INTISARI

Pemanfaatan nanofiber sebagai *Guided Tissue Regeneration* (GTR) dapat memicu terjadinya regenerasi jaringan periodontal. *Freeze-dried platelet-rich plasma* dapat digunakan sebagai agen terapetik yang ditambahkan di dalam pembuatan nanofiber karena mengandung berbagai macam *growth factor* salah satunya *Transforming Growth Factor-β* (TGF-β) yang dapat mempercepat proses penyembuhan. Pembuatan nanofiber *Platelet-rich plasma* (PRP), kitosan, dan *polyvinyl alcohol* (PVA) dapat mengendalikan pelepasan TGF-β sehingga dapat meningkatkan efektivitas TGF-β dalam proses penyembuhan. Penelitian ini bertujuan untuk menguji ikatan antara TGF-β dengan nanofiber PRP kitosan PVA serta pengaruhnya terhadap kadar pelepasan TGF-β.

Pada penelitian ini digunakan sampel nanofiber PRP kitosan PVA untuk dilakukan uji FTIR dan ELISA. Uji FTIR digunakan untuk mengidentifikasi ikatan yang terbentuk pada nanofiber, dilanjutkan dengan uji ELISA untuk menilai kadar pelepasan TGF-β dalam lima waktu pengamatan, yaitu 15 menit, 60 menit, 1 hari, 3 hari, dan 10 hari. Data FTIR dianalisis secara kualitatif dengan cara membandingkan spektra nanofiber dengan referensi spektra setiap bahan. Data ELISA dianalisis menggunakan uji korelasi *Spearman*.

Hasil uji FTIR menunjukkan tidak terbentuk gugus fungsi baru yang menandakan tidak terjadi ikatan kimia, melainkan terjadi ikatan fisika antara bahan penyusun nanofiber PRP kitosan PVA. Uji kadar pelepasan TGF-β menunjukkan terdapat korelasi yang signifikan ($p<0,05$) dan sangat kuat ($r=0,962$) antara waktu pengamatan dengan kadar TGF-β. Kesimpulan dari penelitian ini adalah pencampuran bahan nanofiber PRP kitosan PVA tidak menghasilkan ikatan kimia terhadap TGF-*β*, melainkan menghasilkan ikatan fisika dan terdapat korelasi antara waktu pengamatan dengan kadar pelepasan TGF-β.

Kata kunci : Nanofiber, *platelet-rich plasma*, *transforming growth factor*-β, ikatan kimia, kadar TGF-β

ABSTRACT

The use of nanofibers as *Guided Tissue Regeneration* (GTR) can trigger periodontal tissue regeneration. *Freeze-dried platelet-rich plasma* can be used as a therapeutic agent that is added in the manufacture of nanofibers because it has various *growth factors*, one of them is *Transforming Growth Factor-β* (TGF-β) which can accelerate the healing process. The preparation of nanofibers *Platelet-rich plasma* (PRP), chitosan, and *polyvinyl alcohol* (PVA) can control the release of TGF-β so that it can increase the effectiveness of TGF-β in the healing process. This study aims to examine the bond between TGF-β and PRP chitosan PVA nanofiber and its effect on the release rate of TGF-β.

In this study, PRP chitosan PVA nanofiber samples were used for FTIR and ELISA tests. The FTIR test was used to identify the bonds formed on the nanofiber, followed by the ELISA test to assess the levels of TGF-β release in five observation times, namely 15 minutes, 60 minutes, 1 day, 3 days, and 10 days. FTIR data were analyzed qualitatively by comparing the nanofiber spectra with the reference spectra of each material. ELISA data were analyzed using the correlation test *Spearman*.

The FTIR test results showed that no new functional groups were formed which indicated there was no chemical bonding, but rather a physical bond occurred between the constituent materials of the PRP chitosan PVA nanofiber. The TGF-β release test showed a significant ($p < 0.05$) and very strong ($r = 0.962$) correlation between the time of observation and the TGF-β level. The conclusion of this study is the PRP Chitosan PVA Nanofiber material mixture did not produce a chemical bond to TGF-β, however it produce a physical bond. Also there was a correlation between the time of the observation and the release level of the TGF-β which corresponding to the result.

Keywords : Nanofiber, *platelet-rich plasma*, *transforming growth factor*-β, chemical bonds, levels of TGF-β