

CHAPTER II

RATIONALE

Streptozotocin (STZ)-Treated Rat Model

The experimental model of diabetes mellitus which was used in this study was induced by a single intraperitoneal injection with the dose of 70 mg/kg.BW.streptozotocin (STZ). The STZ-treated rat model is considered to be an experimental model that closed resemblance to insulin dependent diabetes mellitus (IDDM) in humans. With a single injection of STZ, the rats become hyperglycemia and hypoinsulinemia within 24-48 hours, which was also observed in this investigation. The diabetogenic action of STZ was fragmented the islet β -cell DNA due to a general alkylating effect, thereby stimulation poly(ADP-ribose) synthase and nicotinamide dinucleotide (NAD) depletion. The result was responsible for deterioration in insulin synthesis and secretion (Okamoto et al.,1988). Besides hyperglycemia, the animals that received the STZ-injection have normal levels of blood ketones, plasma free fatty acids and heart glycogen (Rerup, 1990).

The Isolated Perfused Heart Model

The isolated perfused heart preparation was developed by LANGENDORFF. Physiologists and pharmacologists, as well as biochemists and morphologists have applied this model for the study of hemodynamics, metabolism and histological structure of the heart and have modified it in multiple ways to fit their special demand (Doring and Dehnert,1988).

Because of the general acceptance and use of this model, the isolated perfused heart was chosen as a experimental model in this study. Especially, the isolated heart allows direct access of left ventricular contraction without interference of central neural autonomic responses might interpretation of the results becomes very complex, if the

study is done in an intact heart model due to many additional factors which may become importance.

Garlic vs. Tolbutamide

Mathew and Augusti (1973) have reported that the hypoglycemic action of garlic in alloxan rabbits was related to the endogenous insulin effect. Jetapai, A.(1994) reported the significant decrease of serum glucose in garlic-treated STZ-rats. However, the direct effect of garlic on plasma insulin level has not yet been confirmed by using STZ induced animals. Therefor, the purposes of this study section are to evaluate the hypoglycemic action of garlic in relation to the enhancement of insulin level in STZ-rats and to compare its ability with tolbutamide.