVF limited the weight loss of mice and reduced the intestinal permeability. Immunohistological analyses in intestinal tissues revealed an increase of regenerating crypts, a restoration of the stromal compartment and an increase of Ki67+ proliferating cells in response to ADSVF treatment. In addition, the treatment reduced significantly the expression of cytokines associated to inflammatory response in intestine and normalized the splenic immune cells (CD4, CD8, CD19) populations and increased the C11b/Ly6Clow/Cx3cr1 population.

Conclusion: Treatment in emergency of gastrointestinlal syndrome could be achieved by intravenous injection of ADSVF inducing regeneration of intestine.

50

STRATEGIES TO IMPROVE ADIPOSE MESENCHYMAL STROMAL CELL THERAPEUTIC EFFECT: APPLICATION TO PELVIC RADIOTHERAPY SIDE EFFECTS

Presenter: Noëlle Mathieu, PhD (France)
Affiliation: IRSN
Authors: Mathieu N, Moussa L, Demarquay C, Semont A, Linard C, Chapel A, Squiban C, Milliat F, Barritault D, Weiss P

Healthy tissues surrounding pelvic tumours may be impaired during radiotherapy (RT) and could lead to chronic gastrointestinal complications with substantial mortality. Injection of Adipose-derived Mesenchymal Stromal Cells (Ad-MSC) represents a promising therapeutic strategy. However, many stem cell clinical trials do not confer expected beneficial effect, suggesting a real need to accelerate research towards the successful clinical application. We hypothesized that heparan sulfate (HS)-mimetic injections that restore the extracellular matrix network and enhance the biological activity of growth factors, associated with local injection of MSC protected in a hydrogel that improves cell engraftment and cell survival, could improve the therapeutic benefit of MSC treatment.

We used an experimental model of radiation proctitis developed in rats that reproduces severe colonic mucosal damages and fibrosis similar to those observed in patients treated by radiotherapy [1]. We tested injections of HS-m, local injection through endoscopy of Ad-MSC embedded in Si-HPMC hydrogel as well as combinations of these various treatments. The therapeutic benefit was evaluated by endoscopy, histology and functional parameters as epithelial barrier were also tested.

We demonstrated that hydrogel loaded-Ad-MSCs were viable, able to secrete trophic factors and responsive to the inflammatory environment. In animal model, Ad-MSC+Si-HPMC improve colonic epithelial structure and hyperpermeability. This therapeutic benefit is associated with greater engraftment of Si-HPMC-embedded Ad-MSCs in the irradiated colonic mucosa [2]. We demonstrated that combination of HS-m to hydrogel-embedded MSC treatment enhances the therapeutic benefit of MSC therapy alone. We also demonstrated that the combined treatment favored the epithelial regenerative process. Finally, using an animal model of colonic surgery after irradiation, we demonstrated that the combined treatment improved rat survival, healing of the anastomosis and scar quality assessed by collagen deposit [3].

In this study, we identified a new way, clinically applicable, to optimize stem-cell therapy and could be proposed to patients suffering from severe colonic defect after RT.

51

STROMAL VASCULAR FRACTION TREATMENT OF CHRONIC RADIATION CYSTITIS IN RATS

Presenter: Clement Brossard, PhD (France)
Affiliation: IRSN
Authors: Chapel A, Brossard CB

Introduction: Chronic radiocystitis (CRC) is a consecutive pathology of pelvic irradiation characterized by chronic inflammation sometimes progressing to fibrosis and in the most severe cases to fistulas with symptoms such as pain and bleeding. There is no effective treatment and we propose to test Stromal vascular fraction (SVF) as a new therapeutic method. Our previous studies on radiation rectitis have shown that MSCs can reverse chronic inflammation and fibrosis after irradiation.

Material and Methods: Preclinical modelling of CRC in rats was implemented by localized irradiation guided by scanner imaging of the bladder from 20 to 40 Gray with a follow-up of 3 to 6 months post-irradiation. Gene and protein expression analyses as well as histological and functional parameters are carried out.

Results and Statistical Analysis: The analysis of urinary parameters revealed transient hematuria but no decrease in urinary volume over the 6 months. Transcriptomic analysis indicates a profile of chronic inflammation (IL1β, CCL2, IL6) and hypoxia (HIF1α) at 6 months. Histological observations reveal a disorganization of urothelium at 6 months, with a decrease in its thickness and vascular lesions, which is consistent with gene expression results.

Conclusion: These initial results attest to the relevance of the study by showing an initiation of CRC at 6 months with chronic inflammation, signs of hypoxia, hematuria and urothelium disorganization. The analysis of kinetics over later times will make it possible to characterize the evolution towards fibrosis and to have an established CRC. In a second step we will set up the treatment of this pathology by cell therapy.

52

AUTOLOGOUS FAT GRAFTING COMBINED WITH ADIPOSE-DERIVED STROMAL VASCULAR FRACTION INJECTION FOR COMPLETE SPONTANEOUS HEALING OF RADIATION-INDUCED RECTUM LESIONS

Presenter: Viacheslav Vasilyev, PhD (Russia)
Affiliation: South Ural State Medical University
Authors: Teriushkova ZI, Vasilyev VS, Vazhenin AV, Dimov GP, Lomakin EA, Eremin II, Vasilyev YS, Vasilyev IS

Introduction: Late radiation-induced damage of soft tissue is an irreversible long-lasting process that starts from fibrosis and in some cases ends up with necrosis. Radiation-induced rectal proctitis, ulcers and fistulas are very difficult to treat due to the features of the anatomical area. A new approach for treatment of radiation-induced soft tissue damage was offered by G.Rigotty et al in 2007. Authors showed that fat grafting resulted in complete healing of radiation wounds in all cases. Later Akita et al demonstrated the same efficiency of adipose-derived stromal-vascular (SVF) fraction injections for radiolesions.

Method: 63 patients with radiation-induced lesions of rectum (rectovaginal fistula – 41 patients, ulcers – 16 patients, proctitis – 7 patients) were treated with autologous fat and stromal-vascular fraction injection. Fat harvesting was performed with suction-assisted syringe liposuction with 14 holes 2,5 mm cannula. Deep plane of rectovaginal septum was infiltrated with 10-20 cc of microfat. Stromal-vascular fraction was isolated from 50 cc of decantated lipoaspirate with collagenase type 2 digestion and resuspended in 5 cc of Hartman's solutions. Results were evaluated with digital examination, fistula probing, anoscopy, rectoromanoscopy, colonoscopy, proctography, endorectal ultrasound with elastosonography, magnetic resonance imaging, histology and immunohistochemistry.

Results: In all cases complete spontaneous healing of rectum radiation-induced defects has been achieved. From one to five repeated procedures with 3-6 months intervals was necessary to gain epithelization. Relapse was not observed in a long term follow up (6 months till 5 years) after closing of colostomy. In patients with rectal radiation-induced proctitis and wounds complete healing was achieved without colostomy. Complications have not been registered. Histology showed nonspecific healing process: necrotic inflammation, granulation tissue formation, epithelization and tissue maturation.

Conclusions: This study demonstrates safety and efficacy of autologous fat and stromal-vascular fraction injection for treatment of radiation-induced rectal lesions. This minimally invasive procedure might be recommended as a method of first choice for such cohort of patients.

53

BONE REGENERATION IN MEDICATION-RELATED OSTEONECROSIS OF THE JAW WITH UNCULTURED STROMAL VASCULAR FRACTION AND L-PRF

Presenter: Cyril Bouland, MD (Belgium)
Affiliation: CHU-ST-Pierre
Authors: Bouland C, Meuleman N, Javadian R, Philippart P, Dequanter D, Lagneaux L, Philippart P, Loeb I

Introduction: Medication-Related Osteonecrosis of the Jaw (MRONJ) is a challenging affection, considering the absence of a «Gold Standard» treatment. Cell-based therapy and tissue engineering could be a therapeutic option, using Mesenchymal Stromal Cells (MSC) and Endothelial Progenitor Cells (EPC), from the Adipose-Tissue Stromal Vascular Fraction (AT-SVF); and L-Platelet-Rich Fibrin (L-PRF) as a scaffold, given its enhancing healing properties. The purpose of this pilot study is to use autologous fresh AT-SVF in a L-PRF scaffold to treat MRONJ.

Methods: Two patients benefited from the protocol consisting of applying autologous AT-SVF in a L-PRF matrix on the alveolar bone after surgical debridement. They were followed under 3 criteria: clinical, biological and by medical imaging.

Results: The first patient, suffering from a Multiple Myeloma (MM), had a superior maxillary stage III MRONJ. Two weeks after the procedure, the buccal mucosa was closed. The second patient developed a mandibular stage II MRONJ on her osteoporosis treatment. One month after the procedure, the buccal mucosa was closed. During the eighteen months of clinical follow up, no signs of MRONJ recurrence occurred for both patients. Bone regeneration was observed on the jaw Cone Beam Computed Tomography (CBCT) 2, 6, 12 and 18 months after the surgical procedure. We confirmed the presence of MSC and EPC in the AT-SVF by immunophenotyping: 25±10% CD34+, 18±6% CD31+ and 42±13% CD146+.

Conclusion: We report here on the two first cases of MRONJ treatment using autologous AT-SVF in a L-PRF scaffold. Our results are encouraging and suggest the extension of this pilot study.

54

SKIN DAMAGE SECONDARY TO RADIOTHERAPY: A POTENTIAL THERAPY USING ASC-BASED BIOLOGICAL DRESSINGS IN A MURINE MODEL

Presenter: Candice Diaz, BS (Canada)
Affiliation: LOEX- Laval University
Authors: Diaz C, Hayward CJ, Paquette C, Langevin J, Galarneau J, Archambault L, Pollock NW, Fradette J

Radiotherapy used for cancer treatment can lead to incapacitating hard-to-heal skin wounds. Such wounds can be highly debilitating for patients, with significant negative impact on quality of life. There is no gold-standard curative treatment for radiodermatitis. Mesenchymal stem cell-based therapies appear to offer a promising approach to cure radiation lesions. We have engineered biological dressings from human adipose-derived stem cells (ASC) that secrete high levels of prohealing factors. These natural cell-based human tissues are produced without exogenous biomaterials and feature an abundant tissue-specific extracellular matrix. Our hypothesis is that weekly topical application of dressings engineered using ASC can improve healing in a murine model of excisional wounds on irradiated tissues. A single 45 Gray radiation dose was delivered to dorsal skin (1 cm2) in CD-1 mice using a medical linear accelerator. Four weeks after irradiation, full-thickness splinted excisional wounds (8 mm diameter punch) were created in irradiated and non-irradiated areas. Global wound closure evaluation from macroscopic images revealed that wounds in irradiated tissues featured delayed healing (58% vs 90% healed surface area, P=0.007). ASC dressings promoted wound closure in irradiated tissues (86% vs 58%, P=0.01). While irradiation initially decreased tissue vascularity (1.3-fold fewer CD31+ vessels), this was increased 2.5-fold (P=0.0005) with ASC dressings. The number of αSMA+-myofibroblasts, commonly associated with fibrosis and overabundant in irradiated tissues, was reduced 2-fold (P=0.005) with dressing treatment. Following these encouraging results, we are evaluating a synergistic novel therapy combining ASC-based dressings with serial hyperbaric oxygen treatment to further improve healing. In preliminary results, combined treatment also significantly increased wound closure in irradiated skin (90% vs 58% healed surface area, P=0.004). We thus established a murine model to assess various therapeutic protocols for the treatment of refractory skin wounds. Upon completion, these preclinical studies will provide an evidence-based evaluation of the efficacy of these treatments to improve healing, to speed recovery and hopefully return patients to a higher quality of life.

55

COMPARATIVE ANALYSIS OF THERAPEUTIC EFFICACY OF MESENCHYMAL STROMAL CELLS ISOLATED FROM DIFFERENT SOURCES ON RAT MODEL OF THERMAL SKIN BURN

Presenter: Ilya Eremin, MD (Russia)
Affiliation: Central Clinical Hospital
Authors: Eremin I, Korsakov I, Petrikina A, Chauzova T, Grinakovskaya O, Paklina O, Setdikova G, Pulin A

Wide range of cell products consisting of different types of cells obtained from various sources are used today in the regenerative medicine. The most popular sources of cells in the adult body are bone marrow, fat tissue, skin, mucous membranes. In this case, each of the sources has their advantages and disadvantages. Comparative studies of cells isolated from various sources, their concentrations and the frequency of administration on a single model are practically absent.

Experiments were approved by local ethics committee. The rat model of thermal skin burn was used. Under general anesthesia skin on the back was depilated. Steel cylinder (diameter - 23 mm, weight - 100 g) was heated 2 minutes in boiling water and applied without pressure to the skin for 20 seconds. 192 adult Whistar rats were divided into 16 groups, 12 in each. Following cell products and dosages were investigated: allogeneic placenta derived multipotent mesenchymal stromal cells (MSCs) (1 injection 5 mln or 2 injections 5 mln each with 1 week interval), adipose-derived stromal-vascular fraction (SVF) (isolated from 1 ml of fat), SVF (isolated from 1 ml of fat) + allogeneic adipose-derived MSCs (adMSCs) (1, 5 or 10 mln), SVF (isolated from 1 ml of fat) + autologous adMSCs (5 or 10 mln), autologous adMSCs (1, 5 or 10 mln), allogeneic adMSCs (5mln), allogeneic gingiva-derived MSCs (1 or 5 mln). Investigated product was suspended in 0,6 ml of saline and administered subcutaneously at 24 points along the circumference of burn and under the wound bottom through 8 punctures in equal portions. Cells were administered at day 3 (single injection) or days 3 and 10 (double injections) after burn modeling. Control group received equal volume of saline. Primary endpoint was the time to complete epithelialization of the wound (in days). Secondary endpoints were - reduction of dermal wound area at days 21 and 30 and the degree of regeneration according to histological examination.

Greater therapeutic efficacy of single injection of allogeneic MSCs isolated from the placenta compared to all other cell types was demonstrated. Second injection of placenta derived MSCs significantly improved results.

The study was funded by Russian Science Foundation (project # 17-75-30066).

56

PROVIDING FUNCTIONAL AND AESTHETIC HEALING WITH MATRIDERM® AND LATE FAT INJECTION IN FRONTAL ARM FLEXOR FACE BURN CONTRACTS

Presenter: Perçin Karakol, MD (Turkey)
Affiliation: Bagcilar Educaton And Research Hospital
Authors: Balikç T, Bozkurt M, Karakol P, Sezgiç M, Metin A

Introduction: Target reconstruction of burn contractures, optimal restoration of disease, functional socially and psychologically as well as collective reintegration of patients. In burn contracture surgery, scar excision, can be done, defects that occur due to breakage of contraction bands can be restored by full thickness skin graft (FTSG), split thickness skin graft (STSG), local and remote skin flaps. In our study, it was aimed to demonstrate the effect of dermal equivalent (MatriDerm) and late-stage fat injections on the functional recovery of burn contractures.

Materials and Methods: 15 patients aged between 2 and 41 were treated with MatriDerm and STSG and late-stage fat injection; FTSG was applied to the other 15 patients (group 2) and each patient group was followed up to 18 months postoperatively. In the study, we examined the functional and aesthetic consequences of closing the burns of the forearm flexor face with KKDG and MatriDerm®, as well as the injection of fat in the late postoperative period. In this procedure: the contracture lines in the upper extremity are first relieved incisionally and rigid and poorly organized tissue excision is achieved. MatriDerm was then placed open and the STSG placed. The ROM of the patients were measured at one month intervals starting from the first physical therapy and rehabilitation session with postoperative fat injections at the 3rd. and 6th. months respectively.

Results: During the follow-up period, ROM of the MCP, PIP, DIP was found to be 23.5 degrees to 77 degrees in 1st. group, 23.5 degrees to 70 degrees in the 2nd. group; It was noted that relaxation was observed in both groups in the contracture lines where the flexor movement deficit was decreased in the first group after the late period fat injections. It was seen that the increase in skin elasticity and the speed of healing were more prominent in group 1.

Discussion: Recurrences, inadequate skin quality and flexibility are common problems after contracture surgery. In our study, we conclude that the combined use of MatriDerm with STSG in the treatment of burn contracture has increased the skin qualities flexibility and visibility, making it more acceptable as a deep-seated appearance.

57

THERAPEUTIC EFFECTS OF ADIPOSE MESENCHYMAL STEM CELLS SECRETOME ON A MOUSE SPINAL CORD INJURY MODEL

Presenter: Jorge C. Ribeiro, MS (Portugal)
Affiliation: Cibraozinho
Authors: Ribeiro JC, Monteiro S, Lima R, Serra SC, Teixeira FG, Graça JL, Silva NA, Salgado AJ

Spinal cord Injury (SCI) is a dramatic pathology, with a high number of new cases emerging every year (57.8 new cases per year in Portugal) and a typical higher incidence is found in younger males. The most common cause of injury comes from traumatic events, such as traffic accidents, falls, violence and sports activities, while the non-traumatic events (tumors, neurodegenerative and infectious diseases) are less prevalent. The injury itself triggers several biological events such as the activation of apoptotic pathways, the release of inflammatory cytokines and also the formation of a glial scar that primarily contains further damage, but also releases biomolecules that inhibit axons outgrowth, causing motor and sensory functional loss below the level of the spinal cord which translates in poor living conditions to the patients. The purpose of this work was to evaluate the therapeutic potential of Adipose Stem Cells (ASCs) secretome on a mouse (C57BL/6) spinal cord injury model, when injected systemically or locally in the injury site. As reported previously, ASCs are known to secrete several factors, including: anti-apoptotic and angiogenic factors, neuroprotectants and immunomodulators which may prime the unfavorable environment created upon SCI to a more neuroprotective/ neuroregenerative one. Furthermore, this is a cell-transplantation-free therapy without the disadvantages associated with the transplantation of cells. Our results demonstrated that ASCs secretome induced a significant improvement ($P<0.05$), of the locomotor performance of SCI mice, when compared to untreated animals, as assessed by the Basso Mouse Scale test (BMS), Open Field and Beam Balance tests. This was particular evident in the animals that were injected systemically with ASCs secretome. Additionally, the histological analysis has indicated that this motor improvement is closely related with a consistent reduction of the lesion volume, as well as a decreased activation of inflammatory cells (microglia) activation after treatment. Overall, our results have shown a positive effect of ASCs secretome in the recovery after a spinal cord injury in mice, giving an opportunity to further explore the therapeutic potential of it.

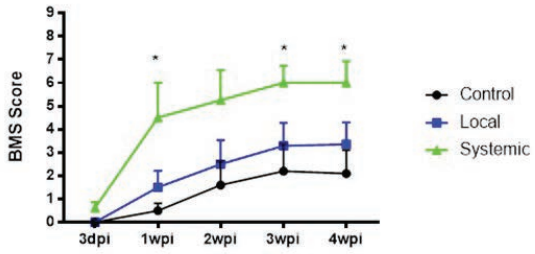


***Figure 1**-Locomotor behavior evaluation using the BMS test (Basso Mouse Scale) of animals treated with culture medium and ASCs secretome injected local and systemic. Data show as mean ± standard error mean. (Control=6; Local=9; Systemic=4; *P<0.05)*

58

NEUROPROTECTIVE EFFECTS OF ADIPOSE-DERIVED STROMAL VASCULAR FRACTION STEM CELLS ON ACUTE TRAUMATIC SPINE CORD INJURIES IN RATS

Presenter: Nicolas Serratrice, MS (France)
Affiliation: Hôpital de La Conception
Authors: Serratrice N, Brezun JM, Marqueste T, Vogtensperger M, Magalon J, Giraudo L, Belluco S, Magalon G, Marchal T, Fuentes S, Sabatier F, DecherchI P

Spinal cord injuries remain a real public health issue. However, despite more than half a century of intensive research and numerous clinical trials, the different strategies for repairing the spinal cord remain, so far, still inconclusive even if the diagnosis and the patient care have improved considerably. At a time when Japan and China are embarking on cell therapy trials for chronic spinal cord injuries, there is currently no recommended treatment that would allow spinal cord injured people to preserve damaged tissue avoiding the secondary expansion of the lesion and recovering all of their sensorimotor functions. We thought the stromal vascular fraction (SVF) derived from adipose tissue could have a neuroprotective effect on the acute phase after spinal cord injuries. SVF is extractable in just 2 h and contains a true "cocktail" of mesenchymal and hematopoietic stem cells known for their regenerative and anti-inflammatory properties. Our strategy is based on an autologous injection of the SVF within 4 hours after a spinal cord injury. To check our hypothesis, we conducted a pre-clinical study in adult male rats. Contusions performed at thoracic level T10 using an impactor. The epididymal fat removed in a second time. From a fat sample of 11.7 +/- 3.5 cc it is possible to extract 8.9 +/- 2.1 million cells of the SVF with a viability of 92.2 +/- 1.6% and a yield of more than 77.7 +/- 0.04%. 1 million cells of the rat autologous SVF then injected into the peri-medullary space in front of the lesion. The procedure performed within 4 h after the spinal cord injuries. The following 3 months are devoted to kinematic analysis of movement, evaluation of post-traumatic sensorimotor recoveries using different behavioral tests (BBB test, Ladder rung walking test, Tape-removal test, Grip strength meter test, CatWalk,...), electrophysiology (recording of evoked potentials, sensorimotor reflexes,...), biochemistry (Elisa,...), immunohistology (neurofilament labeling, signs of neuronotrophic and neuritogenic). We present here for the first time the results.

59

RE-NEUROLYSIS AND INFILTRATION OF AUTOLOGOUS LIPOASPIRATE AROUND THE MEDIAN NERVE IN SECONDARY RECURRENT CARPAL TUNNEL SYNDROME, A PROSPECTIVE COHORT STUDY

Presenter: Olivier Gostelie, MS (Netherlands)
Affiliation: Maasstad Hospital
Authors: Gostelie O, Jaquet J, Tellier M, Nanninga G, Paulusma P, Coert H

Background: Release of the flexor retinaculum in carpal tunnel syndrome (CTS) is a frequently executed operation. Residue or recurrent complaints occur in 3-25% after a primary surgical treatment. Recurrent CTS is mostly caused by new fibrous perineural adhesions around the median nerve. Extensive neurolysis is suggested in a first recurrent episode. In case of secondary recurrence, it is proposed to add an interposition of vascularised fat- fascia or muscle- tissue after an extensive neurolysis. Most of these techniques are labour-intensive and come with donor morbidity. The outcome of our new technique is promising with a low risk of complications.

Methods: In this prospective cohort study (N=20), patients with a 2nd to 5th recurrent CTS are treated with extensive external neurolysis followed by perineural infiltration of unprocessed lipoaspirate. Primary outcome is a Patient Related Outcome Measure (PROM) obtained with the Boston Carpal Tunnel Questionnaire (BCTQ). Secondary outcome is electrodiagnostic nerve conduction velocity obtained with electromyography (EMG). Data are obtained pre-and post-operatively with a mean follow-up of 27 months.

Results: Analysis of the cohort showed a significant relevant clinical decrease in CTS symptoms. The total BCTQ scores decreased with 1.52 ($p<0.05$), with an improvement in both SSS (Symptom Severity Score) as FSS (Functional Severity Scores) scores. In 35% of patients, CTS could not be confirmed post-operatively. No severe complications were observed.

Conclusions: Extensive external neurolysis of the median nerve in combination with perineural infiltration of autologous adipose tissue in secondary recurrent CTS gives a significant long lasting improvement of symptoms with a low complication- and morbidity rate. This operative treatment seems promising and efficient in case of recalcitrant recurrent CTS.

60

AUTOLOGOUS FAT GRAFTING AS TREATMENT FOR POST-HERPETIC NEURALGIA - RESULTS FROM A PILOT TRIAL INVESTIGATING FEASIBILITY, EFFICACY AND SAFETY

Presenter: Martin Sollie, MD, PhD (Denmark)
Affiliation: Odense University Hospital
Authors: Sollie M, Sorensen JA, Thomsen JB

Introduction: Post-herpetic neuralgia (PHN) is a relatively common side effect after an outbreak of herpes zoster. It is characterized by chronic dermal neuropathic pain in the area of the previous rash. Pain is the predominant symptom and their Quality of Life (QoL) is often reduced. PHN is exceptionally drug-resistant and no effective treatment exists for these neuropathic pains. We report on the first human pilot study using autologous fat grafting for treating PHN with a 12-week follow-up. The aim of this pilot trial was to investigate the feasibility, safety, and efficacy of autologous fat grafting as a treatment for PHN.

Methods: We included 10 patients with PHN. Autologous fat grafting to the painful dermal area was performed on all patients. The primary endpoint was patient-reported dermal pain. Secondary endpoints were patient-reported changes in QoL and the degree and quality of the Neuropathic Pain.

Results: All patients experienced high levels of pain and reduced QoL prior to treatment. During follow-up, improvements in pain were seen in both the average and maximum level of pain. Five out of ten patients reported their pain being less than two on a VAS scale after just a single treatment. Patients also reported improvement in the quality and degree of neuropathic pain. All parameters investigating pain were statistically significantly reduced. No improvement was seen in their QoL. No serious adverse effects were seen.

Conclusions: In this pilot study, a single treatment with autologous fat grafting to the area of dermal pain significantly reduced the level of pain on all measured, patient-reported, parameters. Five out of ten patients were close to pain-free after the procedure. No improvement was seen in their QoL. The procedure proved to be safe and no serious adverse effects were seen during follow-up. Results of this trial need to be confirmed in randomized trials.

61

TREATMENT OF PARKINSON'S DISEASE WITH TRANSPLANTATION OF ADIPOSE-DERIVED SVF CELLS TO THE FACE: A FIRST-IN-MAN CASE REPORT WITH 4 YEARS FOLLOW-UP

Presenter: Michael Carstens, MD (USA)
Affiliation: Wake Forest University
Authors: Carstens M, Martinez Cerrato J, Dos Anjos Vilaboa S, Correa D

Background: Previous reports of intravenous adminstration of adipose-derived mesenchymal stem cells (hASC) show (1) homing to sites Alzheimers's disease; (2) rescue of 6-hydroxydopamine lesions in the substantia nigra by hASCs prepared by the technique of Zuk resulting in increased levels of dopamine.

Methods: 72 year-old male physician with Parkinson's disease and knee osteoarthritis was treated with 62.4 x 106 nucleated SVF cells transplanted into the superficial investing fascia and facial muscles. This site was chosen for blood supply to support long-term cell survival and venous drainage via the orbit as a possible access route to the cerebral circulation. Evaluation was carried out preoperatively and 4 years after treatment using videos of the neurologic examination, the Oxford Parkinson's Disease Quotient (PDQ-39) for quality of life and the Parkinson's Disease Rating Scale (PDRS) for motor function.

Results: Video documentation shows clinical changes stabilizing in 2 months, and maintained at 4 year at same medications.

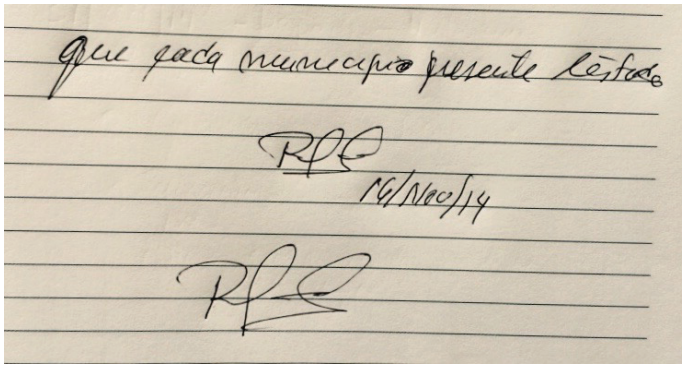
- Gross motor: normal gait, sitting/standing, bending over to pick up objects, turning smoothly
- Fine motor/coordination: feeding, dressing, handwriting
- Cranial nerves: return of facial animation, improvement in voice affecting modulation of tone, greater length of phrases and ability to project the voice
- Autonomic/limbic: normal facial moisture, decreased sialorrhea, improved erection, greater energy, decreased depression, improved libido and sexual function PDQ-39 scores (0-100) decreased in all categories: mobility (36%), activities (33%), emotional health (32%), stigma (16%), social support (24%), cognition (42%), communication (16%), and pain (24%). UPDRS general scores (all categories) dropped from 40/159 (25%) to 27/159 (17%). The changes were most noticeable in the motor category with scores dropping from 20/64 (31%) to 10/64 (16%).

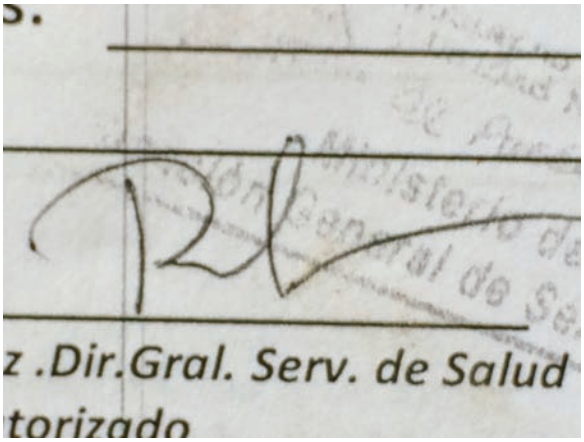
Conclusion: SVF cells may elaborate unknown substances which access the CNS and possibly increase available dopamine. This promising result will promote more research on new treatment options for Parkinson's disease using SVF cells.

61

TREATMENT OF PARKINSON'S DISEASE WITH TRANSPLANTATION OF ADIPOSE-DERIVED SVF CELLS TO THE FACE: A FIRST-IN-MAN CASE REPORT WITH 4 YEARS FOLLOW-UP

Presenter: Michael Carstens, MD (USA)
Affiliation: Wake Forest University
Authors: Carstens M, Martinez Cerrato J, Dos Anjos Vilaboa S, Correa D





62

ADIPOSE TISSUE STROMAL VASCULAR FRACTION CELLS PROTECT AGAINST SKELETAL MUSCLE APOPTOSIS

Presenter: Paul Kingham, PhD (Sweden)
Affiliation: Umea University
Authors: Kingham P, El-Habta R, Backman LJ

NOT PRESENTED

63

THE POSITIVE EFFECT OF MECHANICAL STRAIN ON ASCS: IMPLICATIONS FOR MUSCULOSKELETAL REPAIR

Presenter: Johnny Huard (USA)
Affiliation: Steadman Philippon Research Institute
Authors: Ravuri S, Mu XM, Mullen MM, Huard JH

WITHDRAWN

64

FAT-DERIVED STEM CELL DEPLOY,EMT IN AUTISM SPECTRUM DISORDER- ARE THE EFFECTS LONG-LASTING?

Presenter: Hazem Barmada, MD, FRCSEd, FRCS (CTh) (USA)
Affiliation: Gulf Coast Stem Cell - Regenerative Surgery
Author: Barmada H

Abstract: Six children ages 5 to 14 with Autism Spectrum Disorder, responded positively to SVF deploy-ment within days, and have maintained their improvements for the duration of the follow-up (up to 4 years in one case).

Description: Six Autistic children, two of whom are first cousins: one 14, with repetitive disorder; and the other 9, with severe autism. Five patients received Stromal vascular fraction (SVF) from a par-ent and one child from a compatible but unrelated donor. All children showed significant improvement within days of deployment with no complications. The positive results have persisted for the duration of the follow-up in all children.

67

THE USE OF KIDNEY EXTRACELLULAR MATRIX HYDROGEL FOR ENHANCING THE THERAPEUTIC EFFECTS OF ADIPOSE-DERIVED MESENCHYMAL STEM CELLS FOR ACUTE KIDNEY INJURY INDUCED BY ISCHEMIA-REPERFUSION

Presenter: Changcheng Zhou, PhD (China)
Affiliation: Nanjing First Hospital
Authors: Zhou C, Zhou L, Ge Y, Liu J, Xu L, Xu Z, Zhao F, Wu R, Jiang N, Jia R

Introduction: Transplantation of adipose-derived mesenchymal stem cells (ad-MSCs) is a promising treatment method for renal ischemia reperfusion injury (IRI). However, the low homing rate of vascular injection transplantation and the low retention rate of local injection transplantation limit the further utilization of ad-MSCs.

Methods: We first introduced three strategies to yield rat kidney extracellular matrix (KECM). KECM is further prepared as a temperature sensitive hydrogel, and we assessed the safety of KECM hydrogel by in vitro co-culture and subcutaneous injection. KECM hydrogel with ad-MSCs were injected into rat kidney after removing the vascular clamp. The retention rate of ad-MSCs in the kidney was calculated using fluorescence detection of kidney section and bioluminescence imaging. HE staining and serum marker detection were conducted to assess the degree of kidney injury. Proliferation and apoptosis of host renal cell were characterized by PCNA and TUNEL staining. We also investigated the effects of KECM hydrogel on ad-MSCs in an in vitro hypoxia-reoxygenation model.

Results: Compared with the other two strategies, the method of 1% Trion/DNase/RNase should be optimal. Compared with normal culture group, the survival rate and apoptosis rate of HRGEC and HK-2 did not alter significantly after co-culture with KECM hydrogel. The subcutaneous injection of KECM hydrogel to rats and rabbits both revealed no significant inflammatory response. KECM hydrogel can significantly increase the retention rate of ad-MSCs in kidney tissues and reduced the number of escaped ad-MSCs in lung and liver. The combined transplantation of KECM hydrogel and ad-MSCs could obviously alleviate kidney injury and apoptosis, and reinforce cell proliferation. In the hypoxia-reoxygenation model, KECM hydrogel could remarkably enhance the migration, proliferation and secretion of ad-MSCs, and decrease its oxidative stress and apoptosis. KECM hydrogel also could promote the differentiation of ad-MSCs into renal tubular epithelial cells.

Conclusions: The present study suggested that the KECM hydrogel produced by our new method could increase the retention rate of ad-MSCs after local injection transplantation, alleviate kidney IRI, and promote the repair of impaired kidney.

68

ADIPOSE TISSUE DERIVED EXTRACELLULAR MATRIX HYDROGELS AS A RELEASE PLATFORM FOR SECRETED PARACRINE FACTORS

Presenter: Joris A. van Dongen, MD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: van Dongen JA, Getova V, Brouwer LA, Liguori GR, Sharma PK, Stevens HP, Van Der Lei B, Harmsen MC

Introduction: Autologous fat grafting has become an established clinical intervention to promote tissue repair and regeneration. Besides the usual suspects i.e. adipose tissue-derived stromal cells (ASC) that supposedly participate in this regeneration, the role of the non-cellular extracellular matrix (ECM) is largely neglected. The extracellular matrix comprises the base of tissue architecture but the ECM also dictates fate and function of adhered cells, and retains a host of soluble factors that are beneficial in regenerative therapy. In this study, we investigated in vitro the uptake and release of ASC released factors by adipose tissue-derived extracellular matrix (ECM) hydrogels. We envisage that ASC released-factor-loaded ECM hydrogels are a novel therapeutic modality for wound healing.

Material & Methods: Lipoaspirates were obtained from donors (n=5) and processed by the use of the fractionation of adipose tissue (FAT) procedure and subsequent decellularization. Finely powdered acellular ECM was evaluated for cell remainders by histological staining and DNA content measurement. Acellular ECM was digested with pepsin and hydrogels were formed at 37°C. The hydrogels were loaded with ASC-released factors for 24h. Uptake and release of ASC-released factors by the ECM-derived hydrogels were measured with a Luminex immune multiplex assay. The influence of released factors by the ECM hydrogels was assessed with a fibroblast proliferation and migration assay as well as an endothelial angiogenesis assay.

Results: Acellular ECM contained no detectable cell remainders and negligible DNA contents after decellularization. ECM derived hydrogels released several ASC-released factors concurrently. These factors were released in a sustained mode for at least 96h. Functionally, these released factors stimulated fibroblast proliferation and migration as well as angiogenesis.

Conclusion: Adipose tissue-derived extracellular matrix derived hydrogels incubated with released factors by ASC are a promising new therapeutic modality to promote several important wound healing related processes such as fibroblast proliferation and migration as well as angiogenesis. Factors released by ASC are released from hydrogels in a controlled way over time.

69

CLINICAL EXPERIENCE IN 107 PROCEDURES WITH ALLOGRAFT ADIPOSE MATRIX (AAM) GRAFTING IN THE PEDIATRIC PATIENT

Presenter: Kevin Hopkins, MD, FACS (USA)
Affiliation: Driscoll Childrens Hospital
Authors: Hopkins K, Dimas V, Pinto J, Ayezel A

Introduction: Autologous fat grafting is a viable tool in restoring soft tissue in the pediatric patient for congenital and traumatic defects but there are inherent issues in this population involving the accessibility and amount of available autologous fat and the potential morbidity in harvesting. FDA approved Allograft Adipose Matrix (AAM) provides a viable alternative tool for correcting soft tissue congenital and traumatic defects in the pediatric patient. We present our experience using AAM for 107 procedures in 74 pediatric patients.

Methods: 74 patients, ages 9 months to 18 years (average 7 years) underwent AAM grafting with serial grafting in 11. There were 70 congenital defects (59 cleft lip/nose/palate, 7 craniofacial soft tissue deficit, 2 ear defects, 2 non-cleft velopharyngeal insufficiency (VPI) and 11 acquired defects. The cleft lip, nose and palate defects include palatal fistula with severe scarring and fibrosis (1), VPI (17) and asymmetric soft tissue volume (44). Craniofacial defects: cranial anomaly (1), hemifacial asymmetry (2), nasal deformity/hypoplasia (4) and macrostomia (1); 2 congenital ear deformities and lower extremity atrophy (1). The acquired deformities involved trauma of extremities (4), face/nose (4) and head/scalp (2); and scleroderma (1). The volume of AAM ranged from 1.5 ml to 24 ml (average 3.4 ml) per site. Delivery was via Coleman cannulas, hypodermic needles and modified standard spinal needles (to facilitate the intraoral delivery of AAM to the contours of the palate).

Results: Clinical observation, serial photographs and speech evaluations demonstrate increased soft tissue volume and enhanced tissue quality. There is improvement in all patients with velopharyngeal insufficiency following AAM grafting. Morbidity included erythema of the nose (2), nodularity of lip (1) that resolved spontaneously. There was one reported superficial infection of the nose that resolved with antibiotic treatment.

Conclusions: Allograft Adipose Matrix (AAM) is a safe and effective alternative to autologous adipose tissue to correct soft tissue contour deformities and improve velopharyngeal insufficiency in children.

70

LYMPHATIC VESSELS ENGINEERING FOR SECONDARY LYMPHEDEMA TREATMENT

Presenter: Qixu Zhang, MD, PhD (USA)
Affiliation: University of Texas MD Anderson Cancer Center
Authors: Zhang Q, Wu Y, Schaverien M, Butler C

Introduction: Lymphedema has been shown to be one of the most significant survivorship issues following the treatment of many solid tumor cancers, most publicized in breast cancer but also impacting patients with melanoma, gynecologic and urologic cancer. Recent advances in microsurgery, specifically lymphovenous bypass and vascularized lymph node transfers, have provided the closest chance at a cure for lymph flow disorders. This study aimed to engineer lymphatic vessels with decellularized adipose tissue matrix (DAM) to improve the lymphedema symptom after transplantation.

Methods: Human adipose tissues were treated with hypotonic solutions, Trypsin, TritonX-100, and isopropanol to remove cells and lipids, which was proved by immunohistochemistry and DNA quantification. DAM was characterized by proteomic analysis (LC-MS/MS) and scanning electron microscope (SEM). Human adipose derived stem cells (hASC) and Human dermal lymphatic endothelial cells' (HDLEC) viability and adhesion on DAM were tested by immunostaining. DAM was implanted subcutaneously in Fisher rats to evaluate foreign body response. Pre-cellularized and pre-vascularized DAM with hASCs and HDLECs were then analyzed by two-photon imaging system at different time point.

Results: H&E, DAPI staining and DNA quantification confirmed cell removal in DAM. DAM maintained natural extracellular matrix structure with 3D nanofibrous features (SEM imagining), strong mechanical properties, biochemical compositions (collagen+, laminin+, MHC1- e.g.) (IHC staining and Mass Spectrometry). DAM provides a niche for hASCs and HDLECs proliferation. Extraction of DAM induced hASCs differentiation. DAM caused little foreign body response in vivo (few CD4+/CD8+; M1-/M2+). Co-culture of hASCs and HDLECs on DAM successfully formed LYVE-1 positive lymphatic vessels-like structures, its density significantly increased along time course. Re-cellularized constructs were successfully subcutaneously transplanted in nude rats, which was remodeled as indicated by lymphatic soft tissue formation at 1-3 months.

Conclusions: Pre-vascularized DAM-cell constructs showed great promise for lymphatic vessels tissue engineering. This platform may provide a novel strategy for secondary lymphedema treatment after transplantation.

71

3D BROWN-LIKE ADIPOCYTES DERIVED FROM HUMAN IPSCS FOR IN VITRO PRECLINICAL DRUG DISCOVERY AND FOR CELL-BASED THERAPY TO TREAT OBESITY

Presenter: Xi Yao, PhD (France)
Affiliation: Université Côte d'Azur, INSERM
Authors: Yao X, Dani V, Gnad T, Carriere-Pazat A, Deschaseaux F, Pfeifer A, Dani C

Introduction: Brown and brown-like adipocytes (BAs), in contrast to white adipocytes, are equipped to burn glucose and lipids to dissipate energy stored. BAs also secrete adipokines that signal other organs and regulate metabolism. Therefore, BAs represent promising cell targets to counteract obesity. However, there are at least two major limitations for a BA-based treatment of obesity that are. 1) The scarcity of BAs in human and the notion to increase the BA mass by transplanting BA progenitors (BAPs) in obese patients recently emerged. 2) The lack of a relevant cell model for a better in vitro prediction of drug candidate efficacy.

In this presentation we describe the capacity of human induced pluripotent stem cells (hiPSCs) to generate BAPs and a method for their differentiation at a high efficiency in 3D adipospheres. We propose hiPSC-3D beige adipospheres as novel model for preclinical drug discovery and for cell-based therapy to treat obesity.

Methods: The physiological relevance of adipospheres generated from hiPSCs was investigated by their comparison with native adipose tissue and subcutaneous fat-adipospheres. The extra cellular matrix was analysed by confocal microscopy and expression of some GPCRs was performed by qPCR. Stimulation of UCP1expression by small molecules was visualized by cell imaging and Western-blot analysis. Co culture of hiPSC-BAPs with endothelial cells (ECs) was done to better mimic the adipose tissue microenvironment and to improve their engraftment in animal models.

Results: The profile of hiPSC-adiposphere extra cellular matrix mimics this of human subcutaneous fat. Expression of the GPCRs analysed was similar in both hiPSC- and adipose tissue-adipospheres. The number of UCP1-expressing cells increased upon stimulation of adipospheres with 8-CPT-cAMP or 8-Br-cGMP. ECs was functional in vitro in 3D adipospheres as revealed by LDL-uptake and induction of aSMA expressing cells. The impact of beige adipospheres on metabolic parameters after transplantation in diet-induced obese mice is under investigation.

Conclusions: hiPSCs represents an unlimited source of human BAPs and hiPSC-beige adipospheres could be a suitable tool both for therapeutic transplantation and discovery of novel anti-obesity drugs.

72

INTRADERMAL INJECTION OF SVF IMPROVES THE RESULTS OF LACERATION WOUND AND SCAR REVISION AFTER PRIMARY CLOSURE

Presenter: Kwang Sik Kook, MD (South Korea)
Affiliation: IDEA Plastic Surgery
Author: Kook KS

Scars on the skin cause patients considerable distress, resulting in unpleasant aesthetics, restriction of movement cross joints and adverse psychological effects. The cutaneous wound healing process brings about scar formation, during which exaggerated inflammation has been demonstrated to have an important role. Mesenchymal stem cells (MSCs) have recently been shown to mitigate inflammatory phase during the wound healing process. To counter this, we locally injected adipose stromal vascular fraction cells (SVF) to treat cutaneous laceration wound and scars together with primary closure and scar revision surgery. We sought to demonstrate the effectiveness of SVF in improving the repair of scars. It makes regeneration beyond repair.

73

THERAPEUTIC POTENTIAL OF HUMAN ADIPOSE-DERIVED ENDOTHELIAL PROGENITOR CELLS (AEPCS) FOR DIABETIC SKIN ULCER

Presenter: Natsumi Saito, PhD (Japan)
Affiliation: Jichi Medical University
Authors: Saito N, Asahi R, Mori M, Shirado T, Yoshimura K

Introduction: Vascular endothelial progenitor cells (EPCs) are one of important cell populations to play pivotal roles in angiogenesis and wound healing. We developed an isolation method of microvascular EPCs from human lipoaspirates (adipose-derived EPCs; AEPCs). In this study, we assessed therapeutic potential of AEPCs for promotion of wound healing in diabetic mice.

Methods: Stromal vascular fraction (SVF) was extracted from lipoaspirates through regular enzymatic digestion. AEPCs were isolated from SVF with combination of magnetic-activated cell sorting (MACS) using CD45 and CD31 microbeads, and adhesive cell culture. We also performed characterization and functional analysis of expanded AEPCs with comparison to HUVECs (Lonza). Cutaneous punch wounds were created to dorsal skin of db/db mice and its control +/db mice, and then intradermal injection of cells were conducted in seven conditions, 1) low conc. AEPCs, 2) high conc. AEPCs, 3) ASCs, 4) low conc. AEPCs with ASCs, 5) high conc. AEPCs with ASCs, 6) vehicle, 7) no injection to control +/db mice. Wound size and epithelialization were monitored for up to 21 days. The full-thickness skins were sampled at day 21 for histological analysis.

Results: AEPCs were comparable to HUVECs in colony forming unit capacity, tube formation capacity, and expression profile of endothelial cell markers. The injection of ASCs promoted wound healing compared to vehicle. The injection of AEPCs with ASCs promoted wound healing compared to ASCs alone. The epidermis and dermis of wound areas were recovered to like intact skin in its thickness in all condition, on the other hand, the adipose were not reconstructed at day 21 in all condition.

Conclusions: AEPCs might be possible to a potent therapeutic tool in regenerative medicine.

74

ADIPOSE-DERIVED STROMAL VASCULAR FRACTION ENHANCES CUTANEOUS WOUND HEALING IN AN ANIMAL MODEL

Presenter: Eleni Karagergou, MD, PhD, MRCS, FEBOPRAS (Greece)
Affiliation: Aristotle University of Thessaloniki
Authors: Karagergou E, Koliakos G, Karagiannopoulou M, Psalla D, Gounari E, Malamidou A, Dionyssopoulos A

Introduction: Limited data exist regarding the correlation between adipose-derived stromal vascular fraction (SVF) and wound healing. The aim of this study was to investigate the direct effect of intradermally injected SVF on full-thickness cutaneous wounds in a murine model.

Method: Wistar rats were divided into three groups (A, B and C) according to their day of euthanasia (day 7, 16 and 21). Inguinal fat pad was excised and SVF enzymatically extracted. Full-thickness cutaneous wounds were created on each side of the dorsum; SVF injected intradermally at one side while the contralateral wound served as control receiving normal saline. Postoperatively, evaluation of wound healing was performed by planimetry (percentages of wound contraction, epithelialisation and total wound healing) on days 0, 3, 5, 7, 10, 13, 16 and 21, and histology and immunochemistry (cellular infiltration score, collagen production score, neoangiogenesis and epithelial thickness) on days 7, 16 and 21. Additionally, measurement of the growth factors VEGF-A, PDGF and TGF-β1 was performed by RT-PCR, following m-RNA isolation from tissue samples.

Results: Despite the high rate of wound contraction, it was significantly lower in the SVF-treated wounds on day 21 ($p=0.037$). On days 13, 16 and 21, the percentages of epithelialisation were higher in the SVF-treated wounds compared with control wounds ($p=0.026$, $p=0.048$ and $p=0.05$, respectively). Histologically, the number of new vessels was significantly higher in the SVF-treated wounds compared with controls on days seven ($p=0.028$) and 16 ($p=0.027$). This increased angiogenesis was also confirmed by immunohistochemistry and by increased expression of the angiogenic growth factor VEGF-A which was observed in treated wounds compared to control wounds on day 3. No significant differences were found between treated and control wounds regarding cellular infiltration score, collagen production score and epithelial thickness.

Conclusions: Data indicate that intradermally injected SVF increases angiogenesis and enhances epithelialisation in full-thickness cutaneous wounds in rats.

75

ADIPOSE-DERIVED STROMAL CELLS ENHANCE WOUND REPAIR UNDER PATHOLOGICAL CONDITIONS OF HYPERGLYCAEMIA AND ISCHEMIA

Presenter: Ali Modarressi, MD (Switzerland)
Affiliation: University of Geneva
Authors: Kallmeyer K, André-Lévigne D, Pittet-Cuénod B, Modarressi A, Pepper MS

Introduction: There is increasing interest in the use of adipose-derived stromal cells (ASCs) for the management of chronic wounds. We set out to investigate whether the local injection of ASCs could enhance wound repair under pathological conditions of hyperglycaemia and ischemia.

Methods: ASCs were transduced to express firefly luciferase and green fluorescent protein (GFP) to allow for their detection by bioluminescence imaging (BLI) and histological analysis. Ischemia was induced unilaterally by resection of the femoral artery in hyperglycaemic rats before full-thickness bilateral wounds were created. Around each wound, 2x10^5 ASCs or NaCl were injected. Rats were followed by digital photography and sacrificed for histology and immunohistochemistry (IHC) at 72h, on days 7, 10, 15, 21 and at complete wound closure. Haematoxylin/eosin staining (for wound cellularity) as well as Masson's trichrome staining (for collagen deposition) and IHC for alpha-smooth muscle actin (for myofibroblasts and vessels), ionised calcium binding adaptor molecule 1 (for macrophages) and GFP (for ASCs) were performed. Wound closure time and the contraction/epithelialisation ratio was assessed.

Results: BLI confirmed the location of ASCs at the injection sites. GFP positive ASCs remained detectable not only at the injection sites but were also found migrating into the wound bed at 72h, days 7 and 10. ASCs significantly enhanced wound closure in non-ischemic and ischemic wounds by 9 days compared to control wounds. Semi-quantitative analysis revealed that ASCs led to enhanced cellularity in the wound. No changes in collagen deposition, vessels or macrophage infiltration were observed between treatment groups. However, myofibroblasts were detected earlier and remained elevated at wound closure in the ASC treated group without modifying the contraction/epithelialisation ratio.

Conclusion: ASCs enhanced wound closure under pathological conditions. A significant increase in wound cellularity was observed, possibly through a mechanism of paracrine signalling that recruited more immune regulating and tissue repair cells into the granulation tissue. Administration of ASCs for chronic wounds shows promise as a cell-based treatment for enhancing wound repair.

76

VALIDATION OF A GOOD MANUFACTURING PRATICES-COMPLIANT PROCESS TO PRODUCE ADIPOSE DERIVED STROMAL VASCULAR FRACTION FOR CELL-BASED THERAPY OF DIABETIC FOOT ULCERS

Presenter: Pauline Francois, PhD (France)
Affiliation: C2VN Aix Marseille Univ INSERM 1263 INRA 1260
Authors: Francois P, Veran J, Giraudo L, Aboudou H, Dumoulin C, Simoncini S, Bertrand B, Casanova D, Grimaud F, Guillet B, Paul P, Dignat-George F, Magalon J, Sabatier F

The adipose tissue-derived stromal vascular fraction (SVF) is an advantageous source of unexpanded mesenchymal and endothelial cells with potential to accelerate microcirculation and promote healing in diabetic foot ulcers. Clinical implementation of this strategy is growing but faces with heterogeneous manufacturing methods. There is an obvious need to standardize a cost-effective, and regulation-compliant procedure. We aimed to validate a Good Manufacturing Pratices-compliant non automatided method for SVF isolation and provide comparability data from the Celution®–based semiautomated method.

Methods: SVF was manufactured from healthy subjects (n=11) and type 2 diabetic patients (n=6) either using the Celution® (Cytori therapeutics CA, USA) or a manual process performed in a closed-sytem. Variation of one critical parameter, such fat separation procedure, enzyme concentration and digestion time, or washing solutions were studied at a time. The collected SVF were qualified based on cell yield and viability assessed using NucleoCounter® NC-100 (Chemotec), phenotype based on flow cytometry, in vitro angiogenic activity and regenerative effect in a mouse model of ischemic cutaneous wound.

Results: The optimal non automated process included Puregraft® device for adipose tissue washing, 0.25U/mL Collagenase for 45 minutes, and two SVF washing with saline solution 5% human serum albumin. Inter-donors batches analysis showed that SVF viability and cell yield were significantly higher for the manual process. No significant difference was observed in the distribution of hematopoietic and regenerative cell subsets and the percentage of CFU-Fibroblats. Both SVF displayed similar ability for new vessel formation in vitro. Comparability of SVF characteristics was also demonstrated in intra-dornor analysis (n=5). Interestingly performance of the method was maintained for SVF isolated in the context of type 2 diabetes. Finally, SVF from both processes similarly accelerated healing of ischemic wounds in mice.

Conclusion: Our study describes a fully GMP-compliant alternative for production of SVF and its use for type 2 diabetes patients. Future clinical trials should further evaluate the therapeutic value of SVF from this standardized cost-efficient manufacturing process.

78

PLATELET RICH PLASMA COMBINED WITH TISSUE-STROMAL VASCULAR FRACTION FROM LIPOASPIRATE AND ITS POTENTIAL EFFECT ON OSTEOARTHRITIS OF THE KNEE

Presenter: Joeri van Boxtel, MSc (Netherlands)
Affiliation: University Medical Center Groningen UMCG
Authors: van Boxtel J, Stevens HP, van Dijck R, van Dongen JA

Background: Osteoarthritis of the knee is a degenerative disease accompanied by pain, reduced mobility and subsequent decrease in quality of life. End-stage disease results in total knee arthroplasty (TKA), an expensive treatment with extensive downtime and a sizeable percentage of postoperative sequalae. Many studies have investigated the use of platelet-rich plasma (PRP) with limited effectiveness. The authors hypothesized that the addition of tissue-stromal vascular fraction (tSVF) to PRP (;Platelet Rich Stroma (PRS)) would increase and sustain the effect of PRP to osteoarthritis of the knee i.e. pain reduction, improved functionality and reduction of overall costs.

Methods: 15 patients (aged 43-75) with osteoarthritis of the knee stage 1 to 3 according to the Kellgren-Lawrence classification have been treated with a single injection of autologous PRS. 3 patients were lost to follow up after the first three months. tSVF was mechanically isolated by means of the fractionation of adipose tissue (FAT) procedure. Clinical evaluation was done using a VAS score, an adapted Western Ontario and McMaster Universities Osteoarthritis index (WOMAC) and Lysholm scores pre-injection as well as three and six months postinjection. MRI's were assessed pre-injection and at six months according to the Boston Leeds Osteoarthritis Knee Score (BLOKS) scoring system.

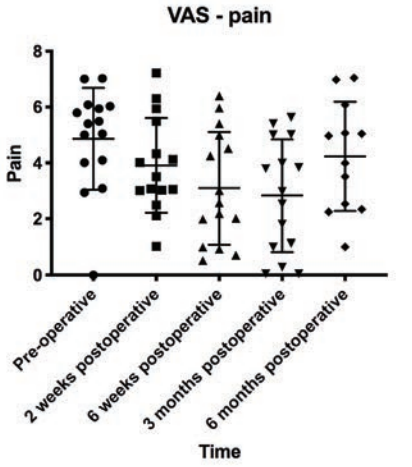
Results: VAS and WOMAC scores for pain improved significantly after three months ($p=0.0018$, $p<0.0001$), but stabilized between three and six months. The function and stiffness WOMAC scores and Lysholm stability scores improved significantly after three months and six months in comparison to pre-injection, but also showed a stagnation between three and six months. MRI images showed an increase of effusion and less synovitis, but no other cartilage, bone or meniscal abnormalities six months post-injection. No complications were observed. 1 patient received a TKA after 4 months.

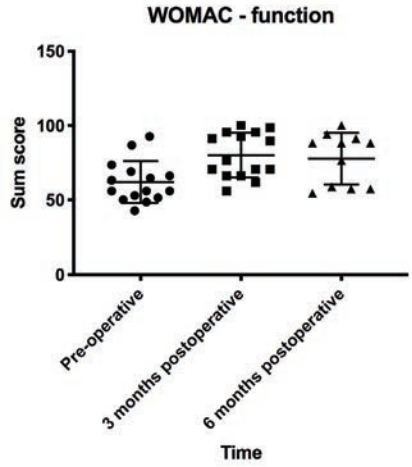
Conclusion: Improvements in function and a decrease in pain and stiffness were seen post-injection in the majority of all patients with knee osteoarthritis after a single injection of PRS. The results seemed to stabilize between three and six months. Further research is required to determine the optimal treatment regimen and long-term results.

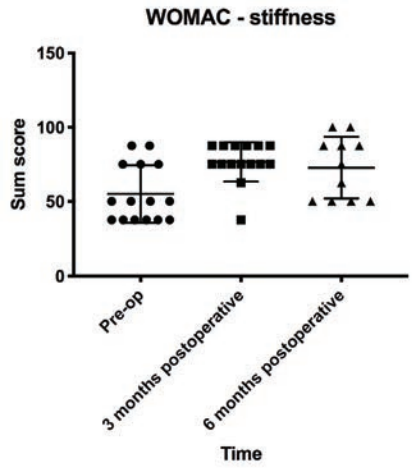
78

PLATELET RICH PLASMA COMBINED WITH TISSUE-STROMAL VASCULAR FRACTION FROM LIPOASPIRATE AND ITS POTENTIAL EFFECT ON OSTEOARTHRITIS OF THE KNEE

Presenter: Joeri van Boxtel, MSc (Netherlands)
Affiliation: University Medical Center Groningen UMCG
Authors: van Boxtel J, Stevens HP, van Dijck R, van Dongen JA







79

PRELIMINARY RESULTS FROM MICROPREP STUDY: INTRA ARTICULAR INJECTION OF AUTOLOGOUS MICROFAT AND PLATELET-RICH PLASMA IN THE TREATMENT OF KNEE OSTEOARTHRITIS

Presenter: Jeremy Magalon, PharmD (France)
Affiliation: APHM
Authors: Louis ML, Magalon JM, Grimaud FG, Jouve EJ, Mattei JM, Rochwerger AR, Dumoulin CD, Aboudou HA, Giraudo LG, Richardet NR, Jourdan EJ, Veran JV, Sabatier FS

Introduction: Osteoarthritis (OA) of the knee is a progressive joint disease involving the intra-articular (IA) tibiofemoral and patellofemoral cartilage and all surrounding IA and periarticular structures. It is one of the most frequent causes of pain, function loss, and walking-related disability among mature adults (>65 years) in the United States. PRP is now described as an effective technique to alleviate pain and improve function in patients presenting knee OA without major changes in magnetic resonance imaging (MRI). We previously described the safety profile of combining autologous microfat and PRP as a mixed regenerative product injected in the carpus or the fetlock joint of sport horses presenting with degenerative joint disease. MICROPREP is a prospective, single-center, comparative, open-label, phase II trial evaluating intra-articular Microfat – PRP injection in the OA of the knee.

Material & Method: Ten milliliters of Microfat –mixed either with saline, PRP (1 billion platelets dose) or PRP (3 billion platelets dose) were injected into the knee joint under local anesthesia. The main endpoint was relaxation time using T2 mapping. Pain EVA, WOMAC and patient satisfaction were also evaluated up to 6 months of follow-up.

Results: Thirty patients were randomized in three groups of ten patients and treated between December 2017 and January 2019. No serious adverse events were identified during follow-up. Results from the 24 patients with 6 months follow-up showed a significant decrease in pain from 59.6 ± 15.5 to 26.5 ± 21.1 ($p<0.0001$) and improve function with WOMAC score decreasing from 39.3 ± 19.0 to 20.5 ± 14.8 ($p<0.0001$). 75% and 85% were either satisfied or very satisfied of the procedure at 3 and 6 months follow-up respectively.

Discussion: Preliminary results from MICROREP study confirm that microfat injection injected or not with PRP may be a promising product to alleviate pain and improve function in knee OA. Randomization will be unblinded in August 2019 and final results on potential cartilage regeneration through MRI and interest of PRP in the mixture could be available in upcoming months.

80

REGENERATIVE MEDICINE AND WRIST OSTEOARTHRITIS: RESULTS FROM PHASE I CLINICAL TRIAL USING INTRA-ARTICULAR INJECTION OF AUTOLOGOUS MICROFAT ASSOCIATED WITH AUTOLOGOUS PLATELET-RICH PLASMA

Presenter: Alice Mayoli (France)
Affiliation: Culture and Cell Therapy Unit INSERM CBT1409
Authors: Magalon J, Mayoli AM, Iniesta AI, Curvale CC, Kachouh NK, Jaloux CJ, Eraud JE, Grimaud FG, Sabatier FS, Veran JV, Jouve EJ, Casanova DC, Legre RL

Introduction: The management of osteoarthritis of the wrist resistant to medical treatment requires surgery stiffening and non-conservative. Intra-articular injection of autologous microfat combined with autologous plasma enriched platelet (PRP) is a promising alternative treatment in the management of this pathology. AMIPREP is a prospective, single-center, non-comparative, open-label, phase I trial evaluating intra-articular Microfat – PRP injection in the osteoarthritic wrist (NCT03164122).

Material & Method: Four milliliters of Microfat – PRP mixture are injected into the radiocarpal joint under local anesthesia. The main endpoint is tolerance (occurrence of adverse events up to one month post-injection). EVA, DASH and PRWE functional scores, strength and range of motion are also evaluated up to 12 months of follow-up. Cartilage regeneration is evaluated at 12 months by the change in cartilage sectional area measured on a high resolution 3T MRI.

Results: Twelve patients were included and treated between June 2017 and February 2018. No serious adverse events were identified during follow-up. At 1 year of follow-up, a statistically significant decrease in pain (EVA (J0) = 50 [49-90] vs EVA (M12) = 30 [0-50], p = 0.003) and functional DASH scores (DASH (J0) = 42.5 [22.5 - 73.3] vs DASH (M12) = 23.3 [1.7 - 63.3], p = 0.001) and PRWE (PRWE (J0) = 60.3 [35.5 - 96] vs PRWE (M12) = 20 [0 - 73], p = 0.001) was observed, as well as a statistically significant increase in strength (Jamar (J0) = 24.8 [13-44.3] vs. Jamar (M12) = 49.3 [26 - 59.3], p = 0.001). No significant difference was found in the range of motion and the change in cartilage sectional area measured on MRI 3T.

Discussion: The microfat and PRP mixture constitutes a quality physiological interposition tissue between the injured joint surfaces. It could have a capacity for cartilage regeneration thanks to the multipotent stem cells contained in the microfat and the growth factors contained in the PRP.

Conclusion: The intra-articular injection of autologous Microfat and PRP is an innovative, simple and minimally invasive procedure that could be a therapeutic alternative to heavy and non-conservative surgeries in the management of wrist osteoarthritis resistant to medical treatment.

81

USE OF INTRA-OSSEOUS PLATELET RICH PLASMA FOR TREATING SEVERE KNEE OSTEOARTHRITIS: RETROSPECTIVE CLINICAL STUDY AFTER 1 YEAR

Presenter: Jose Miguel Catalan, MD (Spain)
Affiliation: Catalan Trauma
Author: Catalan JM

WITHDRAWN

82

MESENCHYMAL STEM CELL INJECTION IS AN EFFECTIVE ALTERNATIVE TO TOTAL KNEE ARTHROPLASTY FOR PATIENTS WITH MODERATE KNEE ARTHROSIS

Presenter: Chadwick C. Prodromos, MD (USA)
Affiliation: Illinois Sports Medicine and Orthopaedic Centers
Authors: Prodromos CC, Finkle SF

Background: Osteoarthrosis of the knee affects millions of people worldwide. Total Knee Arthroplasty is performed extensively for this problem but is associated with substantial cost and morbidity. Intra-articular injection of autologous mesenchymal stem cells has been shown to have possible clinical benefit.

Hypothesis: We hypothesized that injection of autologous adipose tissue and bone marrow aspirate which contain mesenchymal stem cells in addition to platelet rich plasma injection would provide significant clinical benefit resulting in avoidance of Total Knee Arthroplasty.

Methods: 39 total knee replacement candidate patients (45 knees) with moderate (Kellgren Lawrence 2 and 3) knee arthrosis who had failed conservative treatment had autologous adipose tissue, bone marrow, and Platelet Rich Plasma (PRP) injected into their affected knee as an alternative to total knee arthroplasty. Injections were performed in office using only local anesthetic without sedation. All patients had discontinuance of all non steroidal anti-inflammatory medicines and all other analgesics except acetaminophen prior to treatment. Patients were evaluated with KOOS-PS, Womac and SANE prior to treatment. Evaluations were repeated at 6 months, 1 year and 2 years after treatment. Additionally, a percent improved question was asked at all followup intervals.

Results: Good outcomes were seen in 76% knees at 6 months, 67% at 12 months and 71% at 2 years. There were no adverse events. Two patients (5%), who had no improvement from treatment, had knee replacement surgery. Mean SANE, KOOS-PS and Womac scores were significantly improved at 6 months, 1 year, and 2 years as compared to pre-treatment.

Conclusion: Mesenchymal stem cell injection is an effective short and intermediate term alternative to total knee replacement arthroplasty. Long term results of treatment are needed.

83

LONG-TERM SAFETY AND EFFICACY OF LOCAL MICROINJECTION COMBINING AUTOLOGOUS MICROFAT AND ADIPOSE-DERIVED STROMAL VASCULAR FRACTION FOR TREATMENT OF REFRACTORY PERIANAL FISTULA IN CROHN'S DISEASE

Presenter: Florence Sabatier, PharmD, PhD (France)
Affiliation: Hopital Nord
Authors: Serrero M, Grimaud F, Philandrianos C, Visee C, Magalon J, Veran J, Jouve E, Sabatier F, Grimaud JC

Mesenchymal cell therapy is promising for the treatment of perianal Crohn's fistulas refractory to conventional therapy. Autologous adipose-derived stromal vascular fraction (ADSVF) is recognized as an easily accessible source of cells with regenerative properties. ADICROHN pilot study is based on the innovative hypothesis that combined action of ADSVF associated with trophic charasteristics of microfat graft could promote tissue healing for perianal Crohn's fistulas.

Patients and Method: This is a prospective, open, non-comparative, single center, phase I-II clinical trial. Eligible patients were adult with complex perianal Crohn's fistula refractory to conventional treatment. After one week of drainage by seton placement, it was performed on the same day: adipose tissue extraction, ADSVF and microfat preparation then injected into the fistula. Patients were monitored at baseline and at 1, 2, 6, 12, 16 and 48 weeks after injection for safety and efficacy analysis. Fistula closure was also evaluated via radiological assessment with MRI at week 12 and 48. Combined remission was defined as a complete cessation of suppuration confirmed by MRI assessment (absence of collection >2cm). Clinical response was defined as an evident decrease in suppuration.

Results: 10 patients were treated by this innovative local treatment (among 10 cc of microfat and about 30 millions of ADSVF viable cells subsequently injected into the soft tissue around the fistulas). Three serious adverse events occurred: 2 flares and on new fistula tract. The most frequent side effect was moderate pain on lipoaspiration site. No case of incontinence post treatment was described. About efficacy, 70% of response was found at week 12 (50% of clinical response and 20% of combined remission) and 80% of response at week 48 (60% of combined remission and 20% of clinical response). These results were associated to significant reduction of severity of perianal disease with a PDAI score that passed from 7.3 at baseline at 3.8 at week 12 and 3.4 at week 48 (p=0,002) and significant improvement of quality of life score (p=0.038).

This first study evaluating co-local administration of ADSVF with fat graft appears to be a simple, safe and efficient surgical regenerative therapy for perianal Crohn's fistula.

84

FIRST-IN-MAN INJECTION OF AUTOLOGOUS ADIPOSE-DERIVED STROMAL VASCULAR FRACTION IN SCARRED VOCAL FOLDS: A PROSPECTIVE, OPEN-LABEL, SINGLE ARM CLINICAL TRIAL

Presenter: Alexia Mattei, MD (France)
Affiliation: AIx Marseille University
Authors: Mattei A, Bertrand B, Jouve E, Blaise T, Philandrianos C, Grimaud F, Giraudo L, Arnaud L, Giuliani A, Revis J, Galant C, Velier M, Veran J, Dignat-George F, Dessi P, Sabatier F, Magalon J, Giovanni A

Introduction: Patients with scarred vocal folds, whether acquired congenitally or following phonosurgery, often exhibit dysphonia that negatively impacts daily life and is difficult to treat. Autologous adipose tissue-derived stromal vascular fraction (ADSVF) is increasingly recognized as an easily accessible source of cells with angiogenic, anti-inflammatory, immunomodulatory, and regenerative properties. We aimed to evaluate the safety, tolerability and potential efficacy of autologous ADSVF local injections in patients with scarred vocal folds.

Methods: This first-in-man clinical trial was a prospective, open-label, single-arm, single-center study with 12-month follow-up that enrolled 8 patients (7 females, 1 male) with severe dysphonia due to VF scarring (Voice Handicap Index [VHI] > 60/120). ADSVF was prepared and injected into one or two VFs. The primary outcome was the feasibility and the number and severity of adverse events related to ADSVF-based therapy. Secondary endpoints were changes in vocal assessment, videolaryngostroboscopy and self-evaluation of dysphonia and quality of life from baseline to 1, 6 and 12 months after cell therapy.

Results: Safety and feasibility were evident with the only adverse events related to treatment being anticipated minor events related to liposuction and ADSVF injection that all resolved spontaneously. One patient received massage by a physiotherapist to drain local bruising and another complained of a minor contour defect at the liposuction site. At 12 months, VHI was improved in all patients with mean improvement from baseline of 40.1 ± 21.5 ($p = 0.012$). Seven patients were considered as responders using the pre-specified threshold of improvement >18 points. A trend towards improvement of roughness of voice in perceptual analysis was also observed. The main limitations were those of a pilot study design (limited number of patients, different etiologies of scarred vocal folds involved, unblinded trial without control group).

Conclusions: This study outlines the safety of the autologous ADSVF injection in scarred vocal folds and suggests potential efficacy that encourages further confirmation in a future randomised placebo-controlled trial on a larger population.

85

FLUID CARTILAGE

Presenter: Angelo Trivisonno, MD (Italy)
Affiliation: Sapienza University
Author: Trivisonno A

Traditionally to rebuild the cartilage of the nose the first choice is the autologous cartilage. The hardest part it is a careful remodelling of the cartilage grafts, especially in noses with thinner soft tissues, where the edges of the grafts can not be camouflaged. So it would be possible to obtain a good results using a more malleable fluid cartilage derived by shaving with scalpel n. 15, the cartilage strongly held firm by Adson Brown forceps. That we can manipulate as a filler with injection by needles between 18 to 21 gauge, or equivalent size cannulas. We used the fluid cartilage alone or mixing with microfat when we need to increase the thickness of the soft tissues, improving also the tissue's quality. This new product can be helpful also for other cartilaginous districts.

To have this autologous cartilage we must expect a surgical step of harvesting of septum cartilage, or rib. The advantages of the cartilage fluid are that it fits exactly the desired shape, molding to distribute correctly the graft, in the same way as a filler. But contrary to the filler which remains fluid, the paste solidifies in autologous cartilaginous tissue. On the other hand a solid graft implanted after larger dissections, it could have moved. An other advantages is the permanent survival of the graft, as observed with at least one year of follow up. We did not have complications such as infections. We have had few cases of undercorrection. We can not be able to determine the percentage of fat and the cartilage survival.

86

MOLECULAR AND CELLULAR SIGNATURE OF PERIRENAL ADIPOSE TISSUE REFLECTS THE VASCULAR AND INFLAMMATORY STATUS OF MARGINAL KIDNEY TRANSPLANTS

Presenter: Romain Boissier, MD (France)
Affiliation: Aix-Marseille University
Authors: Boissier R, Francois P, Gondran-Tellier B, Lyonnet L, Meunier M, Simoncini S, Magalon J, Arnaud L, Giraudo L, Dignat-George F, Burtey S, Karsenty G, Lechevalier E, Sabatier F, Paul P

Introduction: Peri-organ adipose tissue is poorly investigated but may display features representative of organ microenvironment and homeostasis. We hypothesized that the stromal vascular fraction of perirenal adipose tissue (PRAT-SVF) constitutes an accessible model to study the impact of aging and comorbidities on kidney transplants. We aimed to compare the profiles of PRAT-SVF from optimal and marginal donors and analyze the relationship with early kidney allograft dysfunction.

Methods: We analyzed the cellular components, transcriptomic profile and vasculogenic activity of PRAT-SVF from 10 living donors and 37 deceased donors (20 extended criteria donors and 17 optimal donors). Analysis of PRAT-SVF included: flow cytometry analysis of endothelial stromal and leucocyte subsets, RNA-Seq and q-PCR analysis of transcripts, and matrigel and spheroid assay of PRAT-SVF angiogenic function. These parameters were analyzed in relation to allograft outcome.

Results: Distribution of leucocyte, endothelial, stromal and pericytes cell subsets in PRAT-SVF was highly variable among donors. The proportion of stromal cells was inversely correlated with donor age ($p=0.03$) and significantly lowered in PRAT-SVF of marginal donors (5.6%) analyzed in reference to optimal donors (9.9%, $p=0.04$). The expression level of the CD144 endothelial marker was significantly enhanced in PRAT-SVF from aging donors. The global RNA sequencing approach evidenced a differential molecular signature in PRAT-SVF of ECD donors characterized by overexpression of inflammatory markers. Lowered angiogenic function of PRAT-SVF and enhanced pourcentage of NK cells were associated with slow graft function recovery after transplant.

Conclusion: Data show that the ECD environment (including age and cardiovascular risk factors) is associated with inflammatory features traceable in the PRAT-SVF and able to anticipate early graft outcome. The PRAT-SVF, easily accessible as a surgical waste during kidney transplant surgery can thus be viewed as a timely source of cells representative of the kidney environment. In the context of kidney transplantation and aging, this cellular model may provide original clues for a better monitoring and control of transplant immunogenicity and vascular competence.

88

AN ALLOGENIC 3D SCAFFOLD-FREE TISSUE ENGINEERED PRODUCT FOR DEEP THICKNESS SKIN REGENERATION: IN VITRO DEVELOPMENT TO IN VIVO PROOF OF CONCEPT

Presenter: Sophie Veriter, PhD (Belgium)
Affiliation: Novadip Biosciences
Authors: Veriter S, Thirion G, Modarressi A, Lebrun V, Adnet PY, Caty C, Dufrane D

Introduction: Deep thickness skin wound remains a major challenge for reconstructive surgery. A novel approach of tissue engineering, based on an allogeneic adipose-derived 3D scaffold-free technology, was proposed.

Material and Methods: The 3D-graft was obtained by a combination of ASCs and gelatin beads in view to produce extracellular matrix. The in vivo safety (toxicity/biodistribution and tumorigenicity) was firstly assessed at 1 and 6 months. The efficacy was then evaluated in a xenogenic (human to rat) model of ischemic (vs. non-ischemic) wound in hyperglycemic Wistar rats ($n=42$) among 3 experimental groups: (i) Sham, (ii) Gelatin beads alone and (iii) 3D-graft.

Results: The safety of the 3D-graft was confirmed up to 24 weeks post-implantation (no side effect after transplantation into the dermis, no cellular dissemination in tested organs, no ectopic tissue formation with any sign of tumorigenicity up to 24 weeks post-implantation). The hyperglycemic status was confirmed by a blood glucose with a mean 24.9mM before implantation of the 3D-graft (easily handled/placed on the wound). A complete wound closure was only obtained (in both non-/ischemic legs) at day 34 post-implantation for Groups 1/2 in both conditions. A shorter time of irreversible wound closure was found, in Group 3, at day 24 and 27 in non-/ischemic conditions, respectively. Microscopically, the complete epithelialization was found after day 15 post-implantation for the 3D graft (with the presence of human cells in the dermis up to day 34) while no multilayer epidermis was observed in Groups 1/2. By histomorphometry quantification, a peak of alpha-SMA+ cells was found at day 15 with a down regulation at day 21 and a normal skin thickness in the Group 3 while Groups 1/2 did not revealed any SMA+ cells recruitment and a gain of 40% of wound thickness. Although a significant elevation of the macrophages (CD68+ cells) infiltration was found in all groups between day 5-21 post-implantation, a significant higher CD3+ infiltration was only found the human 3D-graft implantation.

Conclusion: The scaffold-free approach with allogenic 3D-graft (derived from ASCs) demonstrated the safety and efficacy in stringent xenogenic model of hyperglycemic and ischemic deep-thickness wound.

89

3D PRINTABLE BIORESORBABLE TISSUE ENGINEERING CHAMBER TO PROMOTE ADIPOSE TISSUE GROWTH IN VIVO

Presenter: Pierre Guerreschi, MD, PhD (France)
Affiliation: CHRU Lille
Authors: Guerreschi P, Faglin P, Depoortere C, Gradwohl M, Nahon C, Payen J, Danze P, Martinot V, Marchetti P

Introduction: Tissue engineering chambers (TECs) raise great hope in regenerative medicine as they allow growth of adipose tissue for soft tissue reconstruction. To date high range of TEC prototypes has been created with different conceptions, volumes. Here, we addressed the influence of TEC design on the growth of adipose tissue in vivo as well as the possibility to use bioresorbable polymers for optimum TEC conception.

Methods: Vascularized adipose flaps were elevated in the dorso-lumbar region of male Sprague-Dawley rats (n= 30) and in the inguinal region of female minipigs (n=9). The flaps were inserted into TECs with different characteristics including porosity and the presence of a flat base. To conceive the different TECs, we used 3D printing with medical grade bioresorbable filaments. Volumes of fat flap were assessed by MRI at various time points. At the end of the experiments, histomorphometric and immunohistological analyses were performed.

Results: In rats, adipose tissue growth is more rapid under perforated TEC (within 90 days) than non-perforated counterparts (within 300 days). Irrespective of percentage of TEC porosity, the presence of a flat base allowed growth of larger fat volume ($p<0.05$). In pigs, bioresorbable TEC can promote angiogenesis and adipogenesis (up to 75. 6 ml at day 90, more than 140% increase) without predominant inflammatory response. Histologically, the expansion of adipose tissue resulted mainly from an increase in the number of adipocytes rather than cell hypertrophy.

Conclusion: Our large preclinical evaluation has defined the desired design of the 3D-printable bioresorbable TECs and opens perspective for further clinical applications.

90

ALLOGENIC 3D SCAFFOLD-FREE TISSUE ENGINEERED PRODUCT FOR DEEP THICKNESS SKIN REGENERATION: IN VITRO CHARACTERIZATION AND IN VIVO BIOCOMPATIBILITY

Presenter: Valérie Lebrun, MS (Belgium)
Affiliation: Novadip
Authors: Lebrun V, Veriter S, Thirion G, Adnet PY, Caty C, Dufrane D

Introduction: Deep thickness skin wound remains a major challenge for reconstructive surgery. A biological substitute, based on an allogeneic adipose-derived 3D scaffold-free technology, was developed to restore the healing physiology.

Material and Methods: Adipose-derived stromal cells (ASCs) were isolated and process to produce extracellular matrix (ECM). The ultrastructure and the mineralization of the graft were assessed by histology/microtomography/scanning electron microscopy. The protein/growth factors contents were determined by proteomic analysis (LC-MS/MS) and ELISA, respectively. The angiogenic ASCs properties were assessed by RNA sequencing (n=3), q-RT-PCR of a panel of angiogenic genes (n=5) and growth factors (VEGF,SDF1a) secretion (n=3) in view to compare ASCs in a single layer versus embedded in the extracellular matrix. The impact of the high glucose (4.5g/L) and low oxygen tension (1% O2) on the ASCs bioactivity was evaluated in vitro by the quantification of growth factors content/secretion (n=3). The biocompatibility (immune response,biodegradation) was then assessed in vivo in nude/wistar rats up to 4 weeks (n=20).

Results: The 3D-graft is a translucid/malleable membrane easily handled with forceps to be place on the wound bed. Histomorphometric and SEM analysis showed a mean of 175±86 cells/mm² embedded in the ECM with a low level of mineralization (0.30±0.31%v/v). The proteomic and genes analysis revealed the stimulation of the biological pathways involved in early wound healing and the over-expression of pro-angiogenic genes (ANG,ANGPT1,EPHB4,VEGFA,VEGFB,VEGFC,EDN1,THBS1,PTGS1,LEP) in the 3D-graft versus ASCs alone. The VEGF and SDF1a contents (181±12 and 663±27 ng/g, respectively) were also improved by the embedding of ASCs in the ECM. The bioactivity of the 3D-graft was not affected by the in vitro conditions of high glucose and low oxygen tension. The biocompatibility of the 3D-graft was confirmed in vivo with a balance between the elicitation of the inflammatory reaction and the graft integration without evidence of negative impact by the xenorejection.

Conclusion: The allogenic scaffold-free 3D-graft (i) improves the ASCs bioactivity for the angiogenesis and (ii) the in vivo remodeling by the specific ECM-proteins of wound healing.

91

ADIPOSE TISSUE-DERIVED STROMAL CELLS MODIFY THE VISCOELASTIC PROPERTIES OF HYDROGELS: OPPORTUNITIES FOR 3D BIOPRINTING

Presenter: Francisco D. Martinez Garcia, DVM, MRes (Netherlands)
Affiliation: University Medical Center Groningen
Authors: Martinez Garcia FD, Valk MM, Van Akker BJ, Sharma PK, Burgess JK, Harmsen MC

Introduction: Three-dimensional (3D) bioprinting is a technique that combines patient-derived cells, growth factors and hydrogels to reproduce diseased microenvironments or regenerative constructs. Adipose tissue-derived stromal cells (ASC) are patient-derived cells considered in bioink formulations. ASC can be easily obtained via minimally invasive liposuction, and their multipotency allows them to differentiate into vascular, adipogenic or neuronal lineages. Bioinks should resemble the biomechanical properties of the organs and tissues aimed to be reproduced. Literature reports stiffness as the single mechanical feature of hydrogels. However, this only accounts for an elastic component, ignoring the fact that hydrogels, just as organs and tissues are viscoelastic in nature and exhibit stress relaxation. Furthermore, viscoelastic characterization is generally done at a single time point and in the absence of cells. This has neglected the changes in bioink viscoelastic properties caused by cell-matrix interaction. Therefore, the aim of our study was to assess the changes in viscoelastic properties of hydrogels aimed for 3D bioprinting due to stromal cell-matrix interaction over time.

Methods: Immortalised human ASC (iASC13) were embedded in 5% and 10% (w/v) GelMA hydrogels (2x106 cells/cm3). Cell loaded hydrogels were photopolymerised with UV light at 7 mW/cm2 for 5 min. Cell viability and viscoelastic changes in stiffness, percentage of relaxation and the Maxwell analysis of stress relaxation was measured by Low-Load Compression Testing at 20% strain s-1 and examined at 0 h, 24 h, 7 days and 14 days.

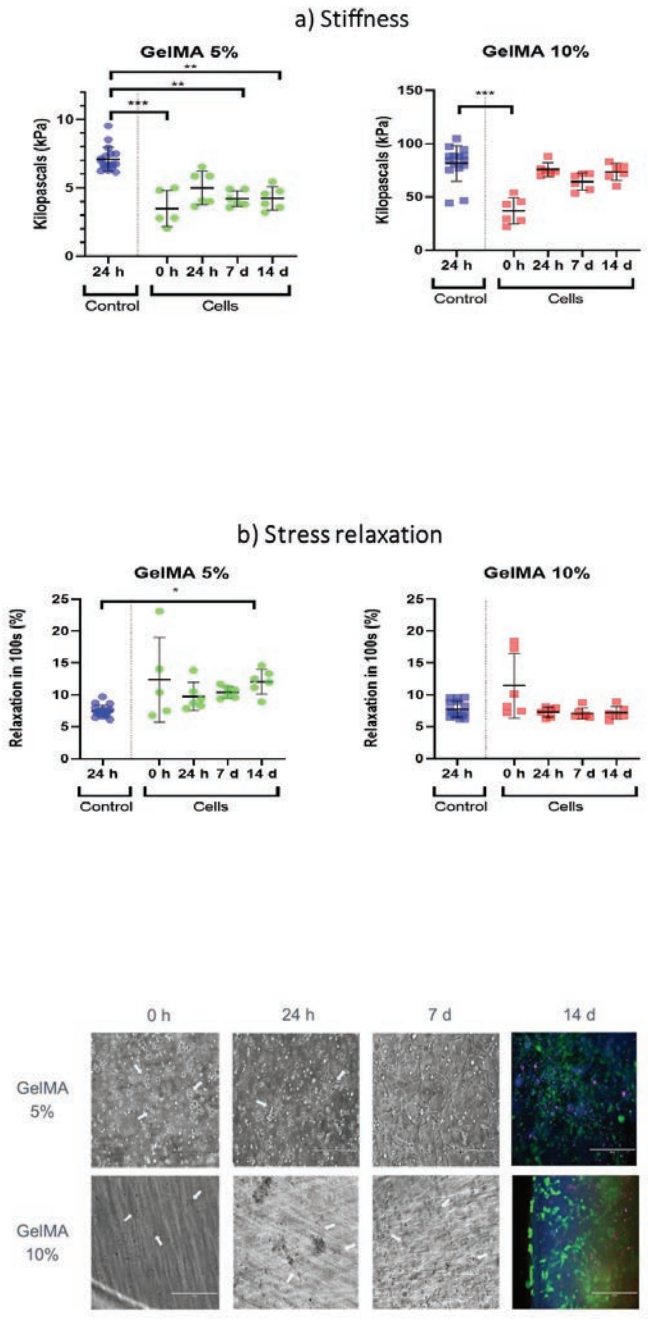
Results: Both control and cell-loaded hydrogels showed a linear GelMA concentration-dependent increase in stiffness while stress relaxation remained constant. a) Stiffness changed in the first 24 h in cell-loaded hydrogels in both concentrations. b) Changes in stress relaxation were only observed in GelMA 5% after 14 days. c) iADSC13 in GelMA 5% showed a faster spreading and proliferation as well as different morphology from those present in GelMA 10%.

Conclusions: Preliminary data shows that viscoelastic properties change due to cell-matrix interaction. Further research will focus on determining if these changes are due to matrix turnover, deposition or degradation.

91

ADIPOSE TISSUE-DERIVED STROMAL CELLS MODIFY THE VISCOELASTIC PROPERTIES OF HYDROGELS: OPPORTUNITIES FOR 3D BIOPRINTING

Presenter: Francisco D. Martinez Garcia, DVM, MRes (Netherlands)
Affiliation: University Medical Center Groningen
Authors: Martinez Garcia FD, Valk MM, Van Akker BJ, Sharma PK, Burgess JK, Harmsen MC



92

CRITICAL LIMB ISCHEMIA TREATED WITH SVF CELLS: 4-YEAR FOLLOW-UP STUDY

Presenter: Michael Carstens, MD (USA)
Affiliation: Wake Forest University
Authors: Carstens M, Gomez A, Pastora I, Dos Anjos S, Correa D

Background: We previously reported a series of ten patients (pts) with critical limb ischemia (CLI) due to arteriosclerosis and/or diabetes as determined by clinical history and ankle/brachial index (ABI) who were treated with local injection of non-expanded autologous, adipose-derived stromal vascular fraction (SVF) cells to promote neovascularization and wound healing. Inclusion criteria were immediate threat of amputation. Outomes were measured at 18 months in 9 patients* by clinical status, ankle-brachial index, and angio-MRI. All pts demonstrated clinical improvement with elimination of rest pain and/or claudication, more favorable ABI and imaging finding in 5/6 patients indicating signs of revascularization. 5/6 wounds healed without surgery, with the largest one (5 x 7 cm) successfully skin grafts. *The 10th pt (age 85) expired due to myocardial infarction. Our goal in the present study was to ascertain the long-term stability of these results.

Methods: At 4 years post implantation there are 6 survivors with a mean age of 74 and pathologies of arteriosclerosis/AS (2), diabetes/DM (2) and AS/DM (2). Evaluation consisted of vascular exam, ankle-brachial index, and doppler ultrasound.

Results: 1 patient underwent amputation of the untreated extremity. In all 17 extremities there was no further disease progression. 3 patients were lost to the study from infarction (2) and from renal failure (1).

- Pain: 2/6 pts use wheelchairs but without rest pain. 4/6 pts with previous claudication, can ambulate at least 200 m.
- Wounds: 4/6 pts had wounds prior to surgery: all remained closed. No new ulcerations have developed, on either the treated or untreated extremity.
- ABI ratios: 6/6 maintain an improved ABI.
- Vascular ultrasound: 6/6 maintain an improved ABI although, difference with the preop value is not as marked. Dorsalis pedis/tibials posterior show increased diameter and flow. Neovascularization is seen beneath healed ulcers.

Conclusions: Despite cell "doses" that varied, all 9 pts at 18 mo follow-up, showed significant improvement in pain control, ambulation, wound healing, and neo-vascularization. At 48 months these results remain stable. SVF treatment for CLI produces anatomic changes that are beneficial and long-lasting.

93

INTERIM ANALYSIS OF A PILOT STUDY ADMINISTRATING LOCAL INTRAMUSCULAR INJECTIONS OF STROMAL VASCULAR FRACTION PROCESSED AT POINT OF CARE IN NONREVASCULARIZABLE SUBJECTS WITH CRITICAL LIMB ISCHEMIA

Presenter: Ruxandra Sava, MD (Ukraine)
Affiliation: The Institute of Endocrinology and Metabolism Kyiv
Authors: Bolgarska SV, Sava RI, Jaradat ZA, Williams SK, Penn MS, Rademaker B, Hadad IP, Orlenko VL, Pasteur IP, Kovzun LI, Sokolova LK, Tsimdalyuk VI, Tronko MD, Kosnik PK, March KL

Introduction: Critical limb ischemia (CLI) is a severe manifestation of peripheral vascular disease, characterized by rest pain, non-healing ulcers and one-year amputation rates ≥20%. We hypothesized CLI subjects may benefit from local intramuscular SVF injections, which have known angiogenic and immune-modulating properties.

Methods: This safety and feasibility pilot study is an FDA-approved Investigational Device Exemption (ClinicalTrials.gov #NCT02234778). We enrolled Rutherford class 4-5 CLI subjects in whom revascularization was deemed impractical, from the USA (n=5) and Ukraine (n=7). This is an interim analysis of 9 treated subjects. We expect complete enrollment by the time of presentation. SVF was obtained immediately before administration, using the Icellator device (Tissue Genesis), and was injected at 20 sites along the index limb. We evaluated tissue loss, ankle-brachial index (ABI), and patient-reported outcomes (PRO).

Results: SVF injection was associated with no significant adverse reactions, except pain at lipoaspiration and SVF injection sites during the first 24 hours. Most subjects presented no new ulcers, infected ulcers, gangrenous lessions or amputations (89%). A single subject had a worsened pre-existent ulcer requiring amputation after the 6-week visit. Healing ulcers were reported in 1 subject. Average ABI increase at 12 weeks was 0.46 (p=0.02, n=8). Pain significantly decreased by a mean 3.38 points on a VAS scale at 12 weeks (p=0.009, n=8). Vascular-disease-related quality of life improved significantly at 12 weeks (mean change 2.4, p=0.001, n=8). At 6 weeks, despite worsening of general health scores, most patients reported improved scores in the physical functioning, role limitations due to emotional problems, energy, emotional well-being, social functioning, and pain domains of the SF-36.

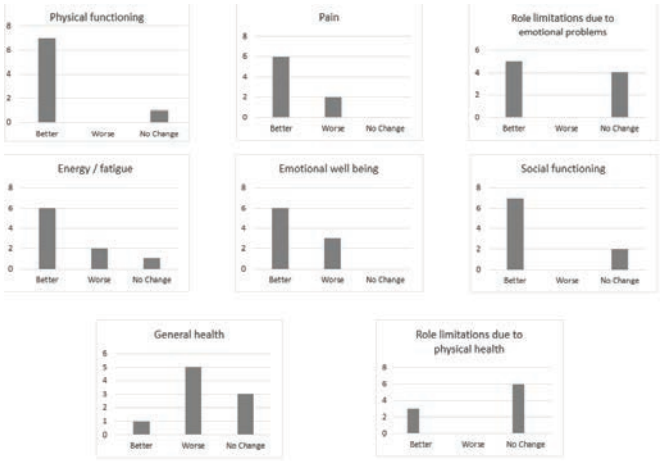
Conclusion: This interim analysis demonstrated local intramuscular injection of SVF was safe in subjects with advanced CLI. ABI increased significantly at 12 weeks, and clinical deterioration appeared to be halted, with no progressive tissue loss in most subjects. PROs also markedly improved at 6 at 12 weeks.

Figure 1: Subjects with improved, worsened or unchanged SF-36 scores between baseline and 6 weeks post-treatment.

93

INTERIM ANALYSIS OF A PILOT STUDY ADMINISTRATING LOCAL INTRAMUSCULAR INJECTIONS OF STROMAL VASCULAR FRACTION PROCESSED AT POINT OF CARE IN NONREVASCULARIZABLE SUBJECTS WITH CRITICAL LIMB ISCHEMIA

Presenter: Ruxandra Sava, MD (Ukraine)
Affiliation: The Institute of Endocrinology and Metabolism Kyiv
Authors: Bolgarska SV, Sava RI, Jaradat ZA, Williams SK, Penn MS, Rademaker B, Hadad IP, Orlenko VL, Pasteur IP, Kovzun LI, Sokolova LK, Tsimdalyuk VI, Tronko MD, Kosnik PK, March KL



94

INTRAPERICARDIAL INJECTION OF HYDROGELS DERIVED FROM DECELLULARIZED CARDIAC EXTRACELLULAR MATRIX LOADED WITH MESENCHYMAL STROMAL CELLS AND THEIR SECRETOME: A NOVEL PROPOSAL OF THERAPEUTIC APPROACH TO CYTOSTATICS-INDUCED DILATED CARDIOMYOPATHY

Presenter: Martin Harmsen, PhD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: Harmsen M, Tavares Aquina Liguori T, Liguori GR, Sinkunas V, De Jesus Correia C, Dos Santos Coutinho E Silva R, Pires Camargo C, Zanoni FL, Demarchi Aiello V, Pinho Morreira LF

Introduction: Intramyocardial injection (IM) of hydrogels containing stem cells, their secretome or both, may hold promise to treat dilated cardiomyopathy (DCM). This therapy, however, may lead to adverse outcomes, such as arrhythmias, related to the trauma of the IM injection and poor conductibility of the biomaterial. Additionally, DCM is a multichambered disease, which demands a treatment setup that reaches the entire heart. Thus, the optimal route of administration for cardiac cell therapy in DCM remains a challenge. We hypothesized that the intrapericardial injection of hydrogels derived from cardiac decellularized extracellular matrix (dECM) loaded with adipose tissue-derived stromal cells (ASC) and their secretome (conditioned medium, CMed) dampen or reverse the progression of DCM.

Methods: DCM was induced in rats through ten weekly intraperitoneal injections of doxorubicin (cumulative dose: 18mg/kg). In week five, the animals were divided in intrapericardial treatments (2ml/kg): 1) saline, 2) dECM hydrogel and 3) dECM hydrogel loaded with ASC and their CMed. ASC concentration was 20 million per mL while 100x concentrated CMed in hydrogel were used. Non-treated, healthy rats, were used as controls. Interstitial myocardial fibrosis was determined by Sirius Red and hemodynamic parameters were determined by pressure-volume loops.

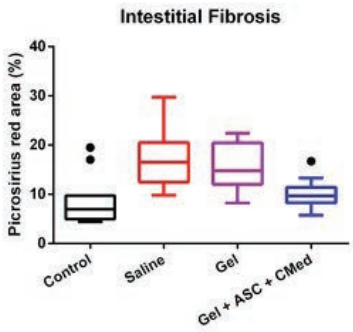
Results: Interstitial myocardial fibrosis was reduced in ASC/CMed-treated animals compared to saline controls ($p=0.0139$). Ejection fraction and cardiac work efficiency were improved in the ASC/CMed-treated rats compared to saline ($p=0.0151$ and $p=0.0655$, respectively). Treatment with sole dECM hydrogel did not reduce interstitial fibrosis nor improve hemodynamic parameters.

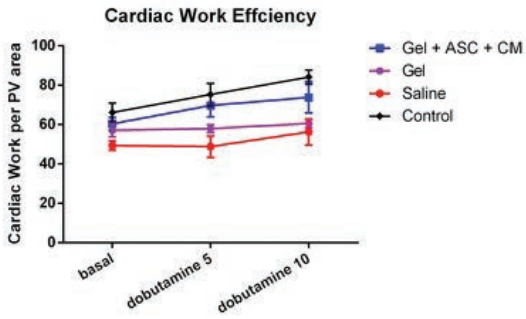
Conclusions: The intrapericardial injection of dECM hydrogels loaded with ASC and their secretome warrant a novel therapeutic possibility by improving ventricular hemodynamics and reducing cardiac remodeling in doxorubicin-induced DCM.

94

INTRAPERICARDIAL INJECTION OF HYDROGELS DERIVED FROM DECELLULARIZED CARDIAC EXTRACELLULAR MATRIX LOADED WITH MESENCHYMAL STROMAL CELLS AND THEIR SECRETOME: A NOVEL PROPOSAL OF THERAPEUTIC APPROACH TO CYTOSTATICS-INDUCED DILATED CARDIOMYOPATHY

Presenter: Martin Harmsen, PhD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: Harmsen M, Tavares Aquina Liguori T, Liguori GR, Sinkunas V, De Jesus Correia C, Dos Santos Coutinho E Silva R, Pires Camargo C, Zanoni FL, Demarchi Aiello V, Pinho Morreira LF





95

INVESTIGATION OF THE PERIPHERAL EFFECTS OF SVF TREATMENT IN PATIENTS WITH ISCHEMIC LIMB

Presenter: Tevfik Balikçi, MD (Turkey)
Affiliation: Bagcilar Educaton and Research Hospital
Authors: Balikçi T, Bozkurt M, Karakol P, Sezgiç M, Metin A

Chronic renal failure is one of the main and life threatining disease in human life which consists multi-organ distribution of the macrovascular complications. It is seen with disability - long time hospitalization, treatment with wide ranged antibiotherapy and finally an amputation could be performed to the limb. In our study we discuss how can we avoid this major vascular complication, by inducing the tissue repair, regeneration and neovascularization to the ischemic area, using the SVF therapy. Adult stem cells located in bone marrow or fat tissue, can be differentiated in blood vessels by angionesis process which promotes tissue oxygenization and also regeneration. Due to their capacity to contribute in neovascularization in the ischemic tissues this remedy have been commonly used in modern medicine. We have treated 6 patients who have renal failure. We prepared SVF from the harvested fat tissue that taken from the abdominal region of the patient's bodies.

After an induced ischemia to the lower extremity for five minutes, we injects SVF intramuscularly around the limb muscles (to the tibialis anterior-posterior and dorsalis pedis artery traces) in the reperfusion state. Later we follow up them approximately six months with glomerular filtration rate next to the discharge from hospital and eventually see the change for the ischemia to better: and superficial blood flow is rised depending upon the results of ICG anjiograpy (SPY) system. Doppler USG, BT angiographies was performed. VAS scale was observed also warmth of the foots. Some serious results have been obtained. However, these results could not be passed biostatic tests due to insufficient number of samples. Also in our country, because SVF treatment is not supported by the state and is very expensive, it will take time to reach sufficient sample size. However, when our sample number becomes sufficient, it is obvious that a significant difference will occur biostatisticaly.

We suggest SVF raise the prospect of extending regeneration to the treatment of ischemic limb patients with adding the prolonging amputation free survival period. We come up with the data that SVF therapies are the beneficial candidates to manage promoting the considerable wound healing in the patients who have peripheral ischemic complications.

97

ADIPOSE STEM CELL CONDITIONED MEDIUM IMPROVES MOUSE HEART AND HUMAN IPSC-DERIVED CARDIOMYOCYTE PRESERVATION IN HEART TRANSPLANTATION CARDIOPLEGIC CONDITIONS

Presenter: Dmitry Traktuev, PhD (USA)
Affiliation: University of Florida
Authors: Traktuev D, Ellis B, Wang M, Merfeld-Clauss S, Can I, Zorlutuna P, March K

Aims: Heart transplantation is a life-saving treatment for patients with end-stage organ failure. A significant number of hearts are rejected for transplantation due to functional deterioration during transportation. Approaches that ameliorate organ damage will expand the pool of acceptable hearts. Human adipose stem cells (ASC) have gained attention for cardiac repair due to their paracrine actions. Here, the protective effect of ASC conditioned medium (ASC-CM) was tested on cardiomyocyte-like cells and on isolated mouse hearts exposed to clinically relevant heart storage conditions.

Methods: Isolated mouse hearts were perfused and stored in University of Wisconsin (UW) cardioplegia solution ± ASC-CM for 6 hours at 4°C. Ventricular function was analyzed using the Langendorff apparatus at baseline and after storage. Cardiomyocytes (iCMs) were generated from human iPSCs. Synchronously beating iCMs were exposed to UW ± ASC-CM and incubated at 4°C or 37°C for up to 8 hours. Beating rate, strength, apoptosis and oxidative stress of iCMs were evaluated during recovering in RPMI ± ASC-CM.

Results: Hearts stored in UW alone demonstrate recovery of cardiac function to 40% of controls, whereas ASC-CM-treated hearts showed 60% of baseline function. In parallel, iCMs exposed to UW show time-dependent apoptosis and deterioration of beating activity. These were significantly mitigated by ASC-CM when added to either storage or recovery solutions. ASC-CM promoted more rapid recovery of contractility and greater preservation of iCM viability. Preserving the cells in UW+ASC-CM allowed significant extension (2-fold) of the period of iCM storage. Silencing of SOD3 or catalase expression in ASC prior to media conditioning depressed the protective effect of ASC-CM.

Conclusion: Our study is the first evidence that ASC-CM significantly preserves function of hearts subjected to cold cardioplegic conditions. ASC-CM possesses a strong cardio-protective effect when presented to iCM at either the storage or recovery phases, and this effect is SOD3- and catalase-mediated. ASC-CM use allows extension of storage time without compromise of iCM function, suggesting that augmenting standard heart storage protocol with ASC-CM will widen the pool of acceptable hearts for transplantation.

98

TREATMENT OF BREAST CANCER–RELATED LYMPHEDEMA WITH ADIPOSE–DERIVED REGENERATIVE CELLS AND FAT GRAFTING: AN ONGOING RANDOMIZED, PLACEBO–CONTROLLED AND DOUBLE-BLINDED CLINICAL TRIAL

Presenter: Mads G. Jørgensen, MD (Denmark)
Affiliation: Odense University Hospital
Authors: Jørgensen MG, Jensen CH, Sheikh SP, Sørensen JA

Background: Lymphedema is one of the most common and serious side effects to breast cancer treatment with axillary lymph node involvement. Currently, only conservative treatment is available. Preclinical lymphedema research has shown promising potential for adipose-derived cell therapy and we have previously conducted the first in human pilot study with favorable results. We are now conducting a randomized, blinded and placebo-controlled trial with an emphasis on efficacy, effectiveness and safety.

Methods: This is an ongoing single-center, phase II/III, randomized, placebo-controlled, double-blinded clinical trial. A total of 80 patients are randomized in a 1:1 ratio to receive either adipose-derived regenerative cells delivered to the axillary region in combination with a scar-releasing lipotransfer or placebo. Outcomes include arm volume, lymph drainage, tissue composition, safety, quality of life, erysipelas events and discontinuation of conservative treatments and outcomes are compared before treatment and 3, 6, 9 and 12 months after treatment. All patients undergo abdominal/thigh liposuction in general anesthesia and stem cell treatment is delivered through masked syringes. Patients are discharged later the same day.

Discussion: This is the first randomized study evaluating the safety and efficacy of adipose-derived regenerative cells in patients with breast-cancer related lymphedema and the largest prospective study on non-conservative treatments for lymphedema. During the first 6 months of trial initiation, we have evaluated more than 120 patients, of which 45 were deemed eligible and have been recruited.

Trial registration: ClinicalTrials.gov identifier, NCT03776721. The trial was prospectively registered on 17 December, 2018. https://clinicaltrials.gov/ct2/show/NCT03776721.

99

LIPOTRANSFER IMPROVES FACIAL FIBROSIS AND VOLUME LOSS IN SCLERODERMA

Presenter: Aurora Almadori, MD (Italy)
Affiliation: UCL - Royal Free Hospital
Authors: Almadori A, Griffin M, Ryan C, Hunt D, Hansen E, Kumar R, Abraham D, Denton C, Butler P

Oro-facial fibrosis in Systemic Sclerosis (SSc) has a major impact on mouth function, facial appearance, and patient quality of life. Lipotransfer can be used not only restores oro-facial volume but also reverses oro-facial fibrosis. Adipose derived stem cells (ASCs) within the engrafted adipose tissue have been shown to mediate the anti-fibrotic effect of lipotransfer.

A cohort of 62 patients with oro-facial fibrosis were assessed before and after lipotransfer treatment. Clinical evaluation included assessment of mouth function using a validated assessment tool (MHISS), validated psychological measurements and pre and post-operative volumetric assessment. In addition, to understand the mechanism by which the anti-fibrotic effect of ASCs occur, SSc derived fibroblasts and ASCs from this cohort of patients were co-cultured in direct and indirect culture systems and compared to monoculture controls. Cell viability, DNA content, protein secretion of known fibrotic mediators including growth factor- β1 (TGF β-1) and connective tissue growth factor (CTGF) using ELISA analysis and fibrosis gene expression using a fibrosis pathway specific qPCR array were evaluated.

Mouth function was significantly improved (6.85±5.07) ($p<0.0001$) after treatment. All psychological measures were significantly improved: DAS 24 (12.1±9.5) ($p<0.0001$); HADS-anxiety (2.8±3.2) ($p<0.0001$), HADS-depression (2.0±3.1) ($p<0.0001$); BFNE (2.9 ± 4.3) ($p<0.0001$); VAS (3.56±4.1) ($p<0.0001$). SSc fibroblast viability and proliferation was significantly reduced in co-culture compared to monoculture via a paracrine effect ($p < 0.0001$). Protein secretion of transforming growth factor (TGF β -1) and connective tissue growth factor (CTGF) was significantly reduced in co-culture compared to monoculture ($p < 0.0001$). Multiple fibrosis associated genes were down regulated in SSc co-culture compared to monoculture after 14 days including Matrix metalloproteinase-8 (MMMP-8), Platelet derived growth factor-B (PDGF-B) and Integrin Subunit Beta 6 (ITG-B6).

Lipotransfer significantly improved the effects SSc. Lipotransfer may reduce dermal fibrosis through the suppression of fibroblast proliferation and key regulators of fibrogenesis including TGFβ -1 and CTGF.

100

CHARACTERIZING THE CAPACITY OF ALLOGRAFT ADIPOSE MATRIX AND ADIPOSE-DERIVED FASCIA MATRIX TO SUPPORT ADIPOGENESIS FOR SOFT TISSUE RECONSTRUCTION

Presenter: Mary Ziegler, PhD (USA)
Affiliation: UCI
Authors: Ziegler M, Sorensen AM, Sayadi LR, Evans GR, Widgerow AD

Introduction: Plastic and reconstructive surgeons routinely treat soft-tissue defects and contour abnormalities using autologous fat grafting. However, there is large degree of variability in the fat graft retention rates and a secondary procedure is needed for harvesting graft material. Thus, there is a need to develop an 'off the shelf' reliable alternative for treating these conditions. Recently, aseptically processed human allograft adipose matrix (AAM) has shown great promise as a scaffold supporting soft tissue regeneration. AAM is currently prepared from the adipose fraction of human cadaveric adipose tissue. We hypothesize that the matrix derived from the superficial fascia fraction might contain important components that are not present in the AAM required to further support adipogenesis.

Methods: First, we characterized and identified the proteins in the AAM and the fascia matrix using a mass spectrometry (MS) analysis. The matrisome proteins were identified and annotated using Gene Ontology (GO). We validated the MS findings using immunofluorescent staining. Then, we conducted an in vivo study and implanted the AAM and fascia matrix either alone or in varying combinations into rats. The implants were harvested 8 weeks later and were assessed by gas pycnometry, H&E and immunohistochemistry to examine adipogenesis and angiogenesis markers.

Results: Approximately 100 matrisome proteins were identified in each sample. The GO annotation analysis revealed that the fascia matrix contained proteins that were enriched for pathways related to angiogenesis, which are not enriched in the AAM. The in vivo study revealed that the addition of the fascia matrix component to the AAM improved the retention of the implant and showed differential expression of markers related to adipogenesis and angiogenesis.

Conclusions: AAM holds great potential as a scaffold for inducing adipogenesis in vivo. However, in order for the newly established tissue to be retained longer term, angiogenesis must occur concurrently. For the AAM, we revealed that when it was mixed with the fascia matrix there was a greater support for adipogenesis, which might be due to the presence of unique angiogenic components in the fascia matrix.

101

NPM3 ACTIVATES THERMOGENESIS IN WHITE ADIPOSE TISSUE

Presenter: Yan Zhang, MD (China)
Affiliation: Sichuan University
Authors: Dong J, Yu MY, Tian TW

Introduction: Brown adipose tissue (BAT) is specialized for energy expenditure, a process called adaptive thermogenesis. Promoting brown-like transformation in white adipose tissue (WAT) is a promising strategy to combat obesity. Our previous study demonstrated that NPM3 is a novel adipokine enriched in BAT. However, whether it can regulate the thermogenesis of adipose tissue remains unknown.

Methods: NPM3 was overexpressed or suppressed in 3T3-L1 cells to analyze the potential role of NPM3 in adipose thermogenesis.

Results: The expression of NPM3 was significantly increased when the mice were exposed to cold temperatures. The lentivirus-mediated overexpression of NPM3 in 3T3-L1 cells lead to increased oxygen and glucose consumption and browning-related gene (UCP-1, PGC1α, CIDEA) expression Inhibition of NPM3 decreased the browning process of white adipose tissue in mice when exposed to cold temperatures. Furthermore, we demonstrated that NPM3 derived from adipose tissue was carried by small extracellular vesicles (sEV). The expression of NPM3 was enriched in BAT. Knocking down the expression of NPM3 in WAT impaired the browning process induced by sEV-BAT both in vitro and in vivo.

Conclusion: The study indicated that NPM3 carried by sEV-BAT could regulate BAT thermogenesis and promote beige adipocytes development in WAT, which could be implied in the treatment of obesity and its associated diseases, such as diabetes.

102

ALLOGRAFT ADIPOSE MATRIX: EXPLORING THE MECHANISM OF ACTION IN DIABETIC MOUSE WOUNDS

Presenter: Evangelia Chnari, PhD (USA)
Affiliation: Musculoskeletal Transplant Foundation
Authors: Chnari E, Xie P, Friedrich EE, Phipps A, Hong SJ, Galiano RD

Introduction: Diabetic foot ulceration is a complex pathology that even after healing may result in recurrence for 75% of the patients within 5 years. The clinical use of lipoaspirate to prevent pressure-induced tissue injury and ulcer recurrence has been increasing. While cells have been perceived as the main actors in the effectiveness of fat grafting, increasing evidence supports the role of the extracellular matrix. A novel off-the-shelf natural allogeneic adipose tissue has been developed through a process that preserves the endogenous matrix proteins and growth factors necessary for cellular infiltration, angiogenesis and adipogenesis. In an effort to better understand the mode of action, we have conducted a study to explore its mechanism in the tissue repair process, using a systemically challenged rodent model of wound healing.

Methods: Rehydrated AAM was implanted in wounds of diabetic (db/db) mice for 7 and 14 days. Control included standard of care dressings without addition of skin substitutes. Histological staining with H&E was used for assessment of granulation tissue formation and immunofluorescence was used for blood vessel formation (CD31) and macrophage polarization (M1:CCR7, M2:CD206). Angiogenesis and modulation of fibrosis were also assessed via gene expression (PCR array).

Results: Histological analysis showed that AAM-treated wounds had three times more actively proliferating cells compared to an untreated control wound (avg 33 vs 11.8 cells/40xHPF) at 14 days post-wounding. Superior angiogenic activity of AAM-treated wounds compared to control was showcased histologically with three times more mature blood vessels (CD31-stained cells, avg 25 vs 7.6 loops per 40xHPF) as well as through gene expression at 14 days that indicated upregulation of angiogenic factors including angiopoietin-1, coagulation factor III, and VEGF. Increased M2/M1 macrophage ratios in AAM compared to controls as well as downregulation of pro-fibrotic markers like alpha-smooth muscle actin (α-SMA), and upregulation of anti-fibrotic markers like HGF indicate progression of tissue remodeling.

Conclusion: In this model, AAM was shown to support tissue regeneration in an impaired healing environment via granulation, angiogenic and anti-fibrotic activities.

103

A NON-ENZYMATIC PROTOCOL FOR ISOLATION OF SVF. CONTROL & COMPARISON TO ENZYMATIC OUTCOMES

Presenter: Timur Veysel Dogruok, BS (Turkey)
Affiliation: T-LAB
Author: Dogruok TV

Due to strong issues and restraints have come up against enzymatic isolation methods, many groups and companies have turned their faces to develop non-enzymatic, mainly mechanical methods to dissociate the cells from adipose tissue. An alternative to enzyme use, we demonstrated here protocols of in-vitro study of cells dissociated using Microlyzer from manually harvested lipoaspirate.

The adipose tissue is known as one of the most important sources in regenerative medicine. SVF are isolated at the point of care from the lipoaspirate tissue using different techniques. The most common isolation method requires the use of collagenase enzyme thus adipose stem cells are able to be isolated using various techniques however some of the methods are being considered more than "minimally manipulated" by current good manufacturing practice requirements. Alternatively, mechanical isolation methods are set to demonstrate whether the possibility of isolation of SVF.

Manually harvested lipoaspirate is used in this study. The design of Microlyzer offers 2-way connectors of Microlyzer bodies with luer-connectors for syringes. The Microlyzer body is a nest for the blade-filters. The blade-filters are 2400 to 600 microns. The device requires 3 steps of cutting of lipoaspirate for mechanical separation of the cells from the ECM. We used Luna Stem (Logos Bio, S. Korea) which can identify the population of nucleated and non-nucleated cells.

Mechanical methods from literature offers wide range of nucleated cell counts/ml with different viability rates. Markarian et al (2014) demonstrated 25.000 and 10.000 nucleated cells/ml with 65 – 70% viability. Conde-Green et al (2014) demonstrated 11.500 – 23.000 nucleated cells/ml with 80% - 90% viability. Our protocol bladed out the lipoaspirate, then centrifuged at 1000G for 4 mins. Final product is roughly 3-5ml. SVF cells are meant to be counted focusing on nucleated cell population importantly. The results show that the Microlyzer method of protocol offers wide range of remarkable nucleated cell counts up to 4.82 million nucleated cells/mL. Flow Cytometry analyses is applied and CD90 cells were found in the freshly isolated SVF using Microlyzer.

104

STROMAL VASCULAR MATRIX (SVM) GRAFTING: BASIC RESEARCH AND CLINICAL APPLICATIONS

Presenter: Tunc Tiryaki, MD (Turkey)
Affiliation: Cellest Plastic Surgery Clinic
Author: Tiryaki T

The conventional method of harvesting SVF is enzymatic digestion of extracellular matrix (ECM) from the lipoaspirate. This process necessarily affects the viability and potency of the cells, eliminates the majority of pericytes embedded in the fibrous matrix and structural/functional support of ECM. To optimize the clinical results, the SVF is mixed with an ECM concentrate, into 'Stromal vascular matrix (SVM)', where the extracellular backbone is not totally disposed. Clinical applications are described, preliminary results of a study, set up to compare cellular contents of enzymatically/mechanically isolated SVF and SVM is presented.

SVM grafting was performed in 47 cases to correct soft tissue defects, scars, facial volume loss as well as superficial rhytides. In the research study, 13 lipoaspirate samples were submitted to conventional enzymatic digestion (E-SVF), mechanical digestion using Lipocube™ (M-SVF) and the mixture of adipose buffy coat and M-SVF (SVM). Three groups were analyzed and compared for nuclear cell viability and cell number. Cells characteristics were quantified by flow cytometry for stem cell marker. The stem cell quality was investigated by cell differentiation assay and gene expression analysis.

The SVF cell yield obtained from the SVM was %25 lower (1,52x106±1,33, n=13) than that obtained by E-SVF alone 1,52x106/ml (±3,63, n=13) and M-SVF alone 0,7x106/ml (±1,69, n=13), p=0,015. The average cell viability was 97,6%±4,58 by SVM, 96,6% ±10.68 by E-SVF and 97,5% ±5,74 by M-SVF. The CD surface markers of fresh ADSC contents (CD73+/CD90+, CD45-/CD90+) in SVM showed approximately 4,47/1,68-fold increase compared to M-SVF and 7,5-4,1-fold increase in E-SVF. The endothelial cell content of SVM is higher compared with M-SVF and E-SVF. SVM group shows the highest capacity of differentiation compare with two groups. Clinical applications showed significant graft uptake in hostile recipient bed, remarkable improvements in skin quality in all patients. No infections, fat cysts, granulomas, or other unwanted side effects were observed.

Stromal vascular matrix has a higher regenerative cell potency and more ECM support than common digestion methods. In clinical applications, SVM seems to be suitable for suboptimal recipient conditions and skin regeneration purposes.

105

SVF, ECM AGGREGATES, AND YELLOW WASTE FROM WHOLE, MECHANICALLY PROCESSED, AND ENZYMATICALLY PROCESSED ADIPOSE TISSUE: ABILITY OF STROMAL CELLS TO PROLIFERATE

Presenter: William Cimino, PhD (USA)
Affiliation: The GID Group
Author: Cimino W

Background: Three processing methods for adipose tissue (whole adipose as control, mechanical and enzymatic processing) were evaluated for cell proliferation and CFU capability. All three phases of processed tissue (SVF, ECM aggregates, and yellow phase) were retained and evaluated for each processing method. The metrics used to evaluate each phase for all processing methods are based on cells that survive processing and are able to release and proliferate.

Methods: Fresh lipoaspirate was washed, separated into three equivalent volumes, and processed as follows: whole lipoaspirate was centrifuged (as control), mechanical processing by 15 passes between syringes, enzymatic processing at 200 CDU/ml for 45 minutes at 37 C. No proprietary equipment or process was utilized. SVF portions were seeded at 50,000 cells/well, cultured 5 days in DMEM+20%FBS. ECM portions and yellow phase were seeded at 0.2 ml per well. For CFU analysis, SVF was seeded at 10,000 cells/well for 12 days at 37 C and 5% CO2. ECM and yellow phase were seeded at 0.2 ml/well. Results were adjusted based on the ratio of the actual phase volumes to the total starting volume to accurately reflect the results relative to the constant starting volume for each processing method.

Results: Results for cell proliferation show that only SVF derived enzymatically (9.0) and the yellow phase derived enzymatically (4.9) have a fold change greater than the control of whole lipoaspirate. All other phases from all methods have a fold change less than whole lipoaspirate. Results for CFU analysis show the fold change for enzymatically derived SVF is 1900 times that of whole adipose, SVF derived mechanically is 195 times that of whole adipose, and the fold change for all other phases from all methods is less than 20.

Conclusions: The ability of stromal cells initially resident in whole adipose lipoaspirate to proliferate in culture and to form colonies in culture is strongly dependent on the tissue processing used to isolate phases of the adipose tissue.

106

PREPARATION OF NANOFAT CONCENTRATE AND ITS USE FOR TREATMENT OF HYPERTROPHIC SCAR

Presenter: Yin-Di Wu, MD (China)
Affiliation: The First Affiliated Hospital of Jinan University
Authors: Liu HW, Wu YD

NOT PRESENTED

107

MSC MECHANICAL DISSOCIATION SINCE 2006: THE SHIFT PARADIGMA AND THE NEW CLINICAL APPLICATIONS

Presenter: Hebert T. Lamblet, MD (Brazil)
Affiliation: UNIFESP
Author: Lamblet HT

Goal/Purpose: Besides the fact that fat grafting gained popularity, isolation of ADCs (Adipose Derived Cells) and fat tissue manipulation still remains controversial. In 2001, a putative Stem cell population was isolated within the adipose stromal compartment. Since then, many studies exhibited and confirmed the abundance of adult mesenchymal cells, endothelial progenitor cells and growth factor-producing cells derived from fat tissue. Isolation of those cells, its activation and their immediate use for fat transplant still remain a challenge. The purpose of this study is to show our evolution from chemical to mechanical dissociation of those cells from the fat tissue stroma since 2002.

Methods/Technique: Adipose tissue is collected from the abdomen of patients undergoing liposuction. The fat is harvested and processed using two selective methods. Chemical: Half of the collected fat is left to decant, the other half is submitted to the collagenase isolation method. The stromal vascular fraction is centrifuge and the infranated pellet is added to the fresh fat tissue. Mechanical: After the washing process with a saline solution, a collagenase free Mechanical shear Force maneuver is made, generating a gradient force that detaches the ADCs from the fat tissue stroma. The presence of mesenchymal stem cells isolated in the pellet was confirmed by Indirect Immunofluorescence and Flow Cytometer analysis in a selective sample data in both methods.

Results/Complications: From February 2002 to October 2018, 667 patients benefited from autologous fat transplant preserving ADCs. The first 72 patients with Chemical Dissociation, from 2002 to 2006, and 625 patients, from 2006 to 2018, with Mechanical Dissociation. The donor site was the abdomen. An average of 40 to 50 million mesenchymal stem cells/100ml of processed lipoaspirate was isolated with the Mechanical method.

Conclusion: Up to now, adipose-derived cells isolation and fat tissue manipulation was mainly be done in the lab or using expensive processing machines and collagenase. The mechanical method has shown to be reproducible is collagenase free and has been used since 2006 in a long-term evaluation.

108

CREATING NEW PARADIGM IN FAT PROCESSING: ADJUSTABLE REGENERATIVE ADIPOSE TISSUE TRANSFER (ARAT)

Presenter: Eray H. Copcu, MD (Turkey)
Affiliation: MEST
Authors: Copcu EH, Oztan S

Introduction: Until today, many types of fat tissue grafting techniques have been described in the literature such as macrofat, microfat and nanofat. We are describing a new approach with using our patented ulta sharp blade system named, "Adinizer". Adipose tissue is the one of the most fragile tissue in the body and we described "Gentle Touch System" with patented protocol.

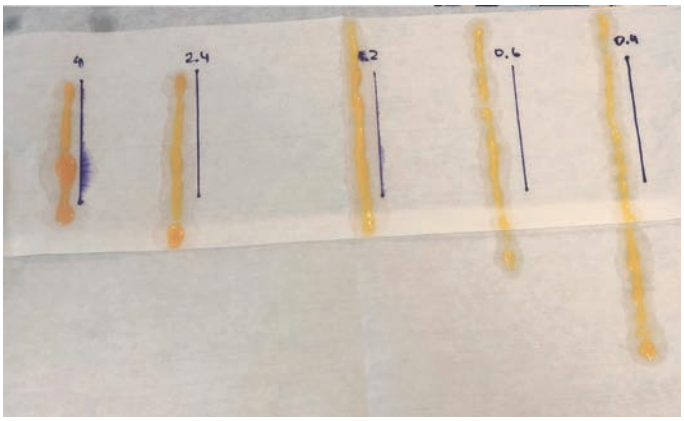
Method: 62 patients have been operated with our protocol with Adinizer as Adjustable Regenerative Adipose Tissue (ARAT) technique. Fat grafting has been used in face, breast, buttock, penis, extremities in different indications. Patients were followed minimum 6 months after operations. Analysis has been performed photographically, MRI imaging, ultrasound imaging and doppler if possible. Also patient satisfaction has been also has been evaluated. Cell integrity and viability have been analyzed histopathological.

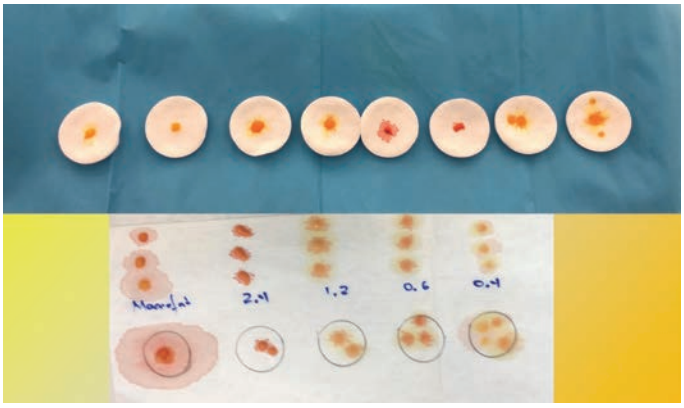
Results: Adipose tissue has been cut with 4000, 2400, 1200, 600 and 400 microns ultra sharp blade system (Adinizer) and sizing of the adipose tissue obtained as diameter as requested in different anatomical areas and in different indications. Also, regenerative cells has been produced as mechanical with our patented protocol. Cell integrity and viability has been proved by histopathological. More fat tissue retaining and more regenerative effect have been obtained. All patients has been satisfied after this approach.

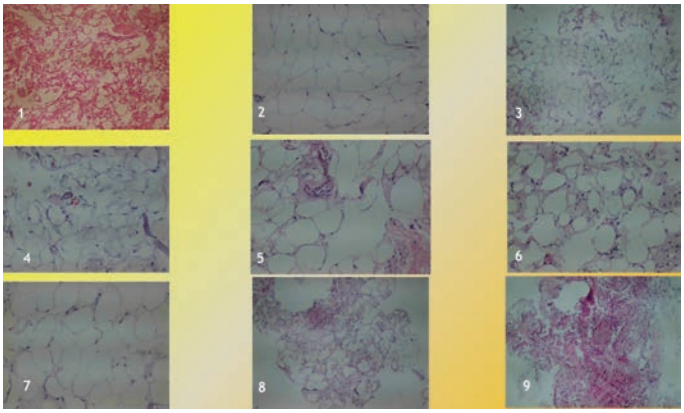
Conclusion: Nanofat grafting is one of the most performed operation in aesthetic plastic surgery. The most important feature of nanofat is regenerative affect due to regenerative cells in adipose tissue. But due to blunt pressure in inter-syringe maneuvers kills the fat tissue and there is no volume effect after nanofat grafting due to unviable adipocytes. We created a new paradigm in adipocytes transfer: We can cut the fat tissue using patented ultra sharp blade system (Adinizer) under minimal pressure in sizes of 4000, 2400, 1200, 600 and 400 microns according to anatomical area and indications. Also, using our protocol we can obtain regenerative cells with our patented protocol. Thus, alive fat cells in diameter as requested and regenerative cells can be used in same session as like "simultaneous cell enriched" therapy. This paradigm can be solved many problems.

108
CREATING NEW PARADIGM IN FAT PROCESSING: ADJUSTABLE REGENERATIVE ADIPOSE TISSUE TRANSFER (ARAT)

Presenter: Eray H. Copcu, MD (Turkey)
Affiliation: MEST
Authors: Copcu EH, Oztan S







113
THE ADDITION OF PLATELET-RICH PLASMA TO FACIAL LIPOFILLING: A DOUBLE-BLIND, PLACEBO-CONTROLLED, RANDOMIZED TRIAL

Presenter: Berend van der Lei, MD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: van Dongen JA, Willemsen JC, Spiekman M, Vermeulen KM, Harmsen MC, van der Lei B, Stevens HP

Background: Lipofilling is a treatment modality to restore tissue volume, but it may also rejuvenate the aging skin. Platelet-rich plasma has been reported to augment the efficacy of lipofilling, both on graft take and rejuvenation, by altering the adipose-derived stem cells. The authors hypothesized that addition of platelet-rich plasma would increase the rejuvenating effect and shorten recovery time.

Methods: The study conducted was a single-center, double-blind, placebocontrolled, randomized trial (2012 to 2015). In total, a well-defined cohort of 32 healthy female patients enrolled in the study, with 25 completing the follow-up. All patients underwent aesthetic facial lipofilling with either saline or platelet-rich plasma added. Outcome was determined by changes in skin elasticity, volumetric changes of the nasolabial fold, recovery time, and patient satisfaction during follow-up (1 year).

Results: Platelet-rich plasma did not improve the outcome of facial lipofilling when looking at skin elasticity improvement, graft volume maintenance in the nasolabial fold. Reversal of the correlation between age and elasticity, however, might suggest a small effect size, and thus might not be significant with our small study population.

Conclusions: This randomized, double-blind, placebo-controlled study clearly has shown that platelet-rich plasma significantly reduces postoperative recovery time but does not improve patient outcome when looking at skin elasticity, improvement of the nasolabial fold, or patient satisfaction. The reversal of the correlation between age and elasticity might indicate some effect on skin but requires more power in future studies.

114

EFFECT OF PLATELET-RICH PLASMA ON THE MIGRATION OF HUMAN ADIPOSE-DERIVED STEM CELLS

Presenter: Fangyuan Lai, MD (Japan)
Affiliation: Kansai Medical University
Authors: Lai F, Kakudo NA, Ma YU, Kusumoto KE

NOT PRESENTED

115

ADDITION OF TISSUE STROMAL VASCULAR FRACTION TO LIPOFILLING AND PLATELET RICH PLASMA DOES NOT IMPROVE THE FACIAL SKIN QUALITY AND PATIENT SATISFACTION

Presenter: Joris van Dongen, MD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: van Dongen JA, van Boxtel J, Vermeulen KM, Willemsen JC, Harmsen MC, van der Lei B, Stevens HP

Introduction: Lipofilling has been used to restore volume loss and to rejuvenate aged skin. The rejuvenating effect of fat is mainly ascribed to the tissue-stromal vascular fraction (tSVF) with its adipose derived stromal cells (ASCs). Many studies have reported that enrichment of fat used for lipofilling with tSVF or ASCs could increase the effect of fat on aged skin. However, thus far, this idea has never been tested in a well-designed prospective randomized clinical trial. The authors hypothesized that addition of mechanically isolated tSVF to fat in combination with platelet-rich plasma (PRP) used for lipofilling would increase both facial skin quality as well as patient satisfaction.

Material & Methods: This study was a single-center, double-blind, placebo-controlled randomized trial. In total, a well-defined cohort of 28 healthy female patients were enrolled in this study with finally 26 completing the entire follow-up. All patients underwent aesthetic facial lipofilling and PRP with the addition of either saline (control) or tSVF. tSVF was mechanically isolated by means of the fractionation of adipose tissue (FAT) procedure. Improvement of facial skin quality was determined by changes in skin elasticity, texture, wrinkles, pore size, pigmentation and vascularity. Patient satisfaction, psychological wellbeing and social function of patients were additionally evaluated.

Results: The addition of tSVF did not improve the effect of facial lipofilling with PRP with regard to skin quality. Patient satisfaction was equal low with no difference in both groups.

Conclusion: This randomized, double-blind, placebo-controlled study clearly demonstrated showed that the addition of tSVF to facial lipofilling in combination with PRP does not improve skin quality or patient satisfaction.

116

BIOLOGICAL TREATMENT OF PLATELET-RICH AUTOLOGOUS PLASMA HEALING DISORDERS (PRP)

Presenter: Nina Hassani, MD (Switzerland)
Affiliation: CIMMRA
Author: Hassani N

Introduction: Current conventional treatments for sores, ulcers, bedsores or necrosis are limited with unsatisfactory results. The rare data of in situ injection of platelet-rich autologous plasma (PRP) in patients with chronic wounds with scarring disorder have shown promising results.

Methodology: Between February 2018 and June 2019, we collected 250 consecutive PRP-treated patients. Of this population, 7 patients suffered from deep healing disorders. Depending on the size and depth of the wounds, we took 20, 40 or 60 ml of the blood. We're going used gel-free kit-separator and without platelet activator just rinsed with chloride citrate, with 360G centrifugation speed. We got 10 to 30 ml PRP. The 0.2-0.3 ml injections were made with 13 or 23mm 30G needles in the wound and healthy edges as well as the different floors ranging from the lesion to the fascias. The average rate of platelets after centrifugation (360G for 8 minutes) was on average 2.3 times the rate of base platelets. Subsequently we performed wet occlusive dressings with Flammasine or in some cases with PRF. The patients are followed every 2-3 days for wound cleaning and repair of the dressing until complete healing. Depending on the need, we repeated the injections leaving a minimum of 2-3 weeks between each treatment.

Results: Seven clinical cases were treated in two different centers. The patients were treated with the same kits and with the same injection technique and care. From the 5th day we noticed a retraction of the wounds thanks to the production of smooth muscle fibers by the myofibroblasts. Then a tissue remodeling was observed that resulted in complete repaving. An increase in peripheral production of endorphins decreased sensitivity and pain. Healing has been obtained in all patients treating.

Conclusion: Peri and intra-lesion injections of PRP on chronic lesions with scarring disorder give very satisfactory results. Healing was obtained in all treated patients. No adverse effects or complications were found.

117

EFFICIENCY OF NANOFAT AND PRP THERAPY ON THE FACIAL SCLERODERMA

Presenter: Flore Delaunay, MD (France)
Affiliation: Centre Hospitalier du Belvedere
Authors: Delaunay F, Magalon G, Delpierre V, Menkes S, Cohen SR, Mulot V, Marie I

Systemic sclerosis is a rare auto immune disease with skin fibrosis. Facial symptoms are associated with cosmetic disfigurement and limited expression with mask-like stiffness of the face. A reduction of mouth opening is induced by the loss of elasticity and the thickening in the perioral area and lips. Fat grafting has been described since years for volume restauration, with proved improvements and encouraging results. Nanofat grafting and PRP are gaining attention since years for regenerative properties and overall the volume effect searched in micro autologous fat transfer, the regenerative effect of nanofat may be also proposed to those patients, given their severe labial and skin dryness.

Material and Methods: Patients with a cutaneous scleroderma were included. Fat grafting was harvesting from knees and hips, under general anesthesia. Purification and cleaning were performed, and nanofat obtained by emulsification. PRP was obtained with a blood sample, with a centrifugation at 3200rpm during 4 minutes. A mix with 80% of nanofat and 20% of PRP was made. Injections were performed in all subdermis areas: frontal, temps, inferior palpebral, cheeks, lips, mandibular area and chin.

Results: Eleven patients were treated from October 2018 to June 2019. The mean of fat transferred was 27,2 cc. 83% patients were high satisfied from the surgery and 17% satisfied. We observed a mean improvement of 15% in the MHISS score at 6 months. We noticed a fast improvement of the skin texture and elasticity of patients between 2 weeks and 6 months. No side effects or complication were noticed.

Discussion: This preliminary report suggests an efficiency of nanofat and prp therapy in the facial scleroderma. This procedure is easy and safe, with an important patient' satisfaction. Protocols have to be precise and standardized to be more reproductible. The regenerative capacities of those two autologous products have to be recognized, and patient proposed to be treated, particularly given than there is currently no other efficient treatment. Double blind placebo randomized studies and histological analyzes are conducted, and longer follow-up needed.

118

FAT GRAFTING TO THE FACE AND HANDS FOR THE TREATMENT OF SCLERODERMA

Presenter: Amy L. Strong, MD, PhD (USA)
Affiliation: University of Michigan
Authors: Strong AL, Cederna PS

Background: Systemic scleroderma is a chronic connective disease that results in skin fibrosis with no pharmacological treatments that have been shown to be successful. While internal organ involvement usually corresponds with poorer prognosis, skin manifestations are universally present in all patients diagnosed with scleroderma. Fat grafting has recently gained significant attention, as the procedure has been shown to improve skin quality. The purpose of this study was to assess the efficacy of fat grafting for scleroderma patients.

Methods: In this retrospective study, we investigated the efficacy of autologous fat grafting to improve skin fibrosis in patients with scleroderma. Patients who underwent fat grafting to the face and hands with a diagnosis of scleroderma between February 2008 to March 2019 were included.

Results: Seven patients were identified that met inclusion criteria. The mean age at the time of surgery was 54.3 (range, 28 to 78). Fat grafting improved peri-oral skin quality and facial expression in patients with systemic scleroderma. Fat grafting to the hands improved skin quality and mobility in systemic scleroderma patients. No complications were identified.

Conclusion: Fat grafting for the treatment of skin fibrosis in systemic scleroderma patients improves skin quality and hand function.

121

THE COMBINED USE OF FAT GRAFT ENRICHED WITH STROMAL VASCULAR FRACTION CELLS, NANOFAT AND PRP IN THE TREATMENT OF FACE SOFT TISSUE DEFECTS

Presenter: Pietro Gentile, MD, PhD (Italy)
Affiliation: University of Rome Tor Vergata
Author: Gentile P

Recently, a new fat grafting technique termed 'nanofat grafting' was proposed which improved tissue repair by the stem cells contained in the stromal vascular fraction (SVF) of nanofat. Here, we reported the clinical outcomes of different fat and nanofat procedures in the treatment of scars in relation with SVF cell yield.

Methods: Three different modified nanofat grafting procedures (supercharged-, evo- and centrifuged-modified nanofat) were compared with the classic nanofat method, and histological analysis was performed to assess skin regeneration. Residual nanofat samples were analyzed to determine SVF immunophenotype and yield from each procedure.

Results: Supercharged-modified nanofat gave the best results in terms of clinical outcome and SVF yield. Histological analysis revealed similar skin regeneration in all treatments.

Conclusion: This work suggested a positive correlation between SVF yield and clinical outcomes in the nanofat treatment of scars.

122

MICROGRAFTS DERIVED BY ADIPOSE TISSUE: INDICATIONS AND PERSPECTIVES

Presenter: Antonio Graziano, PhD (Italy) - **Presented by Giulia Silvani**
Affiliation: Human Brain Wave srl
Author: Graziano A

Background: Adipose tissue displays phenotypic gene expression characteristics similar to human mesenchymal stem cells (hMSCs) and is widely used in the clinical practice due to its easy collection by liposuction intervention for aesthetic purpose. Adipose-derived MSCs (ASCs) are retrieved from the aqueous fraction of the digested lipoaspirate. The aqueous fraction is known as SVF and includes, ASCs, endothelial precursor cells (EPCs), endothelial cells (ECs), macrophages, smooth muscle cells, lymphocytes, pericytes, as well as pre-adipocytes.

Aim: We reported mechanical digestion of adipose tissue (lipoaspirate) by Rigenera procedure to immediately obtain injectable micrografts, and compared this method with classic enzymatic digestion in terms of cell count and viability and expression of MSCs markers. as well as the expression of cluster differentiation (CD) for each sample and the differentiation in adipocytic, chondrocytic, osteocytic lineage.

Results: The micrografts obtained by Rigenera procedure enclosed the SVF with adipocytes and stromal stalks and also contained hASCs and fewer hematopoietic elements. Molecular analysis showed significant hASC uniformity within the cells of the stromal vascular tissue and the positivity for MSCs markers, was more evident after Rigenera procedure, with respect to enzymatic digestion. A higher quantity of hASCs was observed using both methods of isolation with a slight difference between the Rigenera® the enzymatic method in favor of the latter. Cell viability assay showed no significant difference between the Rigenera® and the enzymatic method. No significant difference in cell viability and cluster differentiation pattern expression was observed.

Conclusion: Mechanical method by Rigenera technology is appealing because is simple, quick and not associated with expensive equipment or disposables.

125

LESW PRECONDITIONING PROMOTES HOMING OF ADIPOSE-DERIVED ENDOTHELIAL PROGENITOR CELLS TO ATTENUATE RENAL ISCHEMIA REPERFUSION INJURY VIA COX-2/PGE2 PATHWAY

Presenter: Jingyu Liu, MS (China)
Affiliation: Nanjing First Hospital
Authors: Liu J, Zhou C, Zhou L, Ge Y, Dou Q, Xu L, Xu Z, Jia R

NOT PRESENTED

126

ISOLATION OF HUMAN ADIPOSE-DERIVED STROMAL CELLS USING SUCTION-ASSISTED OR THIRD-GENERATION ULTRASOUND-ASSISTED LIPOASPIRATION AND THEIR THERAPEUTIC POTENTIAL IN CARTILAGE TISSUE ENGINEERING

Presenter: Jian Wang, MD (China)
Affiliation: Plastic Surgery Hospital, Chinese Academy of Medical Science
Author: Wang J

Harvesting adipose-derived stromal cells (ASCs) for tissue engineering is frequently done through liposuction. ASCs were harvested from third-generation ultrasound-assisted lipoaspirate (UAL) and suction-assisted lipoaspirate (UCL). In vitro parameters of cell yield, cell viability and proliferation, surface marker phenotype, osteogenic differentiation, and adipogenic differentiation were performed. The remnant auricular cartilage from microtia has become a valuable cell source for ear regeneration. Co-culture of ASCs and microtia chondrocytes is considered as a promising strategy to generate tissue engineered cartilage as chondrocytes induce the chondrogenesis of ASCs and inhibit the hypertrophy of engineered cartilage. In the study, using the histological assay, biomechanical evaluation, and quantitative analysis of gene expression, we compared co-culture strategies of microtia chondrocytes and ASCs at 5:5 ratio on PGA/ PLA scaffolds to construct tissue engineered elastic cartilage in vitro and in vivo. UAL- and SAL-derived samples demonstrated equivalent ASC cell yield, cell viability and proliferation, and UAL ASCs were not impaired in their osteogenic, adipogenic differentiation capacity. There are no differences for cartilages in vitro and in vivo. We conclude that UAL is a successful method of obtaining fully functional ASCs for cartilage tissue engineering. Cells harvested with this alternative approach to liposuction are suitable for cartilage tissue engineering applications.

127

INFLAMMATORY STATES OF HUMAN ADIPOSE-DERIVED STEM CELLS AND ADIPOSE TISSUE DURING CHRONOLOGICAL AGING

Presenter: Ivona Percec, MD, PhD (USA)
Affiliation: University of Pennsylvania
Authors: Percec I, Shan X

NOT PRESENTED

128

HUMAN ADIPOSE DERIVED STEM CELLS LOADED WITH MAGNETIC NANOPARTICLE AS REGENERATIVE TOOLS

Presenter: Luminita Labusca, MD, PhD (Romania)
Affiliation: National Institite of Research and Development in Technical Phys
Authors: Labusca L, Herea DD, Danceanu C, Minuti A, Stavila C, Chiriac H, Lupu N

NOT PRESENTED

129

VITAMIN D3 (CALCITRIOL) IMPROVES AUTOLOGOUS FAT GRAFT RETENTION IN MURINE MODEL

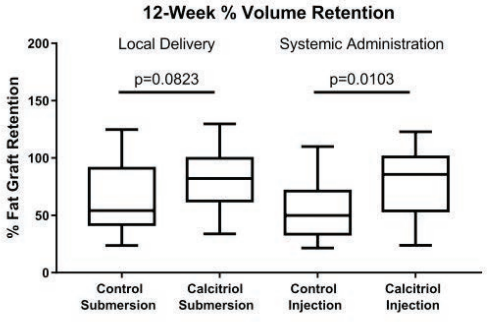
Presenter: Lauren Kokai, PhD (USA)
Affiliation: University of Pittsburgh
Authors: Wang S, Desanto M, Stavros A, Patadji S, Olevian D, Gusenoff J, Rubin J, Kokai L

Introduction: Fat grafting is a powerful technique limited by unpredictable long-term tissue retention. After injection, adipose grafts experience extreme ischemia causing adipocytes to necrotize, inducing macrophage recruitment and inflammation. We hypothesize that reducing inflammation will decrease the rate of phagocytic clearance and improve graft repopulation following revascularization. Calcitriol, the active form of Vitamin D3, both downregulates inflammation and induces adipogenesis; therefore, we aimed to investigate the uses of calcitriol to improve fat graft retention.

Methods: Coleman processed lipoaspirate from 3 donors was implanted bilaterally on the mouse dorsum. Graft retention and viability were assessed at 1, 4, and 12 weeks following thrice weekly calcitriol IP injections. Because calcitriol is lipophilic and retained primarily in adipose tissue in vivo, we also assessed fat grafting outcomes after incubating lipoaspirate with calcitriol for 1 hour. Assessment outcomes included volume retention, H&E injury score, and adipocyte viability. To determine if the observed in vivo effects were primarily due to improved graft viability, we conducted a secondary in vitro experiment measuring adipose viability and gene expression with qRT-PCR in 1% hypoxic culture.

Results: At 1 and 4 weeks, both local and systemic administration of calcitriol increased graft retention ($p<0.05$). At 12 weeks, systemic calcitriol increased retention from 54.6% to 79.8% ($p<0.05$) while local delivery did not. There was no significant difference in the H&E based injury score between groups. Perilipin IHC showed adipocyte viability was increased at 12 weeks from 48.7% to 63.3% (local $p>0.05$) and from 48.3 to 70.7% (systemic, $p<0.05$). In vitro, calcitriol decreased the expression of inflammatory cytokines corresponding to phagocytotic activity and M1 activity (SOD1, IFNγ, IL6). Calcitriol did not change adipocyte viability or adiponectin expression.

Conclusion: Calcitriol, an FDA-approved drug with known immunomodulatory properties, appears to be a promising drug for improving graft retention. Calcitriol demonstrated the ability to increase fat graft retention up to 12 weeks in mice and exhibited anti-inflammatory properties in vitro.



132

TENOGENIC DIFFERENTIATION PROTOCOL IN XENOGENIC-FREE MEDIA ENHANCES TENDON-RELATED MARKER EXPRESSION IN ASCS

Presenter: Gianni Soldati, PhD (Switzerland)
Affiliation: Swiss Stem Cell Foundation
Authors: Mariotta L, Soldati G, Gola M, Stanco D, Caprara C, Ciardelli G, Minonzio G

NOT PRESENTED

133

THE PARACRINE ACTION OF AUTOLOGOUS MICROFRAGMENTED ADIPOSE TISSUE COUNTERACTS INFLAMMATION IN AN IN VITRO MODEL OF TENDON PATHOLOGY

Presenter: Marco Viganò, PhD (Italy)
Affiliation: IRCCS Istituto Ortopedico Galeazzi
Authors: Viganò M, De Girolamo L, Randelli P, Ragni E, De Luca P, Menon A, Colombini A, Perucca Orfei C, Lugano G

The role of inflammation in tendon disorders has been recently confirmed in different disorders including Achille's tendinopathy and rotator cuff tears. Thus, the immunomodulatory ability of Mesenchymal Stem Cells (MSCs) together with their trophic potential in sustaining tissue regeneration could counteract the pathology progression and favor tissue healing. The present study focuses on the ability of MSCs contained in micro-fragmented adipose tissue (μFAT) prepared at the point-of-care to counteract inflammation and catabolic effects in an in vitro model of tendon cells (TCs).

TCs were isolated from remnant portions of long head of biceps tendon (n=8) retrieved from arthroscopic rotator cuff repair. Small aliquots of μFAT of the same patients which was used to augment the rotator cuff repair during the same procedure was also collected. TCs at p4 were incubated for 48 hours in presence of IL-1β and co-cultured with μFAT in a transwell system. Metabolic activity after 48 hours of treatment was measured by Alamar assay. At the same time point, the gene expression of MMP1, MMP3, SCX, COL1A1, COL3A1 and PTGS2 was analyzed by Real Time RT-PCR. The content of soluble mediators (IL-1ra, IL-6, VEGF) in co-culture media was analyzed by ELISA.

IL-1β significantly enhanced cell viability and the expression of MMP1, MMP3, COL3A1, SCX and PTGS2 with respect to untreated controls. The addition of autologous μFAT reduced the expression of COL3A1 and MMP1 compared to IL-1β-only treated samples. While, IL-6 and VEGF were stimulated by IL-1β and further increased by μFAT, the production of IL-1Ra was only induced by μFAT in inflammatory conditions. μFAT also enhanced cell viability in a non-inflammatory environment.

In inflammatory conditions, μFAT influenced the behavior of TCs in vitro, reducing their expression of fibrotic and catabolic markers. This was due to the release of anti-inflammatory mediators by μFAT, such as IL-1Ra. Nevertheless, inflammation also triggers TCs to attempt for a restoration of tissue homeostasis, producing pro-regenerative elements (VEGF). The content of this molecule in culture media was further enhanced by μFAT, demonstrating that the addition of MSCs to the site of injury may support the homeostatic activity of tissue resident cells.

134

STEM CELL THERAPY FOR OSTEOARTHRITIS: A SURVEY OF FLORIDA'S UNREGULATED DIRECT-TO-CONSUMER MARKET

Presenter: Amanda A. Lindeman, BS (USA)
Affiliation: University of Florida
Authors: Lindeman AA, March KM

Introduction: A large body of anecdotal information exists related to cellular therapies with limited high-level evidence on their efficacy. Despite this early stage, out of compassion physicians have wished to offer stem-cell therapy to patients desperate for relief, but because of regulatory hurdles, a growing number of clinics in the USA offer stem-cell therapy without explicit FDA approval. Florida has been identified as a "hotspot" for these clinics, with the greatest number of clinics relative to its population. We performed a survey of clinics in Florida that advertised stem-cell treatment for osteoarthritis.

Methods: Using several search strategies, we identified a total of 73 clinics treating osteoarthritis in Florida. A survey was conducted to collect data on several factors including number of patients treated, success rate, cost, and stem cell source. Data was collected from 20 clinics via their website, by email, or by phone.

Results: A total of 32,101 patients were treated (data for N=13 clinics), with an average success rate of 89% ± 2.31% (N=9), costing an average $5,253 ± $315 (N=19). Sources included adipose tissue (N=12), bone marrow (N=11), umbilical cord blood (N=8), and amniotic fluid (N=1) with doses from 1 million to 240 million stem cells (N=6). Clinics advertised combining stem cells with PRP alone (N=16), PRP in combination with hyaluronic acid or dexamethasone (N=3), or nothing (N=2). All clinics offered intraarticular injections as the route of administration, with some offering intravenous infusions as well (N=6). Eight clinics advertised evaluation of sample cell counts and/or viability, but none of the clinics performed ex vivo expansion. The majority of clinics reported no adverse events (N=13), while others reported minor complications (N=5). Only 3 clinics reported engaging in research-based publications. All clinics stated they were in compliance with FDA regulation.

Conclusions: While stem cells are increasingly attractive to both patients and providers, research and FDA regulations are evolving in this booming direct-to-consumer market. As significant numbers of patients were treated for osteoarthritis, implementation of uniform data collection would be most useful to both patients and the orthopedic field at large.

135

STEM CELLS & CARRIER MATERIALS ON BURNS RECONSTRUCTIVE SURGERY – PROGRESS AND OPPORTUNITIES

Presenter: N. W. Zhu, MD, MSurg, PhD, FBAPS (China)
Affiliation: Fudan University Huashan Hospital
Author: Zhu NW

Stem cells are the core of tissue and organ regeneration and tissue engineering. Cell carrier materials, serving as a good niche, can promote the proliferation, differentiation and migration of stem cells in vivo, and improve the success rate of stem cell therapy. This talk mainly focuses and introduces on the research status of the progress and opportunities of the area of stem cells and carrier materials, shares some of the challenge cases of clinical applications of stem cells therapy combined with carrier materials in burns reconstructive surgery, chronic wounds such as refractory ulcers, congenital skin defects and hair regeneration, and predicts the future development trends and challenges of this fast developing research area of the stem cells and biomaterials.

136

MONITORING OF CELL CULTURE CONDITIONS AND EARLY PREDICTION OF THE QUALITY OF AN OSTEOGENIC CELL-BASED MEDICINAL PRODUCT

Presenter: Anaïs Namur, PhD (Belgium)
Affiliation: Novadip Biosciences SA
Authors: Theys N, Namur A

Novadip Biosciences has developed a technology platform for tissue engineering and manufacturing of osteogenic cell-based products produced. During the production process, a flexible medium refreshment strategy is essential to ensure the quality of the final product and the batch-to-batch consistency. The cellular metabolic activity of several tens of batches has been studied. The concentration of a panel of metabolites has been measured in cell culture supernatant from AMSCs isolation to formulation. Normalization of the data was carried out by calculating absolute and specific production/consumption rates. We defined optimal culture condition. The level of metabolites stays in standard production/consumption rates and never reaches critically high values. A continuous consumption of glucose and glutamine is observed, and medium refreshment strategy allows to keep those nutrients at a sufficient level. A significant production of metabolites is observed throughout the process. The lactate level stays relatively low during the proliferation phase then raises after the induction of osteogenic differentiation. It has been shown that lactate is a major end-product of glucose metabolism during osteogenic differentiation. We highlight an increase in glucose consumption and lactate production showing a transition between proliferating cells and osteogenic-oriented cells. Ammonia level tends to increase after osteo-induction but does not reach inhibitory concentration. Similarly, LDH level increases after osteo-induction. Glutamate consumption increases while pyruvate level decreases progressively during proliferation phase then go down to a low and stable level after osteoinduction. Phosphate concentration raises drastically during differentiation while the calcium level drops. Thus, the osteogenic differentiation leads to a metabolic shift in glucose, lactate, glutamate, LDH and pyruvate concentrations. Production and consumptions rates could be used to implement a routine-based analysis of spent media. Monitoring the rate of nutrients consumption and metabolites production represents a non-invasive and cost-effective strategy to monitor the process performance and predict quality issues with a high level of confidence.

137

HIGHTLIGHTS ON FACELIFTS ANS NANOFAT TRANSFERS OUTCOMES

Presenter: Thierry van Hemelryck, MD (France)
Affiliation: La Clinique Esthetique
Author: van Hemelryck T

The author depicts how to improve your facelifts outcomes with the help of nanofat transfers and or even with PRP.

After showing his personal technique of facelifts, he describes how results seem to be quite different in skin improvement and of course in global fulfilment of the patient.

138

SAFETY AND LONG-TERM FOLLOW-UP OF THE USE OF PLATELET RICH PLASMA IN COMBINATION WITH LIPOFILLING ON FACELIFT

Presenter: Jean-Paul Meningaud, MD, PhD (France)
Affiliation: APHP
Author: Meningaud JP

Introduction: Autologous fat grafting is now a standard therapy in plastic surgery due to its trophic and volumetric effects. The fat intake rate non accurately predictable in the preoperative period and this point is the subject of extensive investigations. However, the use of lipofilling and PRP seems to be promising in order to improve the success rate of fat tissue transplants. Platelet-rich plasma (PRP) continues to attract the attention of surgeons and physicians because of these potential clinical benefits.

Objectives: To date, no study reported the long-term effect and safety of the adjunction of PRP regarding some adverse events such as cancers or other diseases. The purpose of this study is to report any data regarding the use of PRP combined with lipofilling on facelift. The type of PRP used, dose, short and long-term complications were reported.

Material and Methods: This was a retrospective study conducted in a department of plastic, reconstructive and maxillo facial surgery of Henri Mondor Hospital. Data of all patients operated for facelift and treated by lipofilling combined with PRP as an adjunct procedure over the past 5 years, i.e. from January 2013 to January 2018, were collected from operative notes and questionnaire including different items submitted to patients. The facelift was combined with fat injection supplemented with 20% of PRP (From 8 ml of blood, the RegenKit-BCT allowed preparing 4 ml of PRP and the total dose of platelets is over 1.6 billion).

Results: Among the 104 patients included in this retrospective study, there were 92 female (88%) and 12 men (12%) with a mean age of 61.81 (±6.85) years. The mean BMI was 22.54 kg/m2 (±2.98). The mean follow-up was 4.3 (±1.44) years. Pre-existing diseases were reported: eight patients (8%) had hypertension, 4% (4 patients) had diabetes, 1 patient has Ehlers-Danlos syndrome, 1 patient had sarcoidosis, 1 woman had history of breast cancer, and 1 patient had idiopathic purpura. No short- or long-term adverse events related to the use of PRP combined to lipofilling were reported. All patients were satisfied with their outcomes.

Conclusion: No complications were reported after using PRP. It seems that PRP can be safely combined with lipofilling in facelift to achieve complete restoration of

139

THREE SIMPLE STEPS FOR REFINING TRANSCUTANEOUS LOWER BLEPHAROPLASTY FOR AGING EYELIDS: THE INDISPENSABILITY OF MICRO-AUTOLOGOUS FAT TRANSPLANTATION

Presenter: Tsai-Ming Lin, MD, PhD (Taiwan)
Affiliation: Charming Institute of Aesthetic and Regenerative Surgery
Author: Lin TM

Background: Lower blepharoplasty has been used for rejuvenating lower eyelids, and diverse modifications have been used to treat conjunct deformities at the tear trough/lid-cheek junction. Strategies for recontouring prominent tear trough/lid-cheek junctions, including orbital fat manipulation, have been reported with good results in the literature. Micro-autologous fat transplantation (MAFT) is a previously unevaluated, potentially advantageous approach to blending the prominent tear trough/lid-cheek junction.

Objectives: We determined the long-term results after three-step transcutaneous lower blepharoplasty with MAFT for patients with aging eyelids and prominent tear trough/lid-cheek junctions.

Methods: We evaluated 205 patients with aging lower eyelids who underwent transcutaneous lower blepharoplasty with MAFT between October 2010 and September 2016. The three-step procedure involves a subciliary elliptical skin excision, resection of three orbital fat compartments, and MAFT for the tear trough/lid-cheek junction using a MAFT-GUN under intravenous anesthesia.

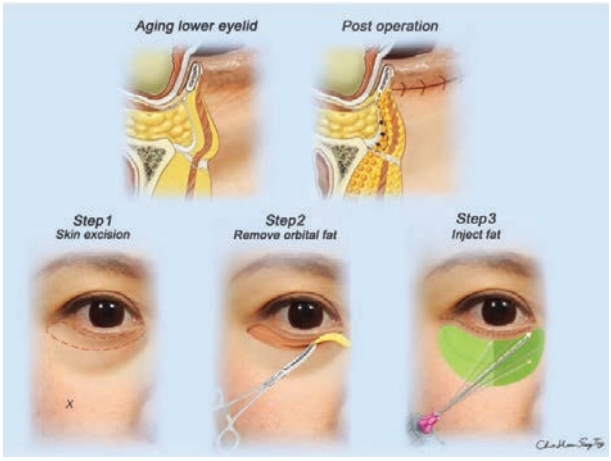
Results: The mean patient age was 52 years (range, 34-78 years). The mean operating time was 61 minutes. The mean fat volumes delivered to the tear trough/lid-cheek junctions were 2.80 mL and 2.76 mL for the left and right sides, respectively. The average weights of the three resected orbital fat compartments were 0.58 g for the left side and 0.56 g for the right side. Patients showed significant improvement and maintenance at an average follow-up of 60.2 months (range, 18-90 months).

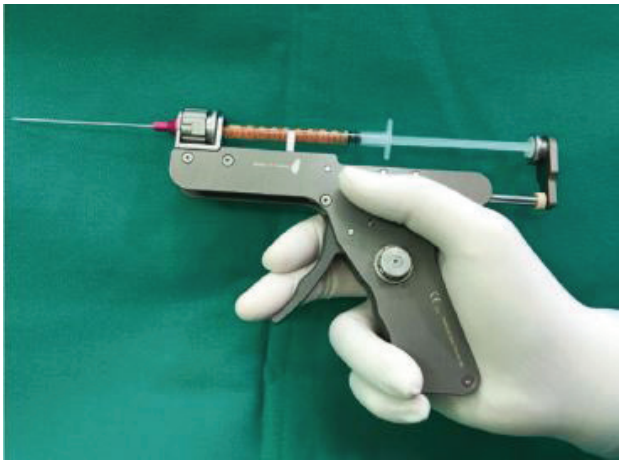
Conclusions: Three-step transcutaneous lower blepharoplasty with MAFT is an effective, reliable, and promising method with high patient satisfaction and minimal risk of complications. Long-term results demonstrated its utility for aging lower eyelid treatment.

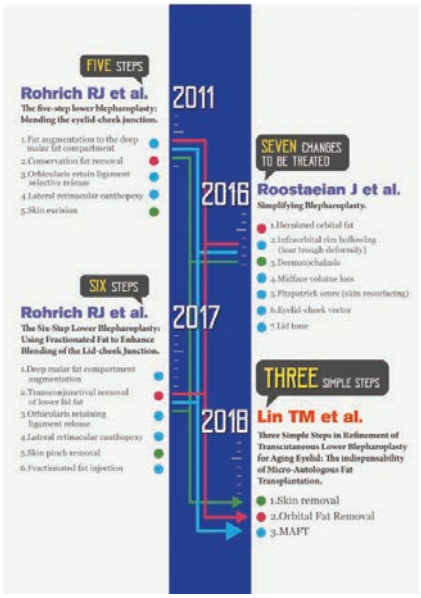
139

THREE SIMPLE STEPS FOR REFINING TRANSCUTANEOUS LOWER BLEPHAROPLASTY FOR AGING EYELIDS: THE INDISPENSABILITY OF MICRO-AUTOLOGOUS FAT TRANSPLANTATION

Presenter: Tsai-Ming Lin, MD, PhD (Taiwan)
Affiliation: Charming Institute of Aesthetic and Regenerative Surgery
Author: Lin TM







141

CELLULAR OPTIMIZATION OF NANOFAT: INCREASED CELL COUNT AND VIABILITY USING LIPOCUBE NANO™

Presenter: Steven Cohen, MD, FACS (USA)
Affiliation: University of California San Diego
Authors: Cohen S, Tiryaki T, Womack HA, Schlaudraff KU, Scheflan M

Introduction: Nanofat was introduced by Tonnard and Verpaele. Their initial observations in intradermal applications showed visual evidence of dermal regeneration. Since that time a number of Nanofat devices have been introduced. The cellular content in the processing of Nanofat is not the same from each device, yet this forms the biologic basis for Nanofat. We sought to find a different solution to produce a matrix enriched Nanofat and optimize the cellular content.

Materials and Methods: The primary objective of this study was to compare cell counts and cell viabilities produced by LipocubeNano™ (Lipocube, Inc., London, UK) in comparison to another common processing method for Nanofat (Tulip, Inc., San Diego, CA). Thirty mls of fat was harvested from ten patients in order to test three methods of cell isolation. Ten mls of fat were used for each SVF isolation and a Muse Cell Analyzer was used to measure cell counts and cell viabilities. Cell Images were taken with a Florescence Microscope.

Results: Cell Number (Total cells from 10 ml of fat, n=10):

	Nanofat	Nanocube	Enzymatic digestion
Cell number	7.5 x106	12.1x106	15.2x106
Cell viability	89.32%	98.42%	94.55%

Conclusions: Nanofat from LipocubeNano™ has a higher regenerative cell count and more SVF than the other common method of Nanofat processing. A new means of mechanical processing, using a lab in a box, preserves more matrix, optimizing the cellular content of the Nanofat.

142

NANOFAT GRAFTING IN SKIN REJUVENATION: EVIDENCED BASED SCIENCE, PROTOCOL AND CLINICAL APPLICATIONS

Presenter: Sophie Menkes, MD (Switzerland)
Affiliation: Forever Institut
Author: Menkes S

We aimed to access wether our novel nanofat grafting procedure improves skin quality, while yielding a regenerative effect, and wether this novel technique can also achieve a lifting effect in facial rejuvenation.

Methods: Patients who requested for skin rejuvenation were enrolled between january 2017 and june 2018. Fat was aspirated from inner face of the knee, or medial thigh, or lower abdomen regions. Following aspiration and flushing, microfat was obtained after washing with saline. This microfat was emulsified to obtain nanofat suspension, wich was injected using a 25 G cannula into the subcutaneous layer of skin. Biological analysis, histological analysis were done before and after 6 months. Images were obtained before and at 3, 6, 12 and 18 months. Patients were also administered a survey concerning skin appearance.

Results: 350 patients were included (48 men and 302 women; mean age, 21-78 years). The clinical results were apparent between 4 and 6 weeks after injection, and improvements were continuously observed until 18 months postoperatively. All patients confirmed an improvement in texture, elasticity, glowing, firmness, fine wrinkles, and skin hydration, along with a regenerative effect. Patients also exhibited considerable improvements in skin glow/regularity, and 80% exhibited considerable improvements in facial shape with a lifting effect, in case of facial rejuvenation. Only minor complications were noted, including redness and edema between 2 and 4 days, and some bruises and pain in donor site.

Conclusion: Skin rejuvenation with subcutaneous nanofat injections appears to be an effective method, although additional studies are necessary.

143

VOLUMETRIC EFFECT AND PATIENTS' SATISFACTION OF FACIAL FAT GRAFTING

Presenter: Aartje J. Tuin, MD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: Tuin AJ, Schepers RH, Spijkervet FK, Vissink A, Jansma J

Background: Volume retention of facial fat grafts is known to decrease after transplantation. This study aims to assess the volumetric effect and patient's satisfaction facial fat grafting up to one year after the procedure.

Methods: Between March 1, 2014 and February 1, 2018, all consecutive adult female patients that solely underwent facial fat grafting were asked to participate. For all fat graft procedures, the same fat grafting method was used. An algorithm based personalized aesthetic template was used to define specific aesthetic areas on the preoperative 3D image. Outcomes of 3D volume differences and patient satisfaction (FACE-Q questionnaire) were measured at baseline, 6 weeks, 6 months and 12 months after fat grafting. Only patients with complete 3D data were included for analysis.

Results: Of 33 female patients that underwent a facial fat graft procedure for aesthetic and reconstructive purposes, 23 patients had complete 3D data and were analyzed. The highest volume gain was observed 6 weeks post grafting followed by continue gradual loss thereafter. Overall and in the zygomatic area in particular, a substantial visible volumetric effect could still be observed 1 year after grafting, while this effect was lost in the lip area. A significant improvement was observed with regard to the "satisfaction with facial appearance overall" and "satisfaction with cheeks" FACE-Q scores, while the "lines lips" returned to baseline levels after one year. Preoperative psychological well-being was positively correlated with the satisfaction with the result after one year.

Conclusion: During one year of facial fat grafting in aesthetic and reconstructive patients, there is a decrease of the visible volumetric effect, which corresponds to patients' satisfaction during one year.

144

TRINITY REJUVENATION TREATMENT (COMBINATION TREATMENT WITH SVF, FATGRAFT, AND FRACTIONAL LASER) FOR AGING FACE

Presenter: Kitae Kim, MD (South Korea)
Affiliation: TAE Plastic Surgery Clinic
Author: Kim K

Introduction: Primary components of aging are sagging, deflation and wrinkling of the facial skin. Rejuvenation treatment targets and improves these three components. Even in an aged face, the midface ages mostly by deflation and not by sagging. As a result, it is possible to rejuvenate the face effectively without surgical procedures such as facelift. SVF is involved in the wound healing process, recovering wounds quickly, minimizing redness and preventing excessive scarring as a result. Using this SVF's ability, SVF therapy was added to the combined procedure of laser treatment and Fatgraft to restore facial aging.

Method: Trinity Rejuvenation, which consists of Fat Graft, Fractional Laser (Ultrapulse CO2 laser or Picosecond Nd-YAG Fractional laser) and SVF. These three procedures conducted simultaneously replace volume to the face, heals wounds across the face and regenerate collagen to minimize time to recovery and improve deflation and wrinkling of the face. The intensity of each of the three procedures can be customized for each patient.

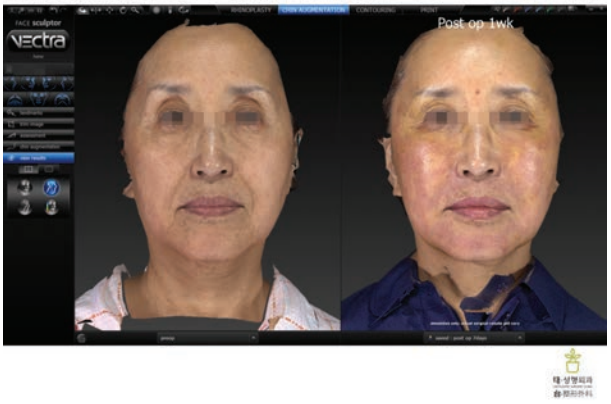
Result: Fatgraft could restored the deflation of the central part of the face and a powerful CO2 fractional laser could induced collagen regeneration in the dermis. Simultaneously, SVF induced minimize laser stimulation. 4mm penetration means that the laser is able to penetrate all layers of the facial skin and help stimulate the SVF that's conjointly used to rejuvenate the skin. Therefore the rejuvenate benefit can be obtained both in the skin layers and SVF.

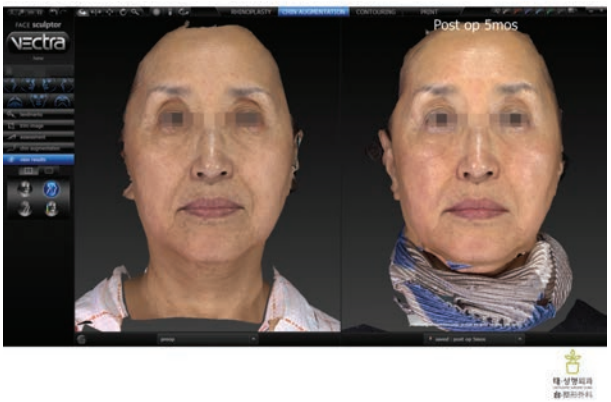
Conclusion: In conclusion, Trinity rejuvenation that utilizes UltraPulse, Fat graft and SVF is a good solution for aging face caused by deflation and wrinkling. When administering the trinity rejuvenation, usage of UltraPulse SCAAR FX targets the subdermal layer of the skin to activate the SVF, which modulates collagen regeneration, while Fat graft restores volume and reduce wrinkle. Based on my experience, 3% density is the most optimal parameter for using the SCAAR FX mode in UltraPulse.

144

TRINITY REJUVENATION TREATMENT (COMBINATION TREATMENT WITH SVF, FATGRAFT, AND FRACTIONAL LASER) FOR AGING FACE

Presenter: Kitae Kim, MD (South Korea)
Affiliation: TAE Plastic Surgery Clinic
Author: Kim K





145

THE EFFECTS OF FACIAL LIPOGRAFTING ON SKIN QUALITY: A SYSTEMATIC REVIEW

Presenter: Joris A. van Dongen, MD (Netherlands)
Affiliation: University Medical Center Groningen
Authors: van Dongen JA, Langeveld M, van de Lande LS, Vriend L, Harmsen MC, Stevens HP, van der Lei B

Introduction: Autologous lipografting for improvement of facial skin quality was first described by Coleman in 2006. The current dogma dictates that adipose tissue-derived stromal cells (ASCs) which reside in the stromal vascular fraction (SVF) of lipograft contribute to skin rejuvenation e.g. increased skin elasticity, a more homogenous skin color and softening of skin texture. Nowadays, many studies have been reported on this 'skin rejuvenation' effect of autologous fat grafting. This systematic review was undertaken to assess the efficacy of autologous lipografting on skin quality.

Material & Methods: MEDLINE, Embase, Cochrane Central, Web of Science and Google Scholar databases were searched for studies evaluating the effect of autologous lipografting on facial skin quality (05-11-2018). Outcomes of interest were skin texture, color and elasticity as well as histological outcomes and number of complications.

Results: Nine studies were included with 301 patients treated in total. No meta-analysis could be performed due to heterogeneity of the metrics and outcomes. Eight studies reported increased skin elasticity, improvement in skin texture as well as a more homogeneous skin color after treatment with lipografting, cellular SVF or Nanofat. One study reported no increased skin elasticity after lipografting. Histological improvement was seen after lipografting and ASCs injections. However, in general, the level of evidence of the included studies was low. No serious complications were reported.

Conclusion: Autologous facial lipografting as well as cSVF and ASCs injections hardly seem to improve facial skin quality but can be considered as a safe procedure.

V1

Q-GRAFT® - A CLOSED AND SAFE SYSTEM FACILITATING THE INTRAOPERATIVE ISOLATION OF THE STROMAL VASCULAR FRACTION FROM ADIPOSE TISSUE

Presenter: Juliane Meyer, Dipl-Biol (Germany)
Affiliation: Human Med AG
Author: Meyer J

Introduction: Adipose tissue is a known source of stromal vascular fraction (SVF) cells. They are a promising tool for regenerative medicine and tissue engineering. Today laboratories have established many differing manual SVF-isolation procedures. These methods rely on laminar flow benches to ensure a sterile working environment. In order to be able to consecutively harvest adipose tissue and isolate the SVF in the operating theatre during one operation, a different solution is necessary.

Method: In combination with a body-jet the adipose tissue can be suctioned right into the Q-graft® system. Here it is digested with Humanase™, a blend of proteolytic GMP grade enzymes, under constant mixing and heating to 37°C. Through a series of steps of washing and filtration the SVF cells can be collected as a suspension in Ringer's solution. The suspension of the SVF can either be concentrated in the device by cross-flow filtration or by one step of centrifugation using a special sterile Q-graft® centrifugation set.

Results: Preliminary results of the flow cytometric characterization show, that the SVF isolated with the Q-graft® with just one step of centrifugation contains regeneratively active cell types like ASC, Pericytes and endothelial cells. It was also shown, that the Q-graft® system was able to isolate an average of 36.3E+04 SVF cells per ml processed tissue. An average of 17.4% of the cells reached plastic adherence and were CD34-positive.

Conclusion: The new compact Q-graft® system provides the possibility to combine the harvest of adipose tissue with the isolation and concentration of SVF cells in one closed sterile environment in a standardized manner. No bacterial contamination was found in the tested cell suspensions. In ongoing work the CFU content, population doubling time of the isolated adMSC, as well as their mesenchymal differentiation potential are being determined. Thus, the successful isolation of the SVF in the closed Q-graft® system can clear the way for the clinical application of this regenerative cell fraction.

V2

MEST: MECHANICAL SVF TRANSFER BY USING ADINIZER

Presenter: Eray H. Copcu, MD (Turkey)
Affiliation: MEST
Author: Copcu EH

Introduction: SVF can be isolated from adipose tissue either by means of enzymatic dissociation or by means of mechanical dissociation. Most enzymatic techniques used thus far for isolating the SVF from adipose tissue use collagenase. Main disadvantage of all these enzymatic techniques is that they are rather time consuming and expensive, but also that enzymatic treatment disrupts all communicative connections that exist between the cells as well as between the cells and ECM. Moreover, regulations in several countries does not allow to clinically apply cell-based products that are derived with collagenase. We developed a new protocol named as "Gentle Touch System" by using patented ultra-sharp blade system (Adinizer).

Methods: 91 patients have been treated with Mechanical SVF Treatment (MEST) technique by using Adinizer in different indication. Patients have been followed minimum 6 months postoperatively. Cell count and viability have been evaluated by using dual florescence cell counter. Also our technique has been compared with enzyme technique in same patients in cGMP, cGLP laboratory with flow cytometry.

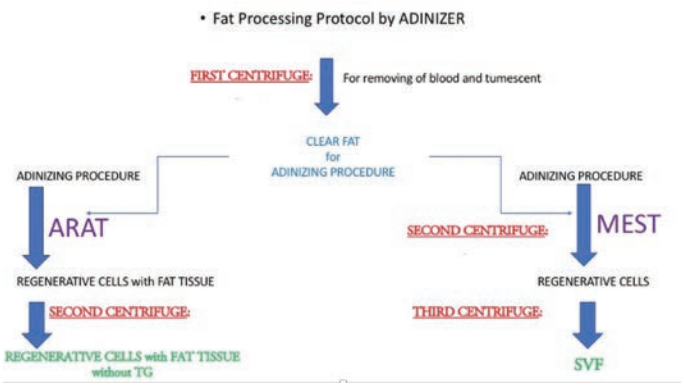
Results: All patients has been treated successfully with MEST technique. In flow flow cytometric analysis total cells were 2,5 X 10(6) viability was 96.68% in MEST group and respectively 3.5 X 10(6) and 98.23% in enzyme group. Also, cell count has been calculated up to 9.2 X 10(6) and viability up tom 99% in dual florescence cell counter.

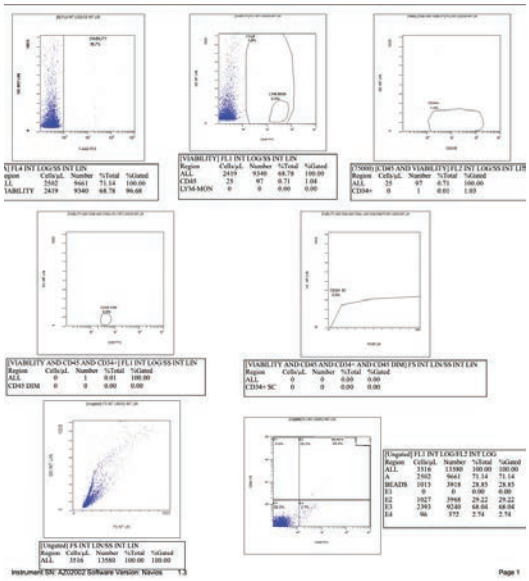
Conclusion: MEST might be more suitable as compared to enzymatic dissociation, because mechanical dissociation of adipose tissue is a fast time sparing inexpensive method and keeps the cell connections. Last 3 years there is shift form enzyme to mechanic SVF production. Since the adipose tissue is the most fragile tissue in the body, we believe that to get best results we should behave the fat tissue "gently". We developed and got patent a new approach as "Gentle Touch System". We cut the fat tissue with ultra sharp blades (Adinizer) to break bond and bridges between the adipocyte and mesenchymal cells instead of enzyme. We also use 2 different centrifuges to get high amount of cells and viability. MEST procedure is simple, inexpensive, reliable, and enzyme-free technique to isolate SVF in office and operating rooms.

V2

MEST: MECHANICAL SVF TRANSFER BY USING ADINIZER

Presenter: Eray H. Copcu, MD (Turkey)
Affiliation: MEST
Author: Copcu EH





V3

DIFFERENT PRODUCTS OF THE FAT

Presenter: Angelo Trivisonno, MD (Italy)
Affiliation: Sapienza University
Authors: Trvisonno A, Toietta GT

Many procedures have been developed in order to reduce or eliminate the contamination of mature adipocytes and to collect SVF cells by mechanical isolation. It is possible to harvest smaller volumes of adipose tissue and therefore a lower number of mature adipocytes using a microcannula, without affecting the possibility to collect a relevant number of SVF cells. With the purpose to reduce the number of adipocytes and the size of the fragments harvested, without destroying all adipocytes to preserve the niche, we developed a "millimicrofat" procedure consisting in: 1) collection of dermal adipose tissue using a microcannula; 2) mechanical processing by manually forcing the graft back and forth for 30 times through a 1.2 mm transfer connected between two syringes to obtain a tissue processed in smaller fragments we called "millimicrofat".

We harvested in the same area 2 types of lipoaspirates from 7 patients: 1) 5 cc of macrofat, collected using a 3 mm cannula with larger 2 mm holes; and 2) 10 cc of microfat, collected using a 2 mm microcannula with 1 mm holes, arranged in a single row. To obtain the millimicrofat sample, 5 cc of microfat were processed by 30 passages between 2 syringes through 1.2 mm transfer. The samples were cultured in complete DMEM medium and the culture was extended for 12 days, before the plastic adherent cells were counted.

The numbers of mesenchymal stromal cells obtained after isolation from cultures of samples of microfat and millimicrofat were similar, indicating that the millimicrofat procedure was not detrimental on the number of viable mesenchymal cells isolated. Most importantly, the number of cells obtained using the millimicrofat procedure was approximately 30% higher than cells isolated from the macrofat sample. The millimicrofat was composed of smaller fragments that we could infiltrate through 25-27 G needles, in a more superficial layer of the tissues.

The millimicrofat can be considered as a pre emulsificated product, maintaining the entire niche and a decreased number of mature adipocytes in a reduced volume. Therefore using the millimicrofat procedure it is possible to obtain a sample with greater regenerative capacity in a small volume suitable for regenerative purposes.

V4

THE APPLE NEVER FALLS FAR FROM THE TREE

Presenter: Elias T. Sawaya, MD (France)
Affiliation: Institut Aquitain de la Main
Authors: Sawaya ET, Guimberteau JC

In this short movie, the authors present their technique of lipofilling applied to the hand and in particular as an adjunctive procedure to the surgical management of Dupuytren's contracture. The technique highlights a novel donor site, fully adapted to the hand as a recipient site, with minimal invasiveness and morbidity. The authors also present adapted equipment for swift, minimally manipulated and guideline-complying harvesting of the adipose tissue.

V5

A SCAFFOLD-FREE GRAFT FOR LARGE CRITICAL SIZE BONE DEFECT: PRECLINICAL EVIDENCE TO CLINICAL PROOF OF CONCEPT

Presenter: Sophie Veriter, PhD (Belgium)
Affiliation: Novadip Biosciences
Authors: Veriter S, Docquier PL, Thirion G, Lebrun V, Adnet PY, Caty C, Theys N, Dufrane D

Introduction: Large critical size bone defect is one of the most challenging pathologies in orthopaedic surgery. This study aims to demonstrate the potential of a scaffold-free osteogenic approach.

Methods: The bioactivity of the scaffold-free graft was in vivo studied in 2 nude rat models: (i) the comparison of fresh/decellularized grafts in term of angiogenesis (up to 1 month) in a fibrotic tissue (in a cauterized muscular pocket,n=20);(ii) the in vivo osteogenicity of the scaffold-free graft (in comparison to HA/bTCP bone substitute) was assessed, at 1/2/3 months post-implantation, in an irreversible femoral critical size bone defect (n=28). The angiogenesis was quantified by histomorphometry while the osteogenesis was studied by micro-CTscan and Q-RT-PCR (for osteogenic genes expression) on graft explants. A 5-year-old boy with congenital pseudarthrosis of the tibia was proposed for the autologous scaffold-free graft approach. At 3 months post-AT procurement, the 3D-graft was placed into the defect in view to be followed clinically/radiologically.

Results: After intra-muscular transplantation, cellular survival (with major osteogenic genes expression) of human ASCs and the promotion of angiogenesis was found at 1month post-implantation. A complete integration and bone fusion were found (at 4/8 weeks post-implantation in the femoral defect) for the 3D graft in comparison to the bone substitute alone which revealed a lack of tissue remodelling and osteogenesis. Specific genes of the skeletal development were overexpressed in the bone defect treated with the 3D grafts (at 4/8 weeks post-implantation) while no osteoinduction was found for the HA/bTCP alone. A large volume (>15cm3) of the 3D graft was manufactured in GMP and then implanted without any modification of the surgical procedure. The graft was easily handled and implanted. The graft demonstrated a continuous remodelling (with bone formation) up to 14 months post-implantation to obtain a sufficient bone fusion (allowing walk without pain) and no recurrence of the disease.

Conclusion: The scaffold-free 3D-graft (made of ASCs) play a major role to promote ASCs engraftment and consequence to induce osteogenesis in a fibrotic environment and to recover a bone fusion in a critical-sized bone defect.

V6

OF CELLS, FIBERS AND THE LIVING HUMAN BODY. EXPLORATION OF THE RELATIONSHIPS BETWEEN THE FIBRILLAR ARCHITECTURE AND CELLS WITHIN THE LIVING HUMAN BODY BY INTRA-TISSULAR ENDOSCOPY

Presenter: Jean Claude Guimberteau, MD (France)
Affiliation: EndovivoProductions
Author: Guimberteau JC

The research we have carried out in recent years has essentially aimed to reestablish the importance of the extracellular environment. In our previous film "Interior Architectures", we concluded that the fibrillar structures that can be observed everywhere in the body are in fact our internal structuring architecture, and are not simply connective tissue, but are actually the constitutive tissue of the body. But how are the cells incorporated into the fibrillar network?

This new film "Of cells, fibers and the living human body" similar to previous films of «in vivo» intratissular endoscopic exploration will once again take us on a journey into a world full of surprises that appear to question certain accepted "truths".

We can say for example:
- that cells are not present everywhere and are therefore not responsible for the final shape of the body
- that cells, vessels and the fibrillar architecture are histogically inseparable,
- that some cells appear to be able to migrate, or change their location by moving along fibrils.

The cells that inhabit this fibrillar edifice are responsible for the manufacture and production of the collagen matrix that ensures their ability to function.

This film will hopefully persuade scientists to consider the cell in its natural environment, the human body, and to consider also that cells can behave in ways that have until now remained unnoticed because they were studied «in vitro» under the microscope or in a test tube in a laboratory.

This video-exploration of cells which the first one realized inside an living human body reveals surprising cell behavior which opens up new fields of research and investigation.

V7

THE NEW ERA OF FAT GRAFTING - MAFT (MICRO AUTOLOGOUS FAT TRANSPLANTATION)

Presenter: Tsai Ming Lin, MD, PhD (Taiwan)
Affiliation: Medical Adviser of Dermato Plastica Beauty Co. Ltd
Author: Lin TM

ADINIZERS, A PARADIGM CHANGER OF REGENERATIVE FAT GRAFTING AND NON-ENZYMATIC SVF TECHNIQUES

Presenter: Peter Jung
Affiliation: BSL Co Ltd

Adinizers are the most advanced, exclusively patented, blade-edge devices for micronizing, homogenizing and sizing of adipose-tissues. Various sizes of micro-pore blade-edge micronizing and homogenizing Adinizers like 4.0, 2.4, 1.2, 0.6, 0.4 and etc. make surgeons quickly available for big, mid, micro, nano-size fat tissues and mechanical SVFs actually containing lots of regenerative ECMs (bioscaffolds) and stromal cells.

Unlike the existing concepts of microfat or nanofat, our Adinizers do not use the emulcification in micronizing and homogenizing adipose-tssues which gives lots of damaging pressures to adipose-tissues and cells. Rather our Adinizers uses sharp blade-edges on every micro-pore corner of the different sizes of the filtering discs. So, when fat tissues are passed between two syringes through such blade-edge pore discs, almost no pressurized cell and tissues happen, leading to lots of alive regenerative tissues and stromal cells in the Adinized fine fat tissues. Histological staining shows the clear difference of Adinizer processed fat from the emuclified nano/microfats. Also GMP lab test results show lots of alive stromal cells and regenerative tissues.

Not just far beyond the emulcified micro-/nano-fat, our blade-edge and gentle-touch Adining techniques provides surgeons with various sizes of alive regenerative adipose-tissues and cells, so that surgeons can expect the excellent regenerative aesthetic results, but also unlike what is called, tissue-SVFs, our Adinizing techniques can quickly isolate high viable stromal cell numbers (SVFs) to the almost similar level of enzymatically isolated SVFs.

Adinizer-Adinizing is going to change the paradigm of the existing regenerative aesthetic fat grafting and mechanical SVF isolation.

FULLY AUTOMATIC SVF ISOLATOR "HURICELL™"

Presenter: Tracy Gu
Affiliation: Hurim Biocell Inc

HuriCell™ is a medical device intended for automatic isolation of SVF cells from Human fat tissue at the point-of-care, with minimal manipulation and human intervention. It has been approved by Korean MFDS, Thai FDA, Vietnamese MOH along with additional 33 patents from domestic and overseas.

HuriCell™ is fully automatic platform provides all-in-one machine system: clean bench, centrifuge, mixer and incubator to deliver not only consistent yield of SVF cells but also washed fat & adipose oil without any contamination risks. It has wide application range of fat tissue from 30cc up to 200 cc at one operation in under 90min. The device gives a user-friendly interface with a straightforward GUI to minimize opportunity for operator variability and error. It is also equipped with additional functions to remove contaminants introduced during liposuction (ex. blood, anesthetic components etc...) to get pure fat tissue and SVF.

The sterile single use plastic disposable kit is designed particularly in developed structure form to eliminate collagen bundles with controlled temperature digestion and separation process. The output gives high purified cells, which is able to obtain 1.5 million cells / cc of aspirate fat tissue in row.

To determine the clinical effect of fat-derived SVF, we are co-operating with local clinics and hospitals in various applications using "HuriCell™", such as knee joint arthritis, lymphedema, atopy, autoimmune disease, cosmestic treatment and anti-aging.

Hurim Biocell is always willing to share information of SVF protocol researching and pipeline developing with any organizations of all times.

LIPOPEN - WHY COMPUTER CONTROLLED INJECTIONS?
Presenter: Arnaud Denis - **Presented by Xavier Migaud**
Affiliation: Juvaplus SA

Lipopen is a unique, cutting-edge device designed for Fat, PRP and combined fluids injections. It guarantees anatomically targeted, safe and reproducible results. Lipopen gives a total control of your dosage, whether in boluses or in continuous delivery and makes retro-injections homogenous and seamless.

Achieve ideal results in nano/micro/mili-fat procedures and optimise the regenerative potential of your fat graft - with Lipopen.

TRANSLATIONAL COLLAGENASE - THE PERFECT TOOL FOR CELL ISOLATION
Presenter: Dr. Johanna Mönch
Affiliation: Nordmark Arzneimittel GmbH & Co. KG

Nordmark is a pharmaceutical company which develops and produces ingredients and drug products through all stages of the value chain. As one of the world's largest manufacturers of pharmaceutical collagenase, we are able to provide translational enzymes - research and GMP Grade collagenase and neutral protease products – to simplify the path from research to clinic. Our Nordmark Biochemicals division offers products for nearly every cell isolation application, including our highly-purified, animal-free Collagenase AF-1 GMP Grade and our excellent Collagenase NB 6 GMP Grade for stem cell isolation. Pharma production standards and FDA oversight ensure reliable excellent quality with extraordinary high lot to lot consistency. If you are in research and development Collagenase NB 4 Standard Grade and Collagenase NB 5 Sterile Grade are available with comparable enzymatic properties like Collagenase NB 6 GMP Grade. This offers the great opportunity to establish the cell isolation procedure using cost effective products before switching to the highly regulated Collagenase NB 6 GMP Grade product. Collagenase NB 6 GMP Grade is provided as a sterile product in a convenient pack size to digest at least 100 ml lipoaspirate with a final outcome of high quality SVF - ready for transplantation. To ease the path to regulatory approval - Collagenase NB 6 GMP Grade comes with comprehensive regulatory support including access to Drug Master Files.

With Translational Collagenase Nordmark supports all branches of cell isolation – from basic research to clinical application.

FASTER, SAFER AND AFFORDABLE ACCESS TO GMP GRADE ASC FOR ACADEMIC CLINICAL TRIAL: CELL-EASY
Presenter: Michel Manach - **Presented by Philippe Bourin**
Affiliation: Cell-Easy

Cell-Easy was founded by experts that are convinced by the ASC therapeutic potential (angiogenic, immunomodulatory, anti fibrosis...) and want to accelerate their adoption by simplifying the access to clinical grade, regulatory approved ASC.

To do so, Cell-Easy offers cryopreserved ready-to-inject adipose-derived allogeneic stem cells for preclinical and clinical drug development projects (doses from 5 to 100M cells). The formulation has been optimized to limit the operations at the point of care and allow for direct injection right after thawing

We also support the clinical trial sponsors by providing regulatory guidance and support to prepare and edit the relevant documents to be submitted for clinical trial (i.e: IMPD, IB, Clinical Trial Protocol).

Our GMP production process has been designed using QbD approach and economical study (Manufacturing Cost model simulation) to ensure cell quality, scalability and economic viability for the clinical development (Phase I to III) and the commercialization. Our starting material and manufacturing process allow us to treat >10,000 patients with one healthy, screened, donor.

Our stem cell products can be used in a wide range of cell therapy and regenerative medicine clinical trial indications.

On top of our ASC platform, we put our expertise, team and tools to your service and act as a CDMO to help support your cell therapy production process development (optimisation using QbD, scale up, cost modeling) and GMP manufacturing.

ENZYMES FOR ADIPOSE TISSUE DISPERSION
Presenter: Dr. Kazuhiro Furukawa
Affiliation: Amano Enzyme Europe Limited

We, Amano Enzyme Inc., supplies high-quality, microbial enzymes for the food, dietary supplements, diagnostics, and regenerative medicine fields worldwide.

As you are aware, enzymes such as collagenase have been used for adipose tissue dispersion and subsequent collection of stromal vascular fraction (SVF). We currently supply four microbial enzymes for this purpose, called Collagenase, Thermolysin, Clostripain, and Clostlysin. The features of these enzymes are as follows. 1. Sterility assurance: Our enzymes are manufactured under sterile condition (Grade A) which prevents users from microbial contamination during filtration process. 2. Animal origin free: Any animal-origin materials are eliminated during manufacturing processes, which allows us to maximally reduce the risk of virus contaminations from animal sources. 3. GMP standard: Our products are manufactured under the condition which meets GMP standards to minimize the lot-to-lot variation. 4. Tailored enzyme: We offer the tailored enzymes which are optimized for adipose tissue.

We found that the combination of Collagenase and Thermolysin showed comparable effects in SVF collection compared with the product commercially available worldwide. To maximize the effect on SVF collection, we have explored the combination of enzymes. The combination of Collagenase and Clostlysin demonstrated not only the higher efficiency in SVF collection but also increasing the population of adipose endothelial progenitor cells.

We will present details of the results from scientific aspects at the meeting.

Q-GRAFT® - A SYSTEM FOR THE INTRAOPERATIVE ISOLATION OF REGENRATIVE CELLS FROM ADIPOSE TISSUE

Presenter: Juliane Meyer
Affiliation: Human Med AG

The cells of the stromal vascular fraction (SVF) from adipose tissue are a promising tool for regenerative medicine and tissue engineering. The gold standard for the isolation of these cells are GMP laboratories, that have established manual SVF-isolation procedures. While most of these methods provide saftey and efficiency for the isolation of the cells, the substantial human involvement in the isolation process still gives room for big variations of the outcomes. In order to be able to consecutively harvest adipose tissue and isolate the SVF in the operating theatre during one operation in a standradized manner, the Human Med AG has developed and produced a system for the intraoperative isolation of regenrative SVF cells from adipose tissue. The research that laid the groundwork for the system was done in close collaboration with the Cell Biology Department of the Rostock University Medical Center and the Chair of Microfluidics of the University Rostock.

The Q-graft® system consists of a device for the water jet-assisted liposuction, a reusable unit that controls the cell separation and a disposable unit that facilitates the cell separation. The disposable unit consists of 3 chambers. The adipose tissue is harvested directly into the first chamber of the Q-graft® system. In the first chamber the tissue is digested with Humanase™, a blend of proteolytic GMP grade enzymes, under constant mixing and heating to 37°C. Through a series of steps of washing and filtration the SVF cells can be collected into the second chamber as a suspension in Ringer's solution. The suspension of the SVF can either be concentrated in the device by cross-flow filtration in the third chamber or by one step of centrifugation using a special sterile Q-graft® centrifugation set.

The standardized isolation of the SVF in the closed Q-graft® system with minimal human interference can clear the way for the clinical application of this regenerative cell fraction. The use of fixed settings for the water jet, the vacuum and for the canula to be used are what make this intra-operative system unique and lay the basis for relyable and reproducable outcomes no other isolation system can offer.

CE CERTIFIED ADIPOSE PROCESSING SYSTEM AND ENZYMES TO DELIVER SVF IN SUB Q & IV APPLICATIONS

Presenter: Kenneth K. Kleinhenz
Affiliation: Lorem Vascular

The processing of cells and tissues for use in humans must be performed with devices and reagents that have been reviewed and certified by a competent authority. The means of processing tissues to obtain a cell therapy product should be constructed as a contiguous and validated system with all critical aspects of the system controlled and certified. The use of a fully certified cell processing system, to include all reagents and enzymes that contact the cells and tissues for therapeutic use, eliminates the risks of contamination and human error associated with choosing off the shelf products that are not certified for a specific outcome. Unintended consequences from unknown contaminants such as potential BSE and TSE exposure to the patient are risks associated with enzymatic digestions of tissues when using uncertified reagents. These points are of paramount importance when considering a cell therapy product for intravascular use. A portable and mobile system that alleviates all of these issues has been developed and certified.

THE SCIENCE OF REVOLVE™ SYSTEM: TISSUE QUALITY, EFFICIENCY AND OUTCOMES

Presenter: Ramón Llull, MD, PhD
Affiliation: Allergan- REVOLVE™ System

A common concern in fat grafting is the variability of volume retention. Poor volume retention affects clinical outcomes, sometimes requiring additional fat grafting procedures to achieve optimal results. Factors including cell concentration in the adipose tissue graft, pH imbalance, hematocrit levels, and percent of oil and aqueous content may impact fat graft volume retention. Also, of interest are the viability and function of adipose and SVF cells within the graft. The fat processing methodology used may have an impact on these components.

This presentation will provide an overview of the science that pertains to REVOLVE™ System; an integrated single patient use fat processing device that actively washes, filters and removes collagen strands to yield high quality adipose tissue for lipofilling procedures. This presentation will review the invitro and animal data in Ansorge et al (2014). This study compared the quantity and quality of processed fat obtained via REVOLVE™ System with samples from centrifugation and decantation, and analyzed fat volume retention after implantation in an animal model.

This presentation will also provide insight on additional in vitro physical and biological characteristics of lipoaspirate of processed using different techniques. Processed fat grafts were analyzed for tissue particle size and morphology, and for viability and function of adipocytes by lipolysis assay and regenerative cells by CD45/CD31/CD34 marker staining and colony forming unit assay. Fat tissue harvested from waste containers of REVOLVE™ System and trapped on the paddles was also evaluated.

Lastly, this presentation will provide an overview of published data focusing on the rate of fat grafting, rate of re-operations, and rate of complications among different fat processing methods.

References:

1) Ansorge H, Garza JR, McCormack MC, et al. Autologous fat processing via the Revolve System: quality and quantity of fat retention evaluated in an animal model. Aesthet Surg J. 2014;34(3):438-447.
2) Gabriel A, Maxwell GP, Griffin L, Champaneria MC, Parekh M, Macarios D. A comparison of two fat grafting methods on operating room efficiency and costs. Aesthet Surg J 2017;37(2):161-168.
3) Ruan QZ, Rinkinen JR, Doval AF, Scott BB, Tobias AM, Lin SJ, Lee BT. Safety Profiles of Fat Processing Techniques in Autologous Fat Transfer for Breast Reconstruction. Plastic and Reconstr Surg J 2019;143(4):985-991.

HOW TO MAKE FAT GRAFTING SIMPLE AND RELIABLE? MAFT-GUN – A NEW WEAPON IN 21TH CENTURY

Presenter: Tsai-Ming Lin, MD., PhD
Affiliation: Medical Adviser of Dermato Plastica Beauty Co. Ltd

Fat grafting was first described by Neuber in 1893 and becomes a popularly procedure because of easy harvesting, abundant material and no rejection. However, the survival/retention rate are unpredictable, and complications such as abscess/cyst, nodulation, irregularity might occur.

Though the concepts of over-injection or the Coleman's "structural fat grafting" are adopted worldwide, the outcomes vary. Carpenada demonstrated 40% of fat survive 1.5±0.5 mm to the grafting margin. The central portion of larger parcels become "central necrosis", then induce the subsequent complications. Therefore, the placement of each fat parcel was emphasized between 1/50 to 1/30 mL Coleman. However, the consistent delivering of tiny parcels is uncontrollable and labor-demanding fore decades.

Lin et al (2007) introduced the concept of Micro-Autologous Fat Transplantation (MAFT). The MAFT emphasized each parcel should be less than 1/100 mL to avoid "central necrosis" which is the main reason causing the majority of complications in fat grafting. MAFT-GUN®, therefore, was developed after clinical trials and GMP certification. This instrument has proved its applicability and feasibility through patent mechanisms which could consistently deliver fat parcel at 1/60, 1/90, 1/120, 1/150, 1/180 or 1/240 mL.

Here, the MAFT evolution and applications are presented to illustrate the availability in aesthetics, reconstruction and regeneration.
Learn:

✓ The advantages of MAFT
✓ Understand potential complications and the strategies for prevention
✓ Novel applications in
↔ Neo-formation of double eyelid in sunken eye with multiple folds
↔ Primary augmentation rhinoplasty
↔ Recontour the tear trough/lid-cheek junction
↔ Aging dorsal hand
↔ Gummy smile
↔ Three Simple Steps for Refining Transcutaneous Lower Blepharoplasty for Aging Eyelids: The Indispensability of Micro-Autologous Fat Transplantation

Booth #21

AABB Center for Cellular Therapies

4550 Montgomery Road, Suite 700 - North Tower
Bethesda, MD
UNITED STATES
Tel: 1-301-215-6558
Email: kloper@aabb.org
www.aabbcct.org

For over 60 years, AABB has been the premier international organization for standards setting and accreditation in cellular therapies and transfusion medicine. We are honored to be collaborating with IFATS and its members in the development of standards for improved patient outcomes and safety in adipose therapeutics.

Booth #37

Adip'sculpt

2, rue Paul Milleret
Besancon, Franche-Comte
FRANCE
Tel: 33-658-270-032
Email: evgenia.tsoy@adipsculpt.com
www.adipsculpt.com

Adip'sculpt is a French company, proposes innovative solutions for cosmetic and reconstructive surgery. These solutions are a result of the most recent cellular engineering techniques, contributing to the comfort and satisfaction of both surgeon and patient. Therefore, Adip'sculpt offers a wide range of lipofilling and lipomodelling kits, adapted for specific needs.

Booth #1

Aesthetic Group

Za La Gobette
Puiseux le Hauberger
FRANCE
Tel: 33 44 74 1995
Fax: 33 44 74 1894
Email: Info@aestheticgroup.fr
www.aestheticgroup.fr

One of the world's leading manufacturers of Cannulas for Infiltration, Liposuction, Fat Harvesting/LipoTransfer/Re-injection/Micro-injection. Wide range of medical devices such as Fat Collector Canister, Tubing, Syringe Connector/Caps/Stopper, Syringe Holder and New Manual Centrifuge. New Nano Fat Transfer System will be presented by our exclusive partner during the show.

Booth #20

Allergan plc – Gold Sponsor

2525 Dupont Drive
Irvine, CA
UNITED STATES
Tel: 1-714-246-3295
Email: Annie.Tennet@Allergan.com
www.Allergan.com

Allergan plc (NYSE: AGN), headquartered in Dublin, Ireland, is a bold, global pharmaceutical company and a leader in a new industry model – Growth Pharma. Allergan is focused on developing, manufacturing and commercializing branded pharmaceutical, device, biologic, surgical and regenerative medicine products for patients around the world. For more information, visit Allergan's website at www.Allergan.com.

Booth #31

Alma Lasers

14 Halamish Street
Caesarea
ISRAEL
Email: noa.mendel@almalasers.co.il
www.almalasers.com

Alma is a world-leading provider of energy-based solutions for the surgical, medical aesthetics and beauty markets, delivering cutting-edge technologies to our partners and customers. We are firm believers in the power of science, redefining the industry through an endless desire to innovate and drive the global industry forward. Alma. For You. For Life.

Booth #32

Amano Enzyme Europe Ltd

Roundway House, Cromwell Park
Chipping Norton
UNITED KINGDOM
Tel: 44(0)1608 644 677
Fax: 44(0)1608 6336
Email: fumiaki_ito@amano-enzyme.com
www.amano-enzyme.co.jp

Amano Enzyme Inc. globally supplies high-quality microbial enzymes for the food, dietary supplement, diagnostic and regenerative medicine fields. Our extensive product range includes four specific microbial enzymes – Collagenase, Thermolysin, Clostripain and Clostlysin – applicable to adipose tissue dispersion and subsequent collection of stromal vascular fraction (SVF).

Booth #12

Benew Medical SA

Rue du Parc 3 bis
Geneva
SWITZERLAND
Tel: 33 6 75 47 4895
Email: xmigaud@benewmedical.com
www.benewmedical.com

Booth #9

Bimini Technologies LLC

420 Stevene Avenue, Suite 220
Solana Beach, CA
UNITED STATES
Email: iblaxland@puregraft.com
www.puregraft.com

Bimini's group of companies include Puregraft, Kerastem and Dermapose. Puregraft is the market leader in the commercialization of innovative fat transfer technologies with products distributed globally. Kerastem's solution for male and female pattern baldness recently completed a US phase-II clinical trial (STYLE). Dermapose is a new microsizing technology that makes fat transfer easy and accessible to surgeons and patients.

Booth #29

BioSpherix Medical

25 Union Street
Parish, NY
UNITED STATES
Tel: 1-315-387-3414
Email: tano@biospherix.com
www.biospherixmedical.com

Biospherix Medical offers a unique but proven Cytocentric modular closed aseptic containment system. Typically configured for a specific production process, it exclusively enables fully aseptic GMP production under cell optimized conditions (O2, CO2, Temp.). By closing any part of a production process you can reduce cost, reduce risk, decreases implementation time, and maintain flexibility.

Booth #2

BSL Co., Ltd.

6-13 Chilsan-ro, 237 Beon-gil
Gimhae-si
Gyeongsangnam-do
SOUTH KOREA
Tel: 82-55-328-9235
Fax: 82-55-328-9236
Email: bsl@biosl.com
www.biosl.com

BSL and BSL Rest, Inc. has over 18 years of experienced in adipose-tissue technology and as a science leader, we are very proud of our automated SVF isolation system, ACS and the CE certified / 510k cleared automated cell processing kit as the most advanced and best cell isolation-efficacy devices in the world, and our paradigm changer, Smart kit and Adinizers, for regenerative aesthetic fat transfer and mechanical SVF markets

Booth #34

Cell-Easy

4bis, Avenue Hubert Curien, Incere R+2
Toulouse
FRANCE
Tel: +33 5 34 27 65 50
Fax: +33 6 95 73 72 45
Email: fabien.moncaubeig@cell-easy.com
www.cell-easy.com

Cell-Easy offers cryopreserved ready-to-inject adipose-derived allogeneic stem cells for preclinical and clinical drug development projects (5 to 100M cells/dose). The formulation has been optimized to limit the operations at the point of care and allow for direct injection right after thawing. Cell-Easy also acts as a CDMO: process development and GMP production.

Booth #19

ChemoMetec

Gydevang 43
Allered
DENMARK
Tel: 45812 1760
Email: mbc@chemometec.com
www.chemometec.com

ChemoMetec is a Danish founded company specializing in the development, manufacturing and sales of high-quality automated Cell Counters, Advanced Cell Analyzers and Image Cytometers to help streamline research and production processes for maximum efficiency. ChemoMetec instruments are based on a patented, unique technology platform that ensures a high quality of analysis results and reliability.

Booth #38

CONNEXT

59, Yangho-gil
Yeongcheon
Gyeongsangbukdo
KOREA
Tel: 82-54-339-0521
Fax: 82-54-339-0510
Email: woojong.lee@connext.co.kr
www.tdzyme.com

CONNEXT has launched a new brand of recombinant collagenase,TDzyme. TDzyme is produced by genetic engineering technology and purified by column chromatography, which provides high quality and lot-to-lot consistency. TDzyme is produced in animal source free conditions and contained in a smart device enabling simultaneous dissolution and in-line sterile filtration of lyophilized enzyme.

Booth #23

Dermato Plastica Beauty Co. Ltd.

10F No. 170, Ziqiang 2nd Rd
Kaohsiung City 801
TAIWAN
Tel: 886-7-2413386
Email: sales-overseas@maft.com.tw
www.maft-gun.com

Dermato Plastica Beauty's main product - MAFT-GUN - is a fat injector with the feature of micro-level injection. This device has been regarded as one of the most reliable and safest injectors for fat and filler injection. It builds the confidence of surgeons to perform such a used-to-be unpromising procedure.

Booth #16

Fidia Pharma – Silver Sponsor

Calle Playa de Las America, Num 2
Las Rozas de Madrid
SPAIN
Tel: 34 663 849 397
Email: jmorais@fidiapharma.es
www.fidiapharma.com

Italian multinational developer and leading manufacturer (FDA-approved operations) of innovative products mainly based on hyaluronic acid (700+ patents), in joint care, wound healing, ophthalmology, aesthetics and autologous biological therapy (PRP, BMC, NANOFAT, SVF). Products are available in 100+ countries worldwide, through wholly-owned subsidiaries and commercial partners.

Booth #33

Germany International Medical

188/10 Moo. 12, Ban-Ped
Bangkok
THAILAND
Tel: +66 656 400 010
Email: info.germanymedical@gmail.com
www.germanymedical.com

GERMANY INTERNATIONAL MEDICAL has a history of three decades as a leading manufacturer of surgical instruments and exporting them to the quality conscious health care industry all over the world. Our commitment to excellence has allowed us to establish our customer bases in strategic and vital surgical hubs of the world.

Booth #18

The GID Group, Inc.

901 Front Street, Suite 240
Louisville, CO
UNITED STATES
Tel: 1-720-412-4233
Fax: 1-720-412-4233
Email: vgood@thegidgroup.com
www.thegidgroup.com

GID BIO, Inc is the leading global provider of products and methods to separate regenerative cell fractions from adipose and bone tissues for cell-based therapies. GID technology is a sterile disposable closed-system that separates cells from tissue in real-time, enabling therapeutic use in a single visit.

Booth #11

Horiba Medical

Parc Euromedecine
Rue du Caducee, BP 7290
Montpelier Cedex 4
FRANCE
Tel: 33 (0) 4 67 14 15 16
Fax: 33 (0) 4 67 14 15 7
www.horiba.com

HORIBA Medical provides an extensive and comprehensive line of hematology, hemostasis, clinical chemistry and automation solutions (including analyzers, reagents and consumables) for use in in vitro diagnostics. Proven quality and trustworthy performance have established widespread confidence in the HORIBA Medical brand. Today, more than 30,000 laboratories are using HORIBA Medical's devices around the world.

Booth #13

Human Med AG – Silver Sponsor

Wilhelm-Hennemann-Str 9
Schwerin
GERMANY
Tel: 49-385-395-700
Fax: 49-385-395-7010
Email: potschwadek@humanmed.com
www.humanmed.com

For over 15 years, Human Med has been offering all-in-one systems and accessories for all indications of autologous fat management. As one of the world's leading manufacturers of medical devices for water jet-assisted liposuction (WAL), we have assumed a pioneering role setting standards in the field of natural body shaping and regenerative medicine.

Booth #30

Hurim Biocell Inc

#403, Gayang Technotown, 217
217 Heojun-ro, Gangseo-gu
Seoul
SOUTH KOREA
Tel: 82-10-5054-0827
Fax: 82-2-2658-2375
Email: getsome7@hurimbiocell.com
www.hurimbiocell.com

HuriCell™ is a medical device intended for fully automatic isolation of SVF cells from human fat tissue at the point-of-care, with minimal manipulation and human intervention. It has been approved by Korean MFDS, Thai FDA, Vietnamese MOH along with an additional 33 patents from domestic and overseas authorities.

Booth #8

Innovative Medical Management SL

c/ Pintor Lorenzo Casanova, 2
Mutxamel, Alicante
SPAIN
Tel: 34 670 95 35 69
Email: alopez@i-m-m.eu
www.innovative-access.com

Innovative S.L., a spanish Medical Engineering company, has been promoting ACCESS, for 8 years, an Autologous Cell Concentration System, allowing blood, bone marrow or fat concentrates to be collected for Cell Therapy treatments. Our motto ("Primum non nocere") indicates our guideline: do not damage the cells if you want good results.

Booth #15

Invivox

21 Rue Eugène et Marc Dulout
Pessac 33600
FRANCE
Tel: 05 56 70 32 05
Email: pospital@invivox.com
www.invivox.com

Invivox is a plug-and-play solution for Healthcare Professionals' continuing education. Invivox optimizes the management of trainings while giving them visibility with their target audience.

Booth #10

Juvaplus SA

Rue du Pré, 10
Fleurier, NE
SWITZERLAND
Tel: 41 22 588 6689
Email: l.zavagno@juvaplus.com
www.juvaplus.com

Swiss innovative company specialized in top-notch Aesthetic Injection Systems for toxin, fat, PRP & other fluid combination.

Booth #22

Lipocube

Kennington Lane 239-241
London
UNITED KINGDOM
Tel: 90-533-747-7194
Email: cihan@lipocube.com
www.lipocube.com

Lipocube™ is a medical device company based in London, UK, established to develop, design, patent, and market medical devices based on human fat tissue processing with applications in primarilyin regenerative medicine. Two medical devices have already been designed, tested and produced with the participation of leading scientists and surgeons. One of the devices is developed for mechanical harvesting of SVF from autologous fat, and the other device is developed for processing of fat tissue to nano fat to be applied in fat grafting.

Booth #14

Lorem Vascular

11A, 5/F China Life Tower
No. 16 Chaowai Street, Chaoyang District
Beijing
CHINA
Tel: 86-1333-106-9096
Email: xma@loremcytori.com
www.loremcytori.com

Lorem Cytori is committed to providing meaningful and quality therapeutic options with broad utility that benefit patients and healthcare providers around the world. Whether it's advancing our product and technology pipeline, performing clinical trials, or commercializing approved therapies, we believe that every day, every trial and every patient matters.

Booth #3

Medical Z

14 Rue Georges Cuvier
Saint Avertin
FRANCE
Tel: 33-2-4771-3330
Email: s.galassi@medicalz.com
www.medicalz.com

For more than 30 years, Medical Z has been offering the best service and optimum quality for its postplastic and burn surgery compression garments. Such high-level constancy has awarded Medical Z with a worldwide reputation as a forerunner in the fields of compression therapy, plastic surgery and treatment of hypertrophic scars.

Booth #5

Möller Medical GmbH

Wasserkuppenstrasse 29-31
Fulda, Hesse
GERMANY
Tel: 49 (0) 66194195
Email: LRusse@moeller-medical.com
www.moeller-medical.com

Möller Medical (www.moeller-medical.com) is the well-known, worldwide German manufacturer of the new Vibrasat® Pro, Vibrasat® power, Liposat® power and Vacusat® power. We produce heavy-duty devices, cannulas and disposables for medical professionals all over the world. "Power Assisted Liposuction" and "Tumescence Local Anesthesia" procedures are key features of our portfolio.

Booth #7

Motiva Implants France – Silver Sponsor

143 Avenue Abel Sarnette
Cavaillon
FRANCE
Email: ccurtillet@establishmentlabs.com
www.motiva.health

Booth #26

MTF Biologics – Gold Sponsor

125 May Street
Edison, NJ
UNITED STATES
Tel: 1-732-661-2354
Email: Jaimie_Handwerger@mtf.org
www.mtfbiologics.org

MTF Biologics serves Plastic & Reconstructive Surgeons in breast reconstruction, craniofacial procedures, burns and other traumatic injuries, while providing solutions in breast, body and facial cosmetic procedures. We meet the needs of surgeons so they can provide the best care for their patients.

Booth #6

Needle Concept

1 Allee Pierre Georges Latecoere ZA
La Maysonnabe
Biarritz
FRANCE
Tel: 33 6 79 455644
Email: sramette@needleconcept.com
www.needleconcept.com

NEEDLE CONCEPT, a French Manufacturer,is well known for the first micro-canulas named Magic Needle which got FDA approval in 2011 and is considered the best micro-canula on the market. Also, NEEDLE CONCEPT manufactures the famous U225 which is the best Meso & PRP Injector in the world. The U225 device leads painless and accurate injections as well as micro-needle in the same unit. NEEDLE CONCEPT has CE 0459, ISO 13485 and MDSAP certifications – deviations USA, Canada, Australia.

Booth #36

Nordmark Biochemicals/Cresent

Pinnau Allee 4
Uetersen
GERMANY
Tel: +49 4122 712 759
Fax: +49 4122 712 286
Email: johanna.moench@nordmark-pharma.de
www.nordmark-biochemicals.com

Nordmark, one of the world's largest manufacturers of pharmaceutical collagenase, produces high quality enzymes with the regulatory support necessary for the clinical environment. Our Collagenase NB 6 GMP Grade is a fast and reliable tool for stem cell isolation from adipose tissue, proven effective by a variety of customers over many years. We also offer highly-purified, animal-free Collagenase AF-1 GMP Grade and Neutral Protease AF GMP Grade as excellent alternatives for cell isolation.

Booth #17

Rigenera (Aveneo)

5 impasse Ramond
Saint Medard en Jalles
FRANCE
Tel: 08 1184 5982
Fax: 08 9738 7574
Email: info@avaneo.fr
www.avaneo.fr

Rigenera technology consists of disposable devices which are mechanical disruptors of biological tissues that allow one to obtain micrografts in an autologous, homologous and minimally invasive manner. The Rigenera technology is applied in aesthetic medicine, dermatology, dentistry, orthopedics and wound care. This technology has obtained CE, FDA and FMA certifications.

Booth #27

T-Lab

Tahtali Mh Degirmen Yolu Sk 10
Bursa
TURKEY
Tel: 90-532-515-0079
Email: ersan@tlab.com.tr
www.tlab.com.tr

T-Lab is a Biotechnological company, manufacturing, developing and marketing regenerative medicine devices for multiple sectors of healthcare. It was created out of the desire to bring curative innovation to patients who seek alternatives to traditional treatments. T-Lab has a range of devices that are purposefully designed to address a range of unmet needs.

Booth #4

Tulip Medical

46 Thatcher St
Medford, MA
UNITED STATES
Tel: 1-617-981-3451
Fax: 1-858-270-5901
Email: info@oneglobebio.com
www.tulipmedical.com

Tulip Medical is the world leader in fat transfer and processing technologies. TRUE NanoFat™, (TNF) is a highly-concentrated, injectable fat product which yields 10x the amount of cells per gram as Enzymatic Disassociation techniques. Visit tulipmedical.com for a recent PRS journal publication demonstrating that TNF is Delivering the benefits of fat to millions™

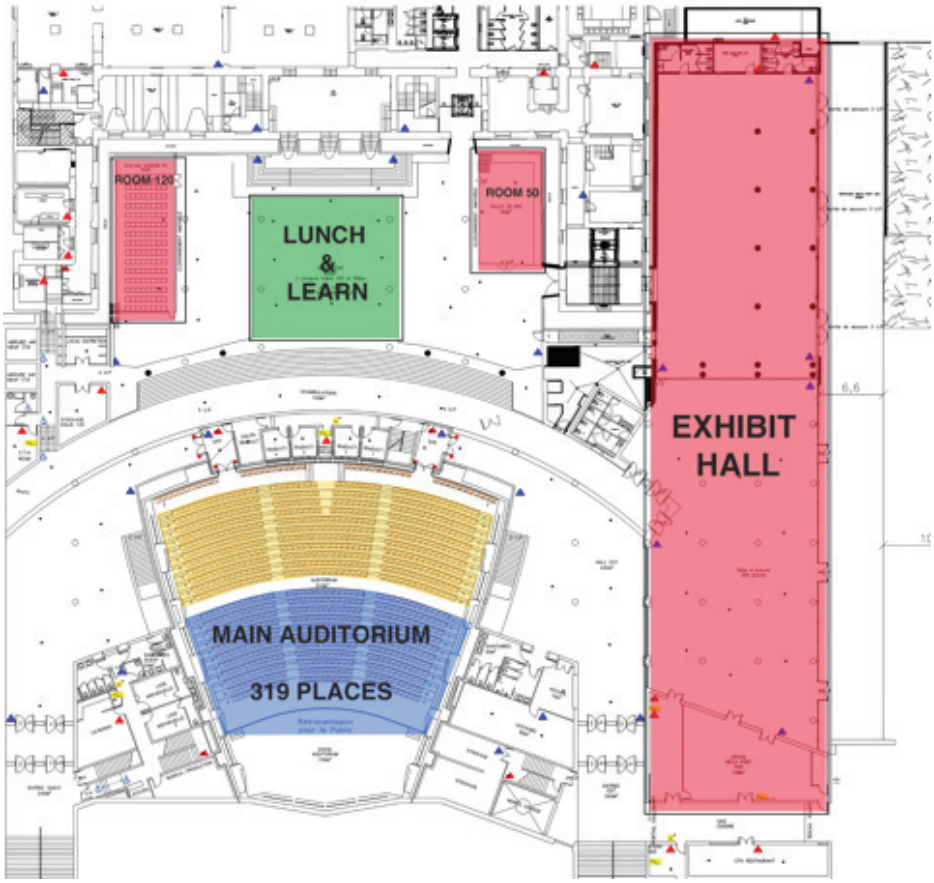
Booth #35

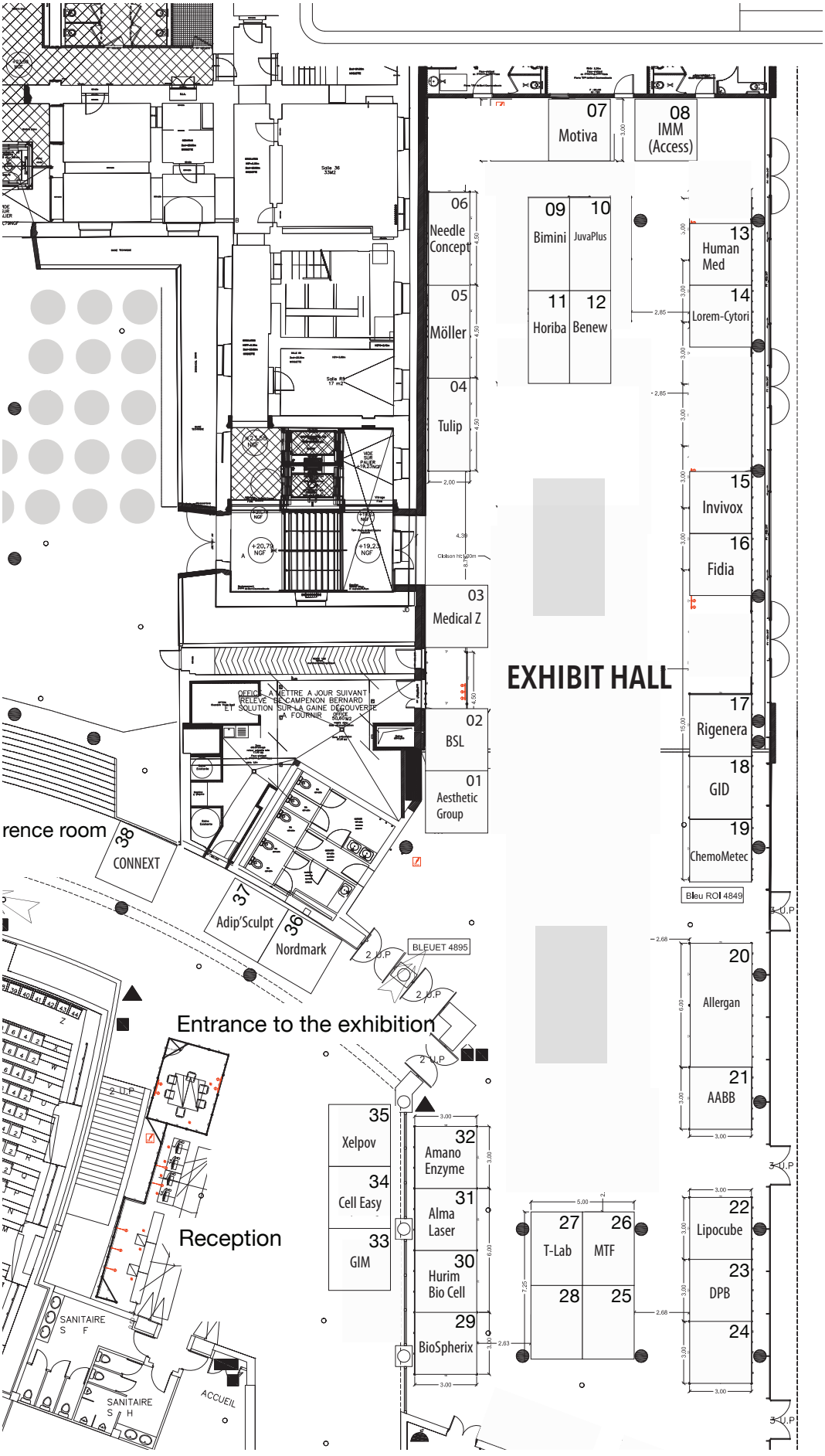
Xelpov Surgical

Ammar Bldg, Airport Road
Sialkot, Punab
PAKISTAN
Tel: 1-586-554-3787
Email: fahad.naeem@xelpovsurgical.com
www.xelpovsurgical.com

XELPOV SURGICAL is synonymous with high quality, efficient service, and close correspondence with its customers. Our commitment to excellence has allowed us to establish our customer base in strategic and vital surgical hubs globally. In addition to cost-effective products designed to meet the needs of your business, there are many other reasons to choose Xelpov Surgical. See us at booth 35.

PLAN IFATS MEETING 2019 MARSEILLE PHARO



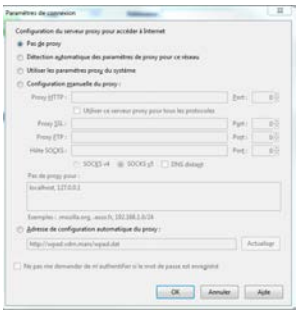

07
Motiva
08
IMM
(Access)
06
Needle
Concept
09
Bimini
10
JuvaPlus
13
Human
Med
05
Möller
11
Horiba
12
Benew
14
Lorem-Cytori
04
Tulip
15
Invivox
16
Fidia
03
Medical Z
EXHIBIT HALL
02
BSL
01
Aesthetic
Group
17
Rigenera
18
GID
19
ChemoMetec
Bleu ROI 4849
rence room
38
CONNEXT
37
Adip'Sculpt
36
Nordmark
BLEUET 4895
Entrance to the exhibition
20
Allergan
21
AABB
35
Xelpov
34
Cell Easy
33
GIM
32
Amano
Enzyme
31
Alma
Laser
30
Hurim
Bio Cell
29
BioSpherix
27
T-Lab
26
MTF
28
25
22
Lipocube
23
DPB
24
Reception
SANITAIRE
S F
SANITAIRE
S H
ACCUEIL

To connect to the Wi Fi network:

With your computer
1: Enable Wifi functionality on your computer
2: Search for the « wifi-pharo » network and connect to it
3: When reaching the following page (see the image at right), select your language by clicking on the appropriate flag

4: Click on “Other Choices”
5: Fill in the ‘username’ and ‘password’ fields with the following data and validate:
Username: fsh
Password: fsh2019

It is sometimes necessary to modify the Proxy settings by ticking the box No proxy



Connexion au réseau public « wifi-pharo »

With your device
1: Enable Wifi functionality on your computer
2: Search for the « wifi-pharo » network and connect to it
3: When reaching the following page (see the image at right), select your language by clicking on the appropriate flag

4: Fill in the fields:
Last Name
First Name
Mail Address

5: Check the box «I accept the term of use»
6: Connect
7: You can now access to the web

NOTES

NOTES

NOTES

NOTES

NOTES

mtf biologics

Science Driven. Patient Focused.

Bringing Regenerative Medicine to Aesthetic Surgery

renuva®

ALLOGRAFT ADIPOSE MATRIX

www.mtfbiologics.org

IFATS

IFATS Executive Office
45 Lyme Road, Suite 304 Hanover, NH 03755 USA
Tel: 1-603-643-2325 • Fax: 1-603-643-1444
Email: ifats@conmx.net • Web: www.ifats.org