

**FAKULTAS KEDOKTERAN
UNIVERSITAS PEMBANGUNAN NASIONAL “VETERAN” JAKARTA**

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**ANALISIS GEN BIOMARKER *ALKALINE PHOSPHATASE (ALP)* PADA
DIFERENSIASI OSTEOGENESIS ADIPOSE-DERIVED STEM CELLS
DENGAN SCAFFOLD PHA dan SILK**

RINCIAN HALAMAN (xv + 98 halaman, 19 tabel, 3 bagan, 16 gambar, 10 lampiran)

ABSTRAK

Tujuan

ADSCs menjadi kandidat yang baik bagi aplikasi klinis untuk meregenerasi jaringan yang rusak. ADSCs belum pernah di uji dengan menggunakan *scaffold* PHA dan *silk* ke arah diferensiasi osteogenesis. Tujuan umum penelitian ini adalah untuk menganalisis ekspresi gen ALP yang menandakan adanya diferensiasi osteogenik ADSCs pada media *scaffold* PHA dan *silk* dengan rasio 3:1 dan 0:4.

Metode

ADSCs diambil dari jaringan adiposa melalui prosedur *liposuction* pada klinik Hayandra, kemudian ADSCs dikultur dan dipasasi dan ditanam pada *scaffold nanofiber* PHA dan Silk dengan rasio 3:1 dan 0:4. Kemudian diamati selama 21 hari, dan dilakukan RT-PCR untuk melihat ekspresi gen osteogenesis berupa ALP.

Hasil

Hasil *Fold Change* ADSCs + Stempro Osteogenesis differentiation kit yaitu 1, ADSCs tanpa *scaffold* yaitu 0.37, ADSCs + *scaffold* PHA dan Silk 0:4 yaitu 0,38, ADSCs + *scaffold* PHA dan Silk 3:1 yaitu 1.

Kesimpulan

Berdasarkan penelitian, Penurunan ekspresi gen ALP pada *scaffold* PHA dan Silk rasio 0:4 tidak lebih baik dibanding penggunaan silk dengan kadar yang rendah, kadar silk yang terlalu tinggi memiliki kekurangan dalam meningkatkan sifat mekanik fitur osteogenik. ADSCs dengan *scaffold* PHA dan Silk 1:3 memiliki tingkat ekspresi gen ALP paling tinggi karena PHA memiliki struktur dan biokompabilitas yang lebih baik dalam mendukung proses osteogenesis.

Daftar Pustaka : 198 (2019-2023)

Kata Kunci : ADSCs, ALP, DMEM, FBS, Osteogenesis, PHA, Scaffold, Silk

**FACULTY OF MEDICINE
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Undergraduate Thesis, January 2024

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**GEN ANALYSIS OF BIOMARKER ALKALINE PHOSPHATASE (ALP)
ON OSTEOGENESIS DIFFERENTIATION OF ADIPOSE-DERIVED
STEM CELLS WITH SCAFFOLD PHA and SILK**

PAGE DETAIL (xv + 98 pages, 19 tables, 3 charts, 16 figures, 10 appendices)

ABSTRACT

Objective

ADSCs are good candidates for clinical applications to regenerate damaged tissues. ADSCs have never been tested using PHA and silk scaffolds towards osteogenesis differentiation. The general objective of this study was to analyze the expression of ALP genes indicating osteogenic differentiation of ADSCs in PHA and silk scaffold media with a ratio of 3:1 and 0:4.

Methodology

ADSCs were taken from adipose tissue through liposuction procedures at the Hayandra clinic, then ADSCs were cultured and passivated and planted on PHA and Silk nanofiber scaffolds with a ratio of 3:1 and 0:4. Then observed for 21 days, and performed RT-PCR to see the expression of osteogenesis genes such as ALP.

Results

The Fold Change result of ADSCs + Stempro Osteogenesis differentiation kit is 1, ADSCs without scaffold is 0.37, ADSCs + scaffold PHA and Silk 0:4 is 0.38, ADSCs + scaffold PHA and Silk 3:1 is 1.

Conclusion

Based on the study, the decrease in ALP gene expression in PHA and Silk scaffolds with a ratio of 0:4 is not better than the use of silk with low levels, too high silk levels have disadvantages in improving the mechanical properties of osteogenic features. ADSCs with PHA and Silk 1:3 scaffold have the highest level of ALP gene expression because PHA has a better structure and biocompatibility.

Reference : 198 (2019-2023)

Keywords : ADSCs, ALP, DMEM, FBS, Osteogenesis, PHA, Scaffold, Silk