**Osteoclastic resorption of dense beta-tricalcium phosphate ceramics**

B. Le Gars Santoni\(^1\), M. Gallo\(^2\), T. Douillard\(^2\), R. Heuberger\(^1\), N. Döbelin\(^1\), C. Stähli\(^1\), S. Dolder\(^3\), J Chevalier\(^2\), W. Hofstetter\(^3\), S. Tadier\(^2\), M. Bohner\(^1\)

\(^1\)RMS Foundation, Bioceramics and Biocompatibility Group, Bettlach, Switzerland; \(^2\)Université Lyon, INSA Lyon, MATEIS, Villeurbanne, France

**Introduction**

Calcium phosphates (CaPs) and particularly β-tricalcium phosphate (Ca\(\text{3}(\text{PO}_4)\_2\)\(β\)-TCP) are well-known to enhance the self-healing abilities of bone [1]. Once implanted, β-TCP grafts are resorbed by osteoclast cells (OC) and replaced by new bone. This study had two aims: 1) find a method to quantify the volume of β-TCP resorbed by OC in vitro and 2) investigate if the β-TCP resorption occurred along preferential grain orientations.

**Materials and Methods**

1. Synthesis and cylinder fabrication

2. Osteoclasts formation

3. Resorption

4. Quantification of resorbed volume

5. Analysis of resorbed grains (EBSD)

**Results and Discussion**

Numerous OC resorption tracks were observed microscopically on β-TCP samples. White light interferometry highlighted the increased resorption activity of OC with RANKL concentration: resorbed volume per surface area increased from 0.011 ± 0.003 [μm\(^3\)/μm\(^2\)] (control) to 0.082 ± 0.018 [μm\(^3\)/μm\(^2\)] (5 ng/mL RANKL) and 0.157 ± 0.029 [μm\(^3\)/μm\(^2\)] (20 ng/mL RANKL).

EBSD measurement on β-TCP resorbed by osteoclasts with 5 ng/mL RANKL revealed no preferential grain orientation [2].

**Summary**

White light interferometry is a very potent technique to quantify OC resorption activity and SEM-EBSD measurements demonstrated that β-TCP is resorbed preferentially along the crystallographic c-axis.

**References**


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