

ABSTRAK

KARAKTERISASI DAN POTENSI DIFERENSIASI *EQUINE DENTAL PULP STEM CELLS* (eDPSCs) BERDASARKAN EKSPRESI GEN DENGAN *REAL-TIME POLYMERASE CHAIN REACTION* (qPCR)

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Dental pulp stem cells (DPSCs) merupakan salah satu jenis *mesenchymal stem cells* (MSCs) yang memiliki kapasitas proliferasi dan berdiferensiasi menjadi osteosit lebih baik dibandingkan dengan *bone marrow stem cells*. Keunggulan tersebut menjadikan DPSCs sebagai kandidat yang baik untuk *bone tissue engineering*. Penelitian ini bertujuan untuk menganalisis karakter dan potensi diferensiasi *equine dental pulp stem cells* (eDPSCs) berdasarkan ekspresi gen menggunakan *real-time polymerase chain reaction* (qPCR). Metode penelitian ini meliputi isolasi jaringan *dental pulp* dari gigi kuda secara eksplantasi, pengamatan mikroskopis morfologi sel dan kemampuan sel membentuk koloni (*CFU assay*), serta analisis ekspresi gen menggunakan *real-time polymerase chain reaction* (qPCR). Hasil penelitian menunjukkan eDPSCs berhasil diisolasi dan mampu melekat baik pada *culture dish* serta menunjukkan kemampuan proliferasi dan pembentukan koloni yang baik pada *CFU assay*. Analisis hasil qPCR menunjukkan eDPSCs dapat mengekspresikan *surface marker* CD90, CD29, CD44, *stemness marker* NANOG, dan *differentiation marker* RUNX2, SOX9, PPAR GAMMA, serta terekspresi bervariasi pada *surface marker* gen CD18. Berdasarkan hasil qPCR yang didapatkan dari seluruh metode yang dilakukan, eDPSCs memenuhi kriteria minimal sebagai MSCs dengan potensi berdiferensiasi menjadi osteosit, kondrosit, dan adiposit yang baik.

Kata kunci: *mesenchymal stem cells*, *equine dental pulp stem cells*, kuda, ekspresi gen, *real-time polymerase chain reaction*

ABSTRACT

CHARACTERIZATION AND DIFFERENTIATION POTENTIAL OF EQUINE DENTAL PULP STEM CELLS (eDPSCs) BASED ON GENE EXPRESSION USING REAL-TIME POLYMERASE CHAIN REACTION (qPCR)

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Dental pulp stem cells (DPSCs) are a type of mesenchymal stem cell (MSC) that have a greater capacity for proliferation and differentiation into osteocytes compared to bone marrow stem cells. This advantage makes DPSCs a good candidate for bone tissue engineering. This study aims to analyze the characteristics and differentiation potential of equine dental pulp stem cells (eDPSCs) based on gene expression using real-time polymerase chain reaction (qPCR). The research methods include the isolation of dental pulp tissue from horse teeth via explantation, microscopic observation of morphology and colony-forming ability (CFU assay), as well as gene expression analysis using real-time polymerase chain reaction (qPCR). The results showed that eDPSCs were successfully isolated and able to adhere well to the culture dish, as well as exhibit good proliferation and colony-forming ability in the CFU assay. qPCR analysis showed that eDPSCs expressed the surface markers (CD90, CD29, CD44), the stemness marker (*NANOG*), and the differentiation markers (*RUNX2*, *SOX9*, *PPAR GAMMA*), with variable expression of the surface marker gene CD18. Based on the qPCR results obtained from all the methods used, eDPSCs meet the minimum criteria as MSCs with strong potential to differentiate into osteocytes, chondrocytes, and adipocytes.

Keywords: mesenchymal stem cells, equine dental pulp stem cells, equine, gene expression, real-time polymerase chain reaction