

ABSTRAK

ISOLASI DAN KARAKTERISASI *CANINE BONE MARROW MESENCHYMAL STEM CELLS* BERDASARKAN PROFIL EKSPRESI GEN DENGAN *QUANTITATIVE POLYMERASE CHAIN REACTION*

Aliyya Nur Faiza

22/492702/KH/11198

Canine bone marrow mesenchymal stem cells (cBM-MSCs) adalah jenis sel punca mesenkimal anjing yang semakin banyak diteliti terkait potensi penggunaannya untuk terapi regeneratif dan *tissue engineering* pada hewan. Namun, informasi mengenai karakterisasi sel masih terbatas dan bervariasi. Penelitian ini bertujuan untuk melakukan isolasi dan karakterisasi cBM-MSCs berdasarkan morfologi dan profil ekspresi gen menggunakan *quantitative polymerase chain reaction* (qPCR). Sel diisolasi dari mandibula anjing melalui metode eksplantasi lalu dikultur sampai *passage* tiga (P3) untuk dilakukan pengamatan morfologi dan analisis qPCR. Sel menunjukkan morfologi mirip fibroblas berbentuk kumparan yang homogen, mampu melekat pada wadah kultur, dan memiliki kemampuan proliferasi yang baik. Analisis qPCR menunjukkan ekspresi *stemness marker* (*NANOG*, *OCT-4*, *REX-1*) dan *surface marker* (CD90, CD73, CD44, CD105). Tidak adanya ekspresi *surface marker* CD45 mengonfirmasi kultur adalah non hematopoietik. Adanya ekspresi *osteogenic marker* (*RUNX-2*, *OSX*, *OCN*), *chondrogenic marker* (*SOX-9*, *COLX*), dan *adipogenic marker* (*PPAR γ* , *LPL*) mengindikasikan potensi diferensiasi *multilineage*. Secara umum, hasil karakterisasi sel memenuhi persyaratan *mesenchymal stem cells* (MSCs) yang diberikan oleh International Society of Cellular Therapy (ISCT) serta mencerminkan potensinya dalam terapi regeneratif dan *tissue engineering*.

Kata kunci: *anjing*, *bone marrow mesenchymal stem cells* (BM-MSCs), *ekspresi gen*, *mesenchymal stem cells* (MSCs), *qPCR*

ABSTRACT

ISOLATION AND CHARACTERIZATION OF CANINE BONE MARROW MESENCHYMAL STEM CELLS BASED ON GENE EXPRESSION PROFILE USING QUANTITATIVE POLYMERASE CHAIN REACTION

Aliyya Nur Faiza

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Canine bone marrow mesenchymal stem cells (cBM-MSCs) are a type of canine mesenchymal stem cell that is increasingly being studied for its potential use in regenerative therapy and tissue engineering in animals. However, information on cell characterization is still limited and varies from one study to another. This study aimed to isolate and characterize cBM-MSCs based on morphology and gene expression profile using quantitative polymerase chain reaction (qPCR). Cells were isolated from canine mandible using the explant method and then cultured to passage three (P3) for morphological observation and qPCR analysis. The cells showed a homogeneous spindle-shaped fibroblast-like morphology, were able to adhere to the culture dish, and had good proliferation ability. The qPCR analysis showed the expression of stemness markers (*NANOG*, *OCT-4*, *REX-1*) and surface markers (CD90, CD73, CD44, CD105). The absence of surface marker CD45 expression confirmed that the culture was non hematopoietic. The expression of osteogenic markers (*RUNX-2*, *OSX*, *OCN*), chondrogenic markers (*SOX-9*, *COLX*), and adipogenic markers (*PPAR γ* , *LPL*) indicated multilineage differentiation potential. To summarize, the cell characterization results meet the mesenchymal stem cell (MSC) requirements set by the International Society of Cellular Therapy (ISCT) and reflect their potential in regenerative therapy and tissue engineering.

Key words: *bone marrow mesenchymal stem cells (BM-MSCs)*, *canine*, *gene expression*, *mesenchymal stem cells (MSCs)*, *qPCR*