UNIVERSITI TEKNOLOGI MARA

NICOTINAMIDE SUPPLEMENTATION AMELIORATED GLUCOSE HOMEOSTASIS IN STZ+NA INDUCED TYPE II DIABETIC RATS

MUHAMMAD RIDZWAN BIN RAMLI

Dissertation submitted in partial fulfillment of the requirements for the

Bachelor of Pharmacy (Hons.)

Faculty of Pharmacy

JULY 2014

ACKNOWLEDGEMENT

TABLE OF CONTENT

CHAPTER ONE: INTRODUCTION

1.1   Diabetes Mellitus

Diabetes Mellitus(DM) is a metabolic disease that is associated with hyperglycemic condition which is caused by deficiency in insulin production, resistance toward insulin action or even both(Mayfield, 1998). The syndromes manifested include vascular, metabolic and neuropathic components that are usually interrelated. This ineffective insulin action causes a lot of alteration of metabolic processes in the body(Mayfield, 1998). The most prominent alteration is the metabolism of fats, carbohydrates and proteins. This will eventually leads to the dysfunction of organs such as the eyes, kidneys and blood vessels(Narayan, Boyle, Geiss, Saaddine, & Thompson, 2006).

1.2   Pathogenesis Categories

There are two major pathogenesis categories of Diabetes Mellitus (DM), that is Type 1 DM and Type 2 DM. Type 1 DM(T1DM) is caused by complete absence of insulin secretion. This is usually associated with autoimmune response toward the islets cells of the pancreas(Harris, 1998). It can be identified by making use of serologic markers to detect pathologic autoimmune activity toward the ß-islet cells of the pancreas(Harris, 1998). Mostly seen in younger people but it can occur at any age.In Type 2 DM(T2DM), it is caused by combination of factors including deficiency in insulin secretion and/or insulin resistant. Individual with T2DM may have hyperinsulinemia but are not functional due to insulin resistant(Wang, Kaneko, Wang, Tawata, & Sato, 1999). This condition is usually seen in adults over the age of 30 years old. However, epidemiological data has shown that over the past 10 years,

there is an upsurge of T2DM among children, even younger than 4years old. T2DM are also highly associated with eating disorder with high calorie intake but very minimum calorie expenditure(Boyle *et al.*, 2001).

1.3 Prevalence

In Malaysia, 1 in every 5 adults has DM according to National Diabetes Institute data published in 2012. This has shown an increasing pattern compared to the previous data. The prevalence of DM in Malaysia is indeed at an alarming stage because World Health Organization has projected that Malaysia will have 2.48 million people with diabetes by 2030 but approximately 2.66 million adults in Malaysia are currently living with DM.

Globally, there are 347 million people currently living with diabetes. In 2004, epidemiological studies projected that 335 million people will have diabetes by 2030(Malerbi & Franco, 1992). This clear deviation shows that diabetes prevalence and ever-increasing incidence is a serious issue and comprehensive studies to improve the understanding on the pathogenesis of diabetes must be continued. As for this thesis, the therapeutic effect of Nicotinamide(NA) is further studied to prove efficacy in managing DM.