CHAPTER V
CONCLUSIONS

In the present contribution, electrospinning technique was used to fabricate the as-spun chitosan fiber mats as a tissue scaffolding material. The effect of processing parameters includes, solution concentration, applied electric field, and collecting distance on the morphological appearance and average fiber diameter were evaluated. It is obvious that chitosan was succeeded to electrospun into homogeneous fibrous structure from 7% chitosan dissolved in 70:30 trifluoroacetic acid (TFA)/dichloromethane (DC) co-solvent system. The possibility for use of the electrospun fibrous scaffolds for nerve regeneration was evaluated in vitro with schwann cell line in terms of biocompatibility, cell adhesion and cell proliferation. For such a purpose, as-spun chitosan nanofibers mats, chitosan film, and most widely used biocompatible material, likely PLLA film were used as control in this experiment. The experimental results showed that the as-spun chitosan mats did not release cytotoxic substances towards to Schwann cells and mouse fibroblast. The results from the cell attachment indicated much better of cell adhesion on fibrous scaffold due to had more available surface area, resulting in more surface area for cell attachment. However, the results from the cell proliferation exhibited no difference in the ability to promote the cell proliferation of chitosan nanofibers. This behavior must be related to the fact that the cell proliferation was favored by the smoothness of the surface to allow cell mobility. SEM images indicated the influence of surface morphology of scaffolding materials on the change in the phenotype of schwann cells. On the film scaffold, Schwann cells exhibited a normal phenotype (elongate to spindle-like shape) after they were seeded. In case of as-spun fibrous scaffold in the same period of culture time on flat surface, the change in the phenotype was observed in which the cells became expanded and demonstrated branches on their surface. However after long time in culture (after day 3), Schwann cells transformed to spindle-like shape. This indicated that the phenotype of Schwann cells still maintained after they were seeded on the fibrous scaffold.