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PLGA-BASED NANOPARTICLES FOR INTRANASAL DRUG DELIVERY TO BRAIN FOR ALLEVIATING ALZHEIMER'S DISEASE

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ABSTRACT

Poly (lactic-co-glycolide) (PLGA) is a good polymer and usually is preferable to be loaded with drug agent due to its biodegradability and biocompatibility properties. In this study, Memantine Hydrochloride (MEM) is used, loaded in the novel of PLGA-based nanoparticles for intranasal drug delivery to the brain for alleviating Alzheimer's disease. Nanoparticles are preferred because of its smaller size, thus easier to cross blood brain barrier (BBB). This research deals with PLGA and MEM, in which the main focus is to obtain high drug entrapment efficiency and percentage yield of the PLGA-based nanoparticles loaded with MEM that can be obtained through a number of systemic processes. The purposes of this study are to formulate and characterize the nanoparticles based on Particle Size Analysis, Fourier Transform Infrared (FTIR) Spectroscopy, Zeta Potential Analysis of PLGA Nanoparticles, Differential Scanning Calorimetry (DSC) Study and Scanning Electron Microscopy (SEM) for its morphology. These processes will show the characterizations of nanoparticles and also tell us the best condition of nanoparticles with MEM that can penetrate BBB in the brain via intranasal drug delivery.

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Researchers have shown great interest to develop better targeted delivery in introducing drug agents into the targeted site of organs. Better targeted delivery is essential in the growth of drug discovery, indicating that there will be more advancement in the development of pharmaceutical drug approach. As we all know, drug delivery includes a very systematic process in which the drugs involved are obtained from various type of sources, for examples, nature extracts, obtained from body components (*in vivo*) or synthesized in the laboratory (*in vitro*).

Improved targeted delivery systems can ensure the drugs to be efficiently administered, decrease unwanted adverse effects, promote better patient's compliance and adherence, and reduce cost of health care. In this case, nanotechnology had been approached in order to realize the idea of better targeted delivery system. Active ingredients were made as nanomaterials to allow small molecule or particle size of the therapeutic agents to pass through, thus alleviating the symptoms of disease.