Dampak Pajanan Hidroksiapatit-Gelatin-Propolis terhadap Viabilitas Sel Osteoblas In Vitro = Effects of Hydroxyapatite-Gelatin-Propolis Exposure on Cell Viability of Osteoblasts In Vitro

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Abstrak

Latar Belakang: Inovasi biomaterial dalam rekayasa jaringan tulang dapat bermanfaat untuk pengembangan dalam manajemen defek tulang kritis. Hidroksiapatit dan gelatin sudah dikenal potensinya dalam rekayasa jaringan sedangkan propolis dikenal dengan berbagai khasiatnya sebagai antimikroba dan potensi penyembuhan luka. Penggabungan ketiga bahan ini belum diketahui biokompatibilitasnya terhadap sel eukariot.

Tujuan: Penelitian ini bertujuan untuk mengevaluasi sifat biokompatibilitas hidroksiapatit-gelatin-propolis (HA-GEL-P) terhadap sel osteoblas (MG-63).

Metode: HA-GEL-P dibuat dalam bentuk elusi dengan konsentrasi propolis 6% dan 10% lalu dipajankan dalam larutan medium kultur yang telah disebari sel MG-63. Viabilitas sel dievaluasi dengan uji MTT pada hari ke 1 dan ke 8 setelah pemajanan, dengan inkubasi 2 jam. Setelah inkubasi, diberikan larutan acidified isopropanol untuk melarutkan kristal formazan yang terbentuk. Absorbansi diukur dengan panjang gelombang 600 nm.

Hasil: Uji MTT menunjukkan bahwa viabilitas sel setelah dipajankan dengan HA-GEL-P 6% di atas 90% pada hari ke 1, namun mengalami penurunan yang signifikan pada hari ke 8 dengan viabilitas sel di bawah 50%. Sedangkan, HA-GEL-P 10% menunjukkan viabilitas sel di bawah 50% pada hari ke 1 dan 8.

Kesimpulan: HA-GEL-P 6% menunjukkan biokompatibilitas yang baik sedangkan HA-GEL-P 10% menunjukkan sifat toksik. Efek toksik HA-GEL-P tergantung pada konsentrasi dan waktu inkubasi.
.....Background: Biomaterial innovation in bone tissue engineering can be useful for developments in the management of critical bone defects. Hydroxyapatite and gelatin are well known for their potential in tissue engineering, while propolis is known for its various antimicrobial and wound healing properties. The combination of these three materials is not yet known for its biocompatibility.

Objective: The purpose of this study was to assess the biocompatibility properties of hydroxyapatite-gelatin-propolis (HA-GEL-P) on osteoblast cells (MG-63).

Methods: HA-GEL-P was prepared in the form of elution with two propolis concentrations (6% dan 10%) and then exposed to a solution of culture medium that had been spread with MG-63 cells. Cell viability was evaluated by MTT assay on days 1 and 8 after exposure, with 2 hours incubation. After incubation, acidified isopropanol solution was given to dissolve the formed formazan crystals. The absorbance was measured at the wavelength of 600 nm.

Results: The MTT assay showed that the cell viability of HA-GEL-P 6% was above 90% on day 1, but had a significant decrease on day 8 with cell viability below 50%. Meanwhile, HA-GEL-P 10% showed cell viability below 50% on days 1 and 8.

Conclusion: It was suggested that adequate biocompatibility was evident for HA-GEL-P 6%, while HA-GEL-P 10% was toxic. The toxic effect of HA-GEL-P depends on the concentration and duration of incubation.