CHAPTER V
CONCLUSION

In the present contribution, electrospinning was used to fabricate peripheral nerve scaffolding materials from electrospun mats of PHB and PHBV. The effects of some solution and process parameters (i.e. solution concentration and applied electric field strength) on morphological appearance and average diameter of electrospun PHB and PHBV fibers were investigated using scanning electron microscopy (SEM). Chloroform was used as the solvent for those polymers. At low concentrations (i.e. 10 and 12% w/v), only beads or beaded fibers were predominant. At high enough concentrations (i.e. 14 and 16% w/v), mostly smooth fibers were observed. Generally, increased electrostatic field strength favored the formation of smooth fibers with larger diameters. Electrospun PHB, PHBV fibers were obtained by spinning dopes at concentration of 14wt%, 12kV and the average fiber diameters collected at a collector distance of 20 cm were in the range of 2.0-4.0 μm. A higher SEM magnification revealed indentations on the fiber surface. Interestingly, the as-spun fiber mats appeared to be more hydrophobic than the corresponding films. Mechanically, the elongation at break of the as-spun PHBV fiber was greater than as-spun PHB fiber, while the tensile strength of the as-spun PHBV fiber was lower than as-spun PHB fiber because of the content of hydroxyvalerate in PHBV. The potential to use of electrospun fibrous scaffolds for nerve regeneration was evaluated *in vitro* with Schwann cells, RT4-D6P2T. In qualitative measurement of cell viability (MTT) of this study, the results were comparable with those on corresponding with solution-cast films and PLA (control). The obtained results showed that all of the fibrous scaffolds exhibited lower adhesion and proliferation of cells than the corresponding solution-cast film and PLA. Moreover, selected scanning electron microscopy (SEM) images showed showed that after 2 hr culturing, SCs appeared attach on the fiber, film scaffolds and the glass substrate in round shape. For longer time, the cells exhibited bipolar shape on all substrates which cells on fiber migrate faster than those on solution-cast film. Although the PHB and PHBV fibrous scaffold promote the SCs growth were lower than corresponding cast film and PLA, the fibrous scaffold characteristics such as interconnectivity, pore size/curvature and surface

roughness has influenced cellular responses. They also collectively control the degree of nutrient delivery, penetration depth of cells and metabolic waste removal.[C.T. Buckley, 2004].

This study indicated the potential of PHBV fibrous scaffold pre-seeded with SCs to guide and direct regenerating axon. In summary, fibrous scaffold of PHB and PHBV are promised materials for nerve repair. They could be improved by incorporation with neurotrophic factors and neural cells