

Efek pemberian graft tulang berbentuk pasta dengan berbagai komposisi dan konsentrasi terhadap viabilitas sel osteoblas (in vitro)

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Abstrak

Latar Belakang: Penggunaan material graft sintetis (alloplast) berbentuk pasta telah menjadi alternatif untuk meregenerasi defek tulang dengan akses yang sulit. BATAN saat ini telah memproduksi pasta graft tulang Injectable Bone Xenograft (IBX), Injectable Hydroxyapatite-Chitosan (IHA-C), dan Injectable Hydroxyapatite (IHA). Namun, biokompatibilitas produk-produk tersebut belum teruji secara in vitro.

Tujuan: Mengetahui efek toksik pemberian pasta IBX, IHA-C, dan IHA 1%, 0,5%, dan 0,25% terhadap kultur sel-sel osteoblast berdasarkan viabilitas sel.

Metode: Sel-sel osteoblast (MG 63) dikultur dalam medium lengkap (5% CO₂, 37°C) hingga confluent. Selanjutnya sel-sel tersebut dimasukkan ke dalam 96 wells-plate dan diinkubasi selama 24 jam. Selanjutnya dilakukan uji MTT dengan memaparkan ketiga pasta dengan konsentrasi 1%, 0,5%, dan 0,25% pada kelompok perlakuan selama 4 jam, sedangkan kelompok kontrol tidak dipaparkan apapun. Kemudian, dilakukan pembacaan menggunakan microplate reader, panjang gelombang 490 nm.

Hasil: Viabilitas sel pada kelompok perlakuan IBX 0,25% (108,20% ± 8,85%), IHA-C 0,25% (112,01% ± 4,23%) dan IHA 0,25% (115,02% ± 4,37 %) memiliki persentase tertinggi dalam masing-masing kelompoknya. Menurut analisis statistik one way ANOVA perbedaan-perbedaan tersebut bermakna.

Simpulan: Pasta graft tulang IBX, IHA-C, dan IHA dengan konsentrasi 1%, 0,5%, dan 0,25% tidak menimbulkan efek toksik dan menunjukkan kenaikan nilai viabilitas sel. Penurunan konsentrasi pasta graft tulang mengakibatkan meningkatnya viabilitas sel osteoblast, kecuali pada kelompok pasta IHA 1% (107,71% ± 11,95).

.....Background: The use of synthetic material graft in paste form has become an alternative to regenerate bone defect on areas of difficult access. BATAN now has produced bone graft paste in the form of Injectable Bone Xenograft (IBX), Injectable Hydroxyapatite-Chitosan (IHA-C), and Injectable Hydroxyapatite (IHA). However, the iocompatibility of these products have not yet been tested, in vitro.

Objective: To analyze the effect of IBX, IHA-C, and IHA 1%, 0.5%, and 0.25% on osteoblast cells line based on their viabilities.

Method Osteoblast cells line (MG63) were cultured in complete medium (5% CO₂, 37°C) until confluent. After that, the cells were divided into 96 wells-plate, then incubated for 24 hours. Furthermore, did the MTT assay by giving the pastes with concentration 1%, 0.5%, and 0.25% into the test group, meanwhile the control group was not given with anything, incubated for 4 hours. Then the osteoblast viability was

measured using microplate reader with wavelength 490 nm.

Results: On each test group the highest percentage of cells viability was showed at 0.25% concentration (IBX $108.20\% \pm 8.85\%$; IHA-C $112.01\% \pm 4.23\%$; and IHA $115.02\% \pm 4.37\%$). Statistical analysis (One Way ANOVA) showed the differences were significance.

Conclusion: Bone graft paste IBX, IHA-C, and IHA with concentration 1%, 0.5%, and 0.25% do not have toxic effects. However, they do increase cell viability. A decrease in bone graft's concentration increases the viability of osteoblast cell, except on IHA 1% ($107.71\% \pm 11.95\%$).