The expression of osteoclast-associated receptor (oscar) at sites of focal bone resorption adjacent to human implants

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**Introduction:** Osteoclast Associated Receptor (OSCAR) is a novel member of leucocyte receptor complex (LCR)-encoded family. Mouse OSCAR (mOSCAR) has been reported to be expressed by the preosteoclast and mature osteoclast (OC) (1). A putative ligand has been reported to be expressed primarily in osteoblast/stromal cells and OSCAR mRNA was detected in OC rich tissue such as skull and long bones (1). Soluble OSCAR can inhibit the formation of OC from bone marrow precursor cells in the presence of bone resorbing factors indicating OSCAR activation is required for osteoclast formation (1, 2).

Human OSCAR (hOSCAR) was reported to be a homolog to mouse OSCAR (mOSCAR) (3). The gene for hOSCAR has been mapped to LCR complex on chromosome 19q13 and is involved in the regulation of the innate and adaptive immune response (1, 4). Human OSCAR transcript was mainly observed in peripheral blood leukocytes and FACS analysis demonstrated that these cell populations were monocytes and neutrophils (5). Further study indicates that hOSCAR is a functional receptor on monocytes and neutrophils that are involved in the induction of the proinflammatory cascade and initiation of downstream immune response (5). To date there is no data available regarding the expression of OSCAR in tissues associated with osteolysis. Therefore, the objective of this study is to determine if OSCAR is expressed adjacent to focal bone osteolysis and to compare this expression with Osteoarthritis (OA) synovial tissue.

**Materials and Methods:** A total of 22 samples (10 Peri-implant tissue and 12 OA) were studied. All tissues were paraffin embedded (mixture of 4% and 10% formalin fixed). Hematoxylin and Eosin (H&E) evaluation of each tissue was taken for assessment of tissue architecture. Initially nine clones of OSCAR antibodies (a gift from R&D Systems Inc., Minneapolis, MN, USA) were screened and although similar staining patterns were obtained with several of the clones the best one was selected for the study. The results were then analysed semi-quantitatively using semi-quantitative scoring (SQA) independently by two observers according to methods published previously (6). Statistical Analysis was performed using SPSS version 11.5. Non-parametric Mann Whitney-U test was used to compare 2 mean SQAs from two groups. P<0.05 was considered significant statistically.

Dual labelling of OSCAR and cell markers CD68 for macrophages (MAB1968 R&D Systems Inc., Minneapolis, MN, USA) and tryptase-G for mast cells (CMLC890, Cell Marque, Hot Springs, AR, USA) was also performed to investigate the cell lineage of cells expressing OSCAR according to a method published previously (7).

**Results:** Staining of OSCAR was clearly visible in the majority of multinucleated cells in peri-implant tissue. Staining was mostly confined to the cytoplasm although some cells occasionally demonstrated nuclear staining. There was strong staining of peri-implant tissues while OA tissues showed very low levels of OSCAR expression. Dual labelling studies revealed that cells expressing CD68 were the main cell type expressing OSCAR. There was no co-expression observed between OSCAR staining and expression of the mast cell marker, Tryptase-G.

Statistical analysis of SQAs from the two groups demonstrated that there was a significant difference in the expression of OSCAR between peri-implant tissue and OA synovial tissue (p<0.003).

**Discussion:** This study shows that OSCAR is expressed at high levels in peri-implant tissues compared to OA tissues. OSCAR is mainly expressed by the numerous CD68 expressing multinucleated cells present in these tissues. These findings and recent reports on the significant role OSCAR may play in osteoclast formation indicate that OSCAR could be an important mediator of peri-implant osteolysis.

**References:**

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