Application of a modified method for stem cell isolation from lipoaspirates in a basic lab

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Abstrak

Tujuan Lipoaspirate mengandung jumlah sel punca mesenkimal yang banyak, sehingga lipoaspirate kini menjadi sumber sel punca mesenkimal yang sangat potensial bagi riset maupun untuk aplikasi klinis. Metode sederhana isolasi sel punca mesenkimal yang dapat diaplikasikan pada laboratorium dasar akan memfasilitasi perkembangan riset sel punca di negara berkembang. Diharapkan, hasil studi ini dapat meningkatkan pengembangan riset sel punca di Indonesia.

Metode Lipoaspirate dicerna dengan enzim collagenase type I kemudian dilakukan filtrasi. Pemurnian sel punca mesenkimal dilakukan dengan mengkultur sel selama 2-3 hari disusul dengan pembuangan supernatan. Konfirmasi populasi yang homogen dilakukan melalui analisis sel dengan metode flowcytometry sesuai dengan kriteria dari Mesenchymal and Tissue Stem Cell Committee of the International Society of Cell Therapy.

Hasil Sel punca mesenkimal yang dapat diperoleh dengan menggunakan prosedur ini adalah sebanyak 16,41 ± 8,22 x 108 sel per 120 ml lipoaspirate. Sel hasil kultur menunjukan morfologi fibroblastik, sesuai dengan karakteristik sel punca mesenkimal dan berhasil dipurifikasi dari sel lainnya. Hal ini dikonfirmasi dengan analisis flowcytometry yang menunjukan ekpresi CD105, tanpa adanya ekspresi HLA-Class II, CD 45, CD 34, CD14, and CD19.

Kesimpulan Studi ini menunjukan bahwa sel punca mesenkimal dapat diisolasi dari lipoaspirate secara sederhana. Prosedur ini sangat memungkinkan untuk dilakukan di laboratorium dasar.
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Abstract
Aim Lipoaspirate, a wasted by product from liposuction procedure recently has been shown to contain abundant mesenchymal stem cells (MSCs). MSCs have been studied in many research areas to regenerate many cell lineages including, myogenic, cardiomyogenic, and angiogenic lineages. The large quantity of MSCs in lipoaspirate, makes it an attractive source for stem cells used in research and clinical applications. A simplified method which is suitable to be performed in a basic laboratory will facilitate development of stem cell research in developing countries. Therefore the outcomes from this study are expected to encourage the progress of stem cell research in Indonesia.

Methods Lipoaspirate was digested using collagenase type I, followed by a basic filtration method. Purification of MSCs was done by cell culture for 2-3 days followed by supernatant removal. To confirm the homogenous population of MSCs, an analysis using flowcytometry was performed based on the MSCs minimal criteria developed by Mesenchymal and Tissue Stem Cell Committee of the International Society

of Cell Therapy.

Resuts MSCs were able to be obtained at 16.41 ± 8.22 x 108 cells per 120 ml lipoaspirate. The cultured cells showed fibroblastic morphology which is characteristic for MSCs and were able to be purified from non-MSCs cells. This was confirmed by flowcytometry assay showing expression of CD105 and the absence of HLA-Class II, CD 45, CD 34, CD14, and CD19.

Conclusions This study has shown that it was feasible to isolate messenchymal stem cell from human lipoaspirate. The procedure was practicable to be performed within a basic laboratory.