

## **Emilia Kaivosoja**

Report from attending the 7th Annual Meeting of International Society for Stem Cell Research, 8-11.7.2009 Barcelona, Spain

### **Attending the 7th Annual Meeting of ISSCR**

The ISSCR's first meeting in Europe brought together more than 3,100 researchers from around the world to discuss many facts of stem cell science and technology. A diverse speaker program organized in seven plenary sessions and three concurrent sessions followed, showcasing a wide variety of stem cell biology. Many themes ran through the meeting, making it difficult to select individual highlights, but below you'll find a short description of the topics, which I found most interesting.

Keynote speaker Nancy Wexler (*Columbia University and the Hereditary Disease Foundation*) opened the meeting with her remarkable tale of discovering the genetic mutation that underlies Huntington's disease, and introducing a key theme, the ultimate aim of our collective research — to treat disease.

Cato T. Laurencin (*University of Connecticut Health Center*) gave a talk, which I particularly enjoyed. Laurencin had studied a topic closely related to my research; bone formation and biomaterials. The tissue engineering approach involves the use of biodegradable scaffolds, cells and or bioactive molecules to regenerate tissues via a natural process in the body. Stem cell therapy is gaining significant interest particularly adult mesenchymal stem cells, which are emerging as an important tool to engineer bone tissue. In their study Laurencin *et al.* had found out that loading poly(lactide-co-glycolide) scaffolds with hydroxyapatite improved osteogenic differentiation.

Another interesting topic described the osteogenic potential of bone marrow. Paolo Bianco (*Sapienza University*) presented the long history of mesenchymal stem/progenitor cell (MSC) field starting when Friedenstein showed osteogenic potential of bone marrow cells in a boneless transplant. Bianco presented their work of CD146+ cells, which showed that cells lining the bone marrow sinusoids and vasculature of other tissues have colony forming potential and mesodermal differentiation in vitro. These cells had many stem cell features, but Bianco noted that CD146+ cells isolated from different tissues had restricted differentiation potential in vivo. Only CD146+ cells isolated from muscle could form muscle in vivo, but bone marrow derived CD146+ cells could not (a muscle damage model in SCID mice).

The meeting was perhaps a little light on tissue engineering aspect of stem cells, but Paolo Macchiarini (*Hospital Clinico de Barcelona*) discussed clinical results from a whole tissue engineered airway. Decellularised cadaver airways were reseeded with respiratory epithelial cells and chondrocyte differentiated MSC. Using a unique bioreactor, the cells were allowed to expand over the tissue. The tissue was then transplanted into a patient to replace a section of damaged trachea. After three months the transplant was successfully revascularised and had an open and functioning lumen. In current work the group had removed the in vitro bioreactor step. The decellularised airway was doped with MSC then transplanted successfully in an animal model.

The most interesting topic of Industry Symposia was *Temperature responsive UpCell surface* by Thermo Fischer. The presentation was about a surface that enables enzyme

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free harvesting of cells. Cells are detached from the surface, which becomes hydrophobic below 32°C. This approach preserves surface proteins and can also be utilized in tissue engineering without scaffolds. Entire sheets of cells can be detached from the surface and these sheets can be placed one on the other like in lasagna so that a 3D-tissue-culture without scaffolds is possible. This brings quite interesting possibilities for regenerative medicine.

The meeting closed with the Anne McLaren lecture given by Janet Rossant (*Hospital for Sick Children, Toronto*). This was a presentation of elegant work detailing the signaling that defines lineage in the very early embryo, taking us back to the very roots, and indeed essence, of stem cell biology.

A record number of posters — more than 1,700 — were presented. These offered a one-on-one chance to discuss in greater depth what could only be touched on in a single speaker slot. I also had the opportunity to present my work *Adhesion, spreading and osteogenic differentiation of human mesenchymal stem cells cultured on micropatterned titanium, tantalum, chromium and amorphous diamond coatings* on one of the poster presentation evenings. This was actually my first presentation abroad. Questions, comments and advice provoked a lot of new information for me that I can use to further my project.

An aspect of the conference, which was particularly suitable for young PhD students such as myself, was the ‘Meet the expert’ over lunch session. I took this opportunity with Alan Trounson from California Institute for Regenerative Medicine, during which we discussed our research and the possibility of a life after the PhD.

In addition to the highly informative day program of the meeting, the evening program, especially Junior Investigator Social Hour, offered great platform for networking.

Finally, I would like to thank the ESF for granting travel awards so that I was able to attend this highly informative meeting, which has proved tremendously beneficial for my research.