CHAPTER I
INTRODUCTION

Nowadays, a number of bone injuries and other bone defected in people are the motivation for scientists with a hope to treat the patients to get less painful from treatments. Many research focus on understanding cell-matrix interaction required for promoting cellular growth. Bone tissue engineering, which applies methods from engineering and life science to create artificial implanted materials to direct tissue regeneration, is attracted in many research *(Shin et al., 2003).* In order to achieve regeneration of damaged bone, there are several materials considered, including biomaterial scaffolds which can be served as a substrate to let cells attach and regenerate. The challenge of biomaterials for tissue engineering has been focus on the design of biomaterials to mimic the surrounding tissue to achieve good interaction between cell-matrix and implanted material.

Biodegradable polyesters such as poly(lactic acid) (PLA), poly(lactide-co-glycotide) (PLGA), and poly(caprolactone) (PCL) play an important role to serve as a biomaterial for tissue engineering. PCL has been widely used to be an implanted material in human body due to its good mechanical properties, biocompatability, and biodegradability. However, because of the hydrophobicity and lack of functionalities, lead PCL to unpreferable cell adhesion and growth. Therefore surface modification has been taken as a way for enhancing their attachment. Many research have been focused on immobilizing biomolucule, such as collagen, gelatin, chitosan, etc. onto the polymeric surfaces to improve their hydrophilicity and cytocompatability.

Because the cytocompatability of implanted substrates can enhance and control cell growth, the purpose of this work is to modify surface of PCL via aminolysis and then immobilize with either crude bone protein or bovine serum albumin onto aminolyzed PCL to evaluate the effects of each biomolecule-immobilzed aminolyzed PCL substrates on bone cell growth by determining the rate of cell response involving cell adhesion, cell proliferation, cell differentiation and mineralization in comparison to those on neat PCL.