

INTISARI

ISOLASI DAN KARAKTERISASI STEM SEL DARI PAPILA APIKAL KUDA BERDASARKAN PROFIL EKSPRESI GEN MENGGUNAKAN *REAL-TIME POLYMERASE CHAIN REACTION*

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Stem Cells from Apical Papilla (SCAPs) merupakan salah satu jenis *Mesenchymal Stem Cells* (MSCs) yang berasal dari jaringan papila apikal gigi. Sel punca ini memiliki kapasitas proliferasi tinggi dan diferensiasi osteogenik yang menjadikannya kandidat potensial dalam terapi regeneratif. Penelitian ini bertujuan untuk mengisolasi, mengkarakterisasi SCAPs kuda berdasarkan ekspresi gen menggunakan *Reverse Transcriptase Real Time Polymerase Chain Reaction* (RT-qPCR). Metode penelitian meliputi isolasi SCAPs dari gigi kuda, kultur sel dalam medium DMEM, pengamatan mikroskopis morfologi, *Colony-Forming Unit* (CFU) *Assay*, serta analisis ekspresi gen menggunakan qPCR. Ekspresi gen NANOG, CD29, RUNX2, SOX9, dan PPAR γ dianalisis untuk menentukan potensi *stemness* dan diferensiasi SCAPs. Hasil penelitian menunjukkan bahwa SCAPs yang diisolasi memiliki morfologi fibroblastik dengan kemampuan adhesi yang baik pada cawan kultur, serta menunjukkan kemampuan proliferasi dan kolonisasi yang baik berdasarkan CFU *assay*. Hasil qPCR menunjukkan ekspresi tinggi dari *surface marker* MSCs CD29 (1,94) dan *stemness marker* NANOG (17,17), Ekspresi *differentiation marker* secara berurutan dari tinggi ke rendah adalah RUNX2 (0,42), SOX9 (0,022), dan PPAR γ (0,0047) mengindikasikan potensi osteogenik SCAPs yang kuat. Kesimpulannya, SCAPs dari gigi kuda memiliki potensi diferensiasi osteogenik yang dominan, sehingga dapat dikembangkan lebih lanjut dalam terapi regeneratif untuk perbaikan jaringan keras.

Kata kunci: Ekspresi gen, Kuda, *Mesenchymal Stem Cells* (MSCs), qPCR, *Stem Cells from Apical Papilla* (SCAPs)

ABSTRACT

ISOLATION AND CHARACTERIZATION OF STEM CELLS FROM EQUINE APICAL PAPILLA BASED ON GENE EXPRESSION PROFILE USING REAL-TIME POLYMERASE CHAIN REACTION

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Stem Cells from the Apical Papilla (SCAPs) are Mesenchymal Stem Cells (MSCs) derived from the apical papilla tissue of developing teeth. Regenerative therapy may benefit from the use of SCAPs, given their high proliferative capacity and osteogenic differentiation capability. This study aims to isolate, characterize, and evaluate the potential of equine SCAPs based on gene expression using Real-Time Polymerase Chain Reaction (qPCR). The research methods included SCAPs isolation from equine teeth, cell culture in DMEM medium, microscopic morphology observation, Colony-Forming Unit (CFU) Assay, and gene expression analysis using qPCR. The expression of NANOG, CD29, RUNX2, SOX9, and PPAR γ genes was analyzed to determine the stemness and differentiation potential of SCAPs. The results showed that the isolated SCAPs exhibited fibroblast-like morphology with strong adhesion capability to the culture dish and good proliferation and colonization abilities based on the CFU assay. The results of qPCR demonstrated high expression of the MSC surface marker CD29 (1.94) and the stemness marker NANOG (17.17). The expression of differentiation markers from highest to lowest was RUNX2 (0.42), SOX9 (0.022), and PPAR γ (0.0047), indicating a strong osteogenic potential of SCAPs. In conclusion, equine SCAPs exhibit dominant osteogenic differentiation potential, suggesting their further application in regenerative therapy for hard tissue repair.

Keywords: Equine, gene expression, Mesenchymal Stem Cells (MSCs), qPCR, Stem Cells from Apical Papilla (SCAPs)