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 of Cell Viability, Migration Activity, and VEGF-A Expression of hDPSCs)

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Abstrak

Latar Belakang: pulpa memiliki sifat low-compliance yang memengaruhi proses regenerasinya. Tujuan: menganalisis potensi Platelet- Rich Plasma (PRP) Eksosom terhadap regenerasi pulpa gigi secara in-vitro viabilitas sel, aktivitas migrasi, dan ekspresi Vascular Endothelial Growth Factor-A (VEGF-A) hDPSCs. Metodologi: hDPSC sembilan gigi molar tiga dikultur dengan metode enzyme digestion (ED) yang dipanen pada P3 dan P4. Kemudian dikultur di dalam enam media, yaitu: Dulbecco's Modified Eagle Medium (DMEM) dan 10% PRP sebagai kelompok kontrol, dan 0,5%, 1%, dan 5% eksosom dari PRP. 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 Lmmunosorbent 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). Hasil: viabilitas hDPSCs tertinggi pada 24, 48 dan 72 jam observasi pada kelompok Eksosom dari PRP 5% (p <0,05). Eksosom dari PRP 5% menunjukkan aktivitas migrasi yang lebih tinggi dibandingkan dengan kelompok lain, meskipun terdapat perbedaan tidak bermakna dengan kontrol PRP 10% (p >0,05). Ekspresi VEGF-A hDPSCs tertinggi terdapat pada kelompok PRP Eksosom 5% pada 72 jam observasi. Kesimpulan: eksosom dari PRP 5% berpotensi menginduksi regenerasi pupa gigi manusia.

.....Background: pulp has low-compliance properties that affect its regeneration process. Objective: to analyze the potential of Platelet-Rich Plasma (PRP) exosomes on the regeneration of dental pulp by in-vitro evaluation of cell viability, migration activity, and expression of Vascular Endothelial Growth Factor-A (VEGF-A) hDPSCs. Methodology: hDPSCs of nine third molars cultured by enzyme digestion (ED) method were harvested at P3 and P4. Then cultured in six media, Dulbecco's Modified Eagle Medium (DMEM) and 10% PRP as a control group, and 0.5%, 1%, and 5% exosomes of PRP. All groups had a biological triple (Triplo). Cell viability assay was evaluated by MTT assay, cell migration activity by Scratch Assay and Transwell Migration Assay, and VEGF-A expression by Enzyme-Linked Lmmunosorbent Assay (ELISA). Data analysis was performed using One Way ANOVA (p < 0.05) and Kruskal-Wallis and post hoc Mann-Whitney tests (p < 0.05). Results: The viability of hDPSCs was highest at 24, 48 and 72 hours of observation in the Exosomes group of 5% PRP (p < 0.05). Exosomes from 5% PRP showed higher migratory activity compared to other groups, although there was no significant difference with 10% PRP control (p > 0.05). The highest expression of VEGF-A hDPSCs was found in the 5% PRP Exosomes group at 72 hours of observation. Conclusion: exosomes of 5% PRP have the potential to induce the regeneration of human dental pulp.