

Summary Report

ESTS working group meeting

„Use of homografts and Regenerative Medicine in general thoracic surgery“

Grand Hotel Central, Barcelona, November 28th 2009

Presented by Gaetano Rocco & Thorsten Walles
 Naples / Gerlingen, December 1st 2009

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General remarks

Regenerative Medicine including the use of homografts and Tissue Engineering, Biomaterials and Stem Cell Research hold the promise of treating many serious and disabling diseases by replacing damaged, lost or diseased tissues and organs. So far, numerous applications have been investigated in different surgical subspecialties (i.e. skin, cartilage, bone, heart valve), and there may also be new treatment modalities for General Thoracic Surgery. Since advancement takes place in an interdisciplinary setting of physicians, scientists of various backgrounds and engineers, the complex scientific, technological and clinical challenges of Regenerative Therapies require new and tight networking among the various stakeholders in the field to be able to successfully complete the translation “from bench to bedside”.

Therefore, researchers with various scientific backgrounds were invited for this working group meeting to share their views and expertise and to contribute to the intended brainstorming process. The aim of the working group is to develop a loose interdisciplinary network of ESTS surgeons, scientist, and engineers in Europe.

Presentations

Alexander Seifalian, MSc PhD

Professor of Nanotechnology & Tissue Repair in Surgery, University College of London

- presented various own successful approaches on the development of cardiovascular grafts (small diameter vessels, heart valves) using RegMed technologies
- touched nano-technologies implemented at his laboratory for the biofunctionalization of artificial surfaces including Q-Dots
- indicated that his group will start to work on tissue engineering of tracheal grafts in co-operation with M.A. Birchall and P. Macchiarini (both new staff members at UCL)

Katja Schenke-Layland, PhD

Professor of Biology & Material Sciences, UCLA

will switch to University of Tuebingen (Germany) on 01.01.2010

- elaborated the different impact of cryopreservation and vitrification on extracellular matrix (ECM) composition
- introduced near-infrared femtosecond multiphoton laser scanning microscopy as a non-invasive method to analyse ECM composition

Gaetano Rocco, MD FETCS

Professor of General Thoracic Surgery, National Cancer Institute & Pascale Foundation, Naples

- demonstrated the advantage of cryopreserved human bone homografts for the reconstruction of extensive chest wall defects following surgery

Thorsten Walles, MD FETCS

Assistant Professor of General Thoracic Surgery, University of Tuebingen

- demonstrated the concept and first clinical implementation of bioengineered tissue substitutes with a private vascular supply for reconstructive surgery

Martina Schuessler-Lenz, MD

Member of the CAT-Commission of the EMEA, Langen

- elaborated the regulatory framework for regenerative therapies in Europe
- clinical trial applications have still to be filed for on the national level
- pointed out, that organ transplants and homografts currently are regulated by the national authorities, but that new EU directives are under way to harmonize these different regulations

Discussion

Situation of the scientific field

- about 10 years ago, the field (=regenerative therapies) was dominated by physicians/surgeons, which resulted in numerous animal models and first clinical applications, while the underlying mechanisms of tissue regeneration remained unclear
- today, the field is dominated by scientists of various backgrounds, resulting in filed analytical methods, a more detailed understanding of the fundamentals of tissue differentiation and healing with a high prevalence of in vitro studies, will decreasingly numbers of approaches are tested in animal experiments
- the increasing condensation of clinical work in medical and especially surgical departments hampers the planning, execution and analysis of own research projects
- large research centres (like UCL) employ scientists in the surgical departments to plan, execute and analyze research projects

- other medical subspecialties benefit from concerted research activities with related fields (f.e. heart surgery & cardiology)

Funding of research

- national institutions may fund individual research projects
- the European Union sponsors international consortia, especially co-operations with the new EU member states (f.e. Estonia)

Research interests within the ESTS

- tissue engineering approaches for chest wall reconstruction
 - still in the planning and constitution phase
- biofunctionalization of suture materials for improving bronchial stump healing
 - preliminary clinical work on stem cells from fat
 - currently setting up a clinical study
- re-conditioning of human donor lungs to improve their function
 - immunomodulation
 - co-operation with anaesthesiology department
 - currently working on bioreactor-technologies for human organ perfusion
- lung tissue engineering
 - still in the planning and constitution phase
 - animal model
 - currently working on bioreactor-technologies for organ perfusion

In the narrow sense no RegMed approaches:

- *biobanking of chest tumors*
 - *includes pulmonary tumors and thymomas*
 - *for each patient: history, blood specimen, tumour sample, healthy lung tissue*

- *investigation of platelet adhesion factors for their role on pleural healing*
 - *potential treatment for air-leaks ?*

Suggestions of the participants to improve their scientific activities:

- list of potential co-operation partners on the ESTS homepage / homepage of the working group
- list of ongoing projects in other groups
 - was criticized by some participants because of fear of plagiarism
- regular meetings of the working group
- exchange programs for young surgeons / lab members to learn methods in more experienced research facilities and implement them at their home institution
 - travel grants ?
 - UCL maintains a 1-year MSc program

Summary

The RegMed research approaches in the ESTS seem to be at a very early stage compared to other subspecialties (orthopaedics, heart surgery). Therefore the groups may benefit from scientific cooperations outside the ESTS.

The participants seem to focus on 2 target tissues: lung and chest wall (bone). For future activities of this working group it may be advisable to address these preferences in the program composition.

List of participants

Participant	City	Country
Bernhard Jank	Vienna	Austria
Dirk van Raemdonck*	Leuven	Belgium
Emmanuel Martinod	Bobigny	France
Matthias Altmayer	Essen	Germany
Martina Schüssler-Lenz	Langen	Germany
Thorsten Walles	Tuebingen	Germany
Tamas Molnar*	Pécs	Hungary
Pier Luigi Filosso	Torino	Italy
Francesco Leo	Milano	Italy
Mario Nosotti	Milano	Italy
Gaetano Rocco	Naples	Italy
Lorenzo Rosso	Milano	Italy
Luigi Santambrogio	Milano	Italy
Willem Hans Steup*	Den Haag	Netherlands
Jaroslaw Kuzdzal*	Krakow	Poland
Radu Posea	Bucharest	Romania
Jose L. Aranda*	Salamanca	Spain
Carlos Bidegain	Girona	Spain
Emilio Canalis	Tarragona	Spain
Angel F. Carvajal	Mallorca	Spain
Prudencio Díaz-Agero	La Paz	Spain
David Gomez de Antonio*	Madrid	Spain
Alexander Seifalian	London	UK
Katja Schenke-Layland	Los Angeles	USA

* not present at working group meeting