

INTISARI

Perawatan regeneratif periodontal dapat dilakukan dengan mengaplikasikan membran *guided tissue regeneration* (GTR) dalam bentuk nanofiber. *Freeze-dried platelet-rich plasma* merupakan *platelet-rich plasma* (PRP) yang berbentuk serbuk dan mengandung banyak *growth factor* untuk mempercepat proses penyembuhan jaringan. *Freeze-dried* PRP dapat digunakan sebagai bahan pembuatan nanofiber, namun harus dikombinasikan dengan kitosan dan *polyvinyl-alcohol* untuk mengontrol *growth factors* dan memudahkan proses *electrospinning*. Uji sitotoksitas *in vitro* merupakan tahap awal uji biokompatibilitas suatu material baru. Penelitian ini bertujuan untuk mengetahui efek sitotoksik nanofiber PRP-kitosan-PVA terhadap *human primary fibroblast*.

Penelitian ini menggunakan dua jenis nanofiber, yaitu nanofiber PRP-kitosan-PVA (nanofiber PRP) dan nanofiber kitosan-PVA (nanofiber kontrol). Masing-masing nanofiber dipotong dengan ukuran diameter 5 mm menggunakan *biopsy punch* 5 mm lalu dimasukkan ke dalam sumuran yang telah berisi 5×10^3 sel/ml dan diinkubasi ke dalam inkubator CO_2 pada suhu $37^\circ C$. Setelah 24 jam, tiap sumuran diberi MTT (*Methylthiazol Tetrazolium*) kemudian diinkubasi selama 2 jam. Efek sitotoksitas diukur dengan menghitung persentase viabilitas sel (%). Data dianalisis menggunakan uji *equal variance independent t-test*.

Perhitungan rerata viabilitas sel menunjukkan hasil diatas 90% sehingga kedua jenis nanofiber dikategorikan tidak sitotoksik terhadap *human primary fibroblast*. Hasil analisis statistik menunjukkan tidak terdapat perbedaan yang bermakna ($p > 0.05$) antara kelompok nanofiber PRP dan nanofiber kontrol. Kesimpulan dari penelitian ini adalah nanofiber PRP-kitosan-PVA tidak menimbulkan efek sitotoksik terhadap *human primary fibroblast*.

Kata kunci: nanofiber, *platelet-rich plasma*, sitotoksitas, *human primary fibroblast*

ABSTRACT

Periodontal regenerative treatment can use the application of guided tissue regeneration (GTR) membrane which can be made as nanofiber. Freeze-dried platelet-rich plasma is platelet-rich plasma which presents in powders and contains many growth factor which is used to accelerate healing process in tissue. Freeze-dried PRP can be used as nanofiber material, but it must be combined with chitosan and polyvinyl-alcohol to controls growth factors and facilitates electrospinning process. In vitro cytotoxicity assay is used as preliminary step of material biocompatibility examinations. The aim of this study was to investigate the cytotoxic effect of PRP-chitosan-PVA nanofiber on human primary fibroblast.

Platelet-rich plasma-chitosan-PVA nanofiber (PRP nanofiber) and chitosan PVA nanofiber (control nanofiber) were used in this study. Each of nanofibers was cut in 5 mm diameter by 5 mm biopsy punch then added into 5×10^3 cell/ml in well-plates and incubated in CO_2 incubator at $37^\circ C$. Methilthiazol Tetrazolium (MTT) was added into each well-plate after 24 hours incubation and after that put them in CO_2 incubator at $37^\circ C$ for 2 hours. The cytotoxic effect were measured by calculating the percentage of cell viability (%). Data were analyzed by equal variance independent t-test.

The calculation showed that the entire mean values of cell viability were above 90%. It could be concluded that both of nanofibers were classified as non-cytotoxic on human primary fibroblast. The statistical analysis showed there were no significant difference ($p > 0.05$) between PRP nanofiber and control nanofiber groups. The result of this study can be concluded that PRP-chitosan-PVA nanofiber had no cytotoxic effect on human primary fibroblast.

Key words: nanofiber, platele-rich plasma, cytotoxicity, human primary fibroblast