OMICS Group Conferences
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International Conference on
Genetic Syndromes & Gene Therapy

November 19-21, 2012 Hilton San Antonio Airport, USA

# Interaction between T-cells and engineered osteoblasts and chondrocytes: Implications for tissue repair

**Jan Oxholm Gordeladze**
University of Oslo, Norway

MicroRNAs are small RNAs, 21–25 nt long, encoded in the genome, and exert important regulatory roles. In chondrocytes from growth plates, 30 microRNAs were preferentially expressed, most of which were virtually nonexistent in osteoblasts. It has been demonstrated that several microRNAs (e.g. miRs 16, 24, 29, 125b, 149, 328, 339, 133, and 135) are differentially expressed in osteoblasts and chondrocytes derived from mesenchymal stem cells (MSCs). Furthermore, we have shown that some microRNAs (e.g. miRs 150, 20a, 30d, 17, 19b, 638, 663, 923, and 155) constitute a discriminating signatures for CD4+ T cells. Since the miRs 923, 638 and 663 are all abundantly expressed in differentiating chondrocytes, and the miRs 16, 586, and 923 are all targeting Runx2, one might speculate that activated T cells, apart from influencing cartilage/bone turnover in inflamed joints, also may affect chondrocytes and osteoblasts by the microRNAs they secrete (in exosomes) into the synovial fluid.

The results of permutations of the experimental approach taken indicated that osteochondral phenotypes derived from MSCs and adipose stem cells were jeopardized when exposed to "artificial" synovial fluid containing a cytokine mixture, exosomes shredded from Th-17 cells, or certain pre-miR species. Furthermore, both cell phenotypes enhanced the induction and activity of osteoclasts derived from peripheral blood monocytes (PBMCs). Reinforcing the osteochondral phenotypes by manipulating the levels of microRNA species, transcription factors, and growth on scaffolds yielded better osteochondral cells in terms of wanted phenotypes and stability (resilience towards osteoclast activation) when exposed to growth conditions supporting inflammatory processes.

## Biography

Jan O. Gordeladze, PhD (born 25th of April, 1950), holds a triple professor competence (medical biochemistry, physiology, and pharmacology), and is presently working as a professor at the Department of Biochemistry, Institute of Basic Medical Science, University of Oslo, Norway. He has previously been employed as the medical director of MSD, Norway, serving two years as a Fulbright scholar at the NIH, Bethesda, Maryland, USA, and from 2006-2009 being employed as associate professor at the University of Montpellier, France. He has published more than 100 scientific articles, reviews/book chapters and presented more than 250 abstracts/posters/talks at conferences world wide.

j.o.gordeladze@medisin.uio.no