The third RESCUE Society meeting "What is new in Europe in the field of regenerative medicine?" took place in 8th -9th November 2010 in Oxford, UK. The goal of the conference was to set the stage to promote scientific collaboration between stem cell researchers from around Europe from different disciplines, and to stimulate discussion of the latest results in the field of stem cell biology. Finally one public workshop session covered the clinical potentials for stem cell products.

The first session**,** on the morning of 8 November, "Embryonic stem cells" opened with Pete Coffey (London, UK) who introduced clinical aspects of embryonic stem cells (ES) and induced pluripotent stem (iPS) cells, both of which were demonstrated to act effectively in age-related macular degeneration (AMD). They have explained beautifully how the surgically implanted ES cells into a clinical population of AMD patients, which have been transformed into the cells affected in AMD: the support cells for the photoreceptors (retinal pigment epithelium) and the photoreceptors. Daniel Aberdam (Nice, France) then showed a novel role for the transcription factor p63, a member of the *p53* family, in both epidermal and cardiovascular fate using ES cells as a model system. Their findings uncover that p63 could be a candidate gene for orphan congenital heart diseases.

Eran Meshorer (Jerusalem, Israel) exemplified the scope of epigenetic-related mechanisms that act to maintain chromatin plasticity in ES cells. Using epigenetic drugs and mutant ES cells lacking various chromatin binding proteins, they found that histone acetylation enhances chromatin dynamics specifically in euchromatin, while histone H3 lysine 9 (H3K9) methylation and lamin A expression restrict chromatin dynamics exclusively in heterochromatin. Their report elegantly summarized how the altered epigenetic-related mechanisms were associated with perturbed ESC differentiation. Paul Fairchild (Oxford, UK) concluded the session by showing the immunogenicity, or lack thereof, of ES cells as well as their differentiated progeny.

The session on "Adult Stem Cells -Tissue Specific Stem Cells and Trans-differentiation" opened with a presentation by Una Chen (Giessen, Germany), describing the characterization of conditionally-transformed mouse keratinocyte cell lines, which manifest some keratinocyte stem cell properties. Francis Szele (Oxford, UK) has explored the description of the stem cell properties of neuroblasts in the adult subventricular zone. He reported that Gal-3 expression in this region of the central nervous system was required for migration of these cells to the olfactory bulb. Shimon Efrat (Tel Aviv, Israel) concluded the session with a discussion of potential new cell sources for generation of insulin-producing cells. These include cells derived from human islet beta cells expanded in culture, which could be shown by lineage tracing to undergo dedifferentiation, but can be induced to dedifferentiate. These cells also served as a source for generation of iPS cells, which demonstrated an epigenetic memory and a preferential differentiation capacity into insulin-producing cells.

The early bird session, on the morning of 9 November, was opened by Sajjad Ahmad (Newcastle, UK). He deliverd a splendid talk describing the Newcastle protocol in growing autologous limbal stem cells under Good Manufacturing Practices (GMP) condition and transplanted to the diseased eye to release the pain and to restore the vision of the patients. The second session was given by Veronique Azuara (London, UK) who elaborated about the epigenetic changes in culture of embryonic stem cells. It became evident that ES cell lines with

the same name and origin can vary crucially according to culture conditions that might also be laboratory dependent.

Eike Buss (Heidelberg, Germany) then reported about mobilization of human leukemic cells in a mouse *in vivo* xenotransplantation system. The main mobilizing agent was the CXCR4 antagonist/modulator AMD3100 and further data were presented on the mechanistic role of stromal cell-derived factor-1 (SDF-1) and about mobilization by catecholamines. He also presented data about the importance of the enzyme Aldehyde dehydrogenases (ALDH) as a marker for prospective isolation of human Leukemia stem cells (LSCs). The concluding talk was a Keynote speech by Malcolm Alison (London, UK) about the concept of Cancer Stem Cells (CSCs). He gave a concise overview of the development of this crucial oncologic concept. He presented the most recent results and especially the current controversies in this field e.g. the problem of physiologic model systems (xenotransplantation) and the relation to the concept of clonal evolution of cancer cells.

The same day, we had another busy public Workshop entitled "Toward therapeutic products and cells" took place from 15:00-18:00 hrs. The session had very interesting presentations and touched a wide range of audiences, including both scientists as well as non-scientists. This session started with Suzanne Watt (Oxford, UK) who presented a general overview of the clinical use of stem cells in the UK-based East of England Stem Cell Network. She described the current use of cell sources such as hematopoietic stem cells, bone marrow-, peripheral blood- and cord blood-derived stem cells in the clinic, what can be learned from this, and their respective advantages for specific applications. Zara Hannoun (Edinburgh, UK) presented results related to the study of sumoylation of nuclear protein, HNF4a (Hepatocyte nuclear factor 4 alpha), which is plays crucial role in development of the liver, kidney, and intestines. Their studies shed a light on how the sumoylation of this novel protein affects different stages of differentiation of human embryonic stem cells into differentiated hepatocytes.

Slaven Erceg (CABIMER, Spain) made a wider fascinating review about the studies performed in his group with human embryonic stem cells to generate oligodendrocyte progenitors and motoneuron progenitors and their very promising outcome on injured spinal cord in rats upon implantation. Arnaud Scherberich (Basel, Switzerland) described recent insights gained from the study of different tissue engineering approaches to generate bone tissue and blood vessels starting from human adipose tissue-derived progenitor cells. Sheila Mac Neil (Sheffield, UK) described the efforts of her lab to culture human keratinocytes, co-cultured or not with melanocytes, seeded on 2D dressing materials, in a clinically compliant way to be implanted in human dermis, and the extension of this approach to bone marrow-derived cells.

Contributed by Eran Meshorer, Shimon Efrat, Eike Buss, Arnaud Scherberich, edited by Raja Anand, 28.11.2011