

Potensi eksosom dari Platelet Rich Plasma (PRP) dalam meningkatkan kemampuan regenerasi pulpa: analisis in-vitro viabilitas, aktivitas migrasi dan ekspresi Vascular Endothelial Growth Factor-A (VEGF-A) sel punca pulpa (hDPSCs) = The potential ability of Platelet Rich Plasma (PRP) exosome in inducing dental pulp regeneration: an-in vitro analysis: cell viability, migration activity, and VEGF-A expression of hDPSCs

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Abstrak

Tujuan dari penelitian ini adalah untuk menganalisis pengaruh Platelet-Rich Plasma (PRP) Eksosom terhadap potensi regenerasi jaringan pulpa gigi dengan evaluasi in vitro viabilitas sel, aktivitas migrasi, dan ekspresi Vascular Endothelial Growth Factor-A (VEGF-A) sel punca pulpa gigi manusia (hDPSCs). hDPSC diambil dari sembilan gigi molar tiga dari sembilan donor sesuai kriteria inklusi, dan isolasi serta kultur dilakukan dengan metode enzyme digestion (ED) yang dipanen antara P3 dan P4. Setelah starvation, hDPSCs dikultur di dalam enam media, yaitu sebagai berikut: Dulbecco's Modified Eagle Medium (DMEM) dan 10% PRP sebagai kelompok kontrol, dan 0,5%, 1%, dan 5% PRP eksosom sebagai kelompok eksperimental. Semua kelompok memiliki tiga rangkap biologis (Triplo). Uji viabilitas sel dievaluasi dengan MTT assay, aktivitas migrasi sel dengan Scratch Assay dan Transwell Migration Assay, dan ekspresi VEGF-A dengan Enzyme- Linked Immunosorbent Assay (ELISA). Analisis data dilakukan dengan uji One Way ANOVA ($p < 0,05$) serta uji Kruskal-Wallis dan post hoc Mann-Whitney ($p < 0,05$). Nilai rata-rata viabilitas hDPSCs tertinggi pada 24, 48 dan 72 jam observasi pada kelompok PRP-Eksosom 5% ($p < 0,05$). PRP Eksosom 5% menunjukkan aktivitas migrasi yang lebih tinggi dibandingkan dengan kelompok lain, meskipun tidak terdapat perbedaan bermakna dengan kontrol PRP 10% ($p > 0,05$). Ekspresi VEGF-A hDPSCs tertinggi terdapat pada kelompok PRP Eksosom 5% pada 72 jam pengamatan. Dapat disimpulkan bahwa eksosom PRP 5% berpotensi menginduksi regenerasi pulpa gigi manusia.

.....The purpose of this study was to analyze the effect of Exosome Platelet-Rich Plasma (PRP) on their potential for human Dental Pulp regeneration by evaluating in vitro cell viability, migration activity, and expression of Vascular Endothelial Growth Factor-A (VEGF-A) of human Dental Pulp Stem Cells (hDPSCs). hDPSCs was taken from nine third molars from nine donors that fit to the inclusion criteria of this study, isolation and culture were carried out by the enzyme digestion (EZ) method harvested between P3 and P4. After starvation, hDPSCs were cultured in six media, namely as follows: Dulbecco's Modified Eagle Medium (DMEM) and 10% PRP as the control group, and 0.5%, 1%, and 5% PRP exosomes as experimental groups. All groups had a biological triplication (Triplo). Cell viability test was evaluated by MTT assay, cell migration activity with Scratch Assay and Transwell Migration Assay, and VEGF-A expression by Enzyme- Linked Immunosorbent Assay (ELISA). Data analysis was performed using One Way ANOVA ($p < 0.05$) and Kruskal-Wallis ($p < 0.05$) and Pearson/Spearman Correlation test ($p < 0.05$). The highest mean hDPSCs viability was at 24, 48 and 72 hours of observation in the PRP-exosome group 5% ($p < 0.05$). Exosome PRP 5% showed higher migration activity compared to other groups, although there was no significant difference with PRP control 10% ($p > 0.05$). The highest expression of VEGF-A hDPSCs was

found in the PRP exosome group 5% at 72 hours of observation. It can be concluded that the PRP 5% exosome have the highest potential ability in inducing pulp regeneration.