

INTISARI

Teknologi rekayasa jaringan (*tissue engineering*) memerlukan perancah (*scaffold*) dan *growth factor* untuk mempercepat regenerasi tulang. Karbonat apatit merupakan bahan substitusi tulang ideal, memiliki struktur mikroporositas yang memungkinkan *growth factor* dapat berikatan dengan strukturnya. Gelatin merupakan suatu polimer alami yang memiliki potensi untuk mengikat *growth factor* melalui *polyionic copmplexation*. Gelatin dapat dimanipulasi dalam proses pembuatannya dengan menambahkan karbonat apatit, sehingga membentuk komposit membran gelatin-karbonat apatit. Membran gelatin-karbonat apatit diharapkan dapat digunakan sebagai bahan pembawa *vascular endothelial growth factor* (VEGF) untuk mempercepat proses regenerasi tulang. Komposisi gelatin dan karbonat apatit harus dipertimbangkan untuk dapat mengantarkan VEGF dan menimbulkan efek yang optimal. Penelitian ini bertujuan untuk mengetahui pengaruh komposisi membran gelatin-karbonat apatit terhadap persentase muatan VEGF.

Sepuluh membran gelatin-karbonat apatit dibagi menjadi dua kelompok. Setiap kelompok mewakili komposisi gelatin dan karbonat apatit yang berbeda, yaitu 6:4 dan 7:3. Molekul VEGF yang didapatkan dari *Human Platelet Rich Plasma* diaktivasi dan kemudian dikontakkan pada membran gelatin-karbonat apatit selama 1 jam. Jumlah VEGF sebelum dan sesudah dikontakkan dengan membran dihitung menggunakan *Enzyme Linked Immunosorbent-Assay* (ELISA). Data hasil penelitian dianalisis menggunakan uji *Independent Sample T-Test*.

Hasil uji statistik *Independent Sample T-test* menunjukkan terdapat perbedaan yang signifikan antara loading muatan VEGF dalam membran gelatin-karbonat apatit 6:4 dan 7:3. Hal tersebut menunjukkan bahwa terdapat pengaruh komposisi membran gelatin-karbonat apatit terhadap persentase muatan VEGF. Rerata *loading* muatan VEGF dalam membran gelatin-karbonat apatit 7:3 lebih banyak jika dibandingkan dengan rerata loading VEGF dalam membran gelatin-karbonat apatit komposisi 6:4 (dalam %berat).

Kata Kunci: membran, gelatin, karbonat apatit, *Vascular Endothelial Growth Factor*, persentase muatan.

ABSTRACT

In bone tissue engineering, scaffold and growth factor are needed to accelerate bone regeneration. Carbonate apatite is the ideal bone substitute, since it has microporous structure that enables growth factor to bind with the structure. Gelatin is a natural polymer which has potential to bind growth factor through polyionic complexing. Gelatin can be combined with carbonate apatite, so that it forms a composite named gelatin-carbonate apatite membrane. Gelatin-carbonate apatite membrane is expected to be used as a carrier for vascular endothelial growth factor (VEGF) to accelerate bone regeneration. Gelatin and carbonate apatite composition must be considered to provide an optimal effect for the delivery of VEGF. The aim of this study was to investigate the effect of gelatin-carbonate apatite membrane composition to the loading percentage of VEGF.

Ten gelatin-carbonate apatite membranes were separated into two groups. Each group represented different compositions of gelatin and carbonate apatite, which were 7:3 and 6:4. VEGF obtained from the activated Human Platelet Rich Plasma was contacted to gelatin-carbonate apatite membrane for 1 hour. The amount of VEGF before and after being contacted with the membrane was calculated using Enzyme Linked Immunosorbent-Assay (ELISA). The obtained data were analyzed using independent sample t-test.

The result of Independent Sample T-Test showed significant difference in the loading percentage of VEGF between the 7:3 and 6:4 compositions of gelatin-carbonate apatite membrane. It was concluded from this study that different gelatin-carbonate apatite membrane composition results different loading percentage of VEGF. The average value of loading percentage in 7:3 (in %weight) composition was higher than the average value in 6:4 (in %weight) composition.

Key word: gelatin, carbonate apatite, Vascular Endothelial Growth Factor, loading percentage