

ANTARA *STAINLESS STEEL 316 L* DENGAN *TITANIUM ALLOY GRADE 2*

BERDASARKAN REAKSI KOLONI OSTEOLAS DAN FIBROLAS (*in vitro*)

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Pendahuluan:

Biomaterial yang diimplantasikan pada tubuh manusia memiliki kontak langsung terhadap jaringan tubuh. Hal ini dapat menimbulkan reaksi yang tidak diinginkan sehingga perlu dilakukan evaluasi Bioavailabilitas. Bahan implan orthopaedi diantaranya adalah *stainless steel 316 L* and *Titanium alloy grade 2* sering digunakan pada plat, sekrup, dan prosthesis. Tujuan dari penelitian ini adalah untuk mengevaluasi Bioavailabilitas dari *Stainless steel 316 L* and *Titanium alloy grade 2* terhadap sel osteoblas dan fibroblas manusia.

Metode: Penelitian experimental ini dilakukan menggunakan metode MTT assay terhadap sel fibroblas dan osteoblas yang didapatkan melalui proses kultur. Biomaterial implant yang digunakan adalah *Stainless steel 316 L* dan *Titanium alloy grade 2*. Bahan material di potong dan diproses menjadi ukuran yang sama, kemudian diberikan perlakuan terhadap sel. Sel yang telah mengalami kontak dengan implant dinilai densitas optik dan kemudian di hitung persentase kehidupan sel.

Hasil: Penelitian ini menemukan bahwa densitas optik yang terbaca pada sampel lebih rendah dibandingkan dengan sel tanpa perlakuan. Meski demikian, densitas optik pada sel osteoblast dan fibroblas pada sampel *Stainless steel 316 L* memiliki kematian sel lebih tinggi dibandingkan dengan sampel *Titanium alloy grade 2* (sel hidup osteoblast 78% vs 84%; fibroblast 74 % vs 65%) Secara statistik, kematian sel pada *Titanium alloy grade 2* tidak berbeda bermakna jika dibandingkan dengan kematian sel pada *Stainless steel 316 L* ($p>0.05$)

Kesimpulan: Penelitian ini menunjukkan bahwa *Titanium alloy grade 2* dan *Stainless steel 316 L* memiliki Bioavailabilitas yang baik dan tidak berbeda bermakna secara statistik

Keyword: Bioavailabilitas, *Stainless steel 316 L*; *Titanium alloy grade 2*; fibroblas; osteoblas

OF STAINLESS STEEL 316 L AND TITANIUM ALLOY GRADE 2

TOWARDS HUMAN OSTEOLAST AND FIBROBLAST CELL

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Introduction : Implanted biomaterial in the human body is having direct contact to human tissue that can lead to various unfavourable reaction, therefore its bioavailability should be evaluated. The common biomaterial implant in orthopaedic is *Stainless steel 316 L* and *Titanium alloy grade 2* that were used in plate, screws, and other prosthesis. The aim of this study was to evaluate the bioavailability of *Stainless steel 316 L* and *Titanium alloy grade 2* towards human osteoblast and fibroblast cell.

Methods : This was an experimental study conducted on human osteoblast and fibroblast cell which was obtained by cell culture using MTT assay methods. The biomaterial that selected in this study were *Stainless steel 316 L* and *Titanium alloy grade 2*. The material was cut and polished into same size, and then put them in contact with the cell. The optical density of the cell was then measured to calculate the percentage of the living cell.

Results: This study found that the optical density read in the sample was lower compared to control. However, the cell that have contact to *Stainless steel 316 L* have more percentage of cell death compared with *Titanium alloy grade 2* (living cell for osteoblast 78% vs 84%; fibroblast 74% vs 65%). Based on statistical analysis, both osteoblast and fibroblast cell death do not differ significantly between *Stainless steel 316 L* and *Titanium alloy grade 2*.

Conclusion: This study showed that *Stainless steel 316 L* and *Titanium alloy grade 2* which are widely used materials in orthopaedic have excellent bioavailability towards human osteoblast and fibroblast cells.

Keyword: bioavailability; *Stainless steel 316 L*; *Titanium alloy grade 2*; fibroblast; osteoblast

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