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Review Article

INSULIN ORAL DELIVERY MAY BE POSSIBLE

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Abstract:-

In the present review, the challenges for the oral delivery of insulin via different approaches is being studied. In the present study the oral absorption of insulin in body through oral route using different parameters of our body as well as of dosage forms which can increase the oral absorption of insulin is studied. From different insulin preparations which are prevalent it is concluded that insulin can be given in the form of a microsphere with the help of a insoluble resin, and embedded in the enteric coated tablets so that it can show absorption in the small intestine to achieve its absorption.

Keywords: Insulin, oral route, insoluble resin, enteric coated tablets.

Introduction

Insulin, a major protein hormone consisting of 51 amino acids, is secreted by the β-cells of the pancreas and plays a crucial role in controlling diabetes.[1] The incidence of diabetes is growing rapidly both in the united states and worldwide. For example it is estimated that more than 180 million people worldwide are afflicted with diabetes, and the prevalence is expected to be more than double by the year 2030. In the UNITED STATES, approximately 21 million people are estimated to suffer from diabetes, and it is a major cause of morbidity and mortality.[2]

Diabetes is a chronic condition caused by a relative or an absolute lack of insulin. It's hallmark clinical characteristic are symptomatic glucose intolerance resulting in hyperglycemia and alteration in lipid and protein metabolism. Over the long term these metabolic abnormality contributes to the development of complication such as retinopathy, nephropathy and neuropathy.[3]

Genetically, etiologically and clinically diabetes is a heterogeneous group of disorders. Nevertheless most cases of diabetes mellitus can be assigned to type-1 & type-2 diabetes. The term gestational diabetes mellitus is used to describe glucose intolerance that cannot be ascribed specific genetic defect in β-cell function or insulin action; disease of exocrine pancreas; endocrinopathies; drug or chemical-induced; infections; and other genetic syndromes.

Approximately 5-10% of the diagnosed diabetic population has type-1 diabetes, which usually results from autoimmune destruction of the pancreatic β-cells. At clinical presentation these patients have little or no pancreatic reserve, have a tendency to develop ketoacidosis, and require exogenous in saline to sustain life. The incidence of sauto immune-mediated type-1 diabetes peaks during childhood and adolescence, but can occur at any age.[4]Administration of therapeutic peptide drugs such as insulin via the oral route, especially the gastrointestinal tract, represents one of the greatest challenges in modern pharmaceutical technology .[5] Successful delivery is difficult to achieve because these substances are too large and hydrophilic to readily across the intestinal mucosa. In addition, extensive enzymatic degradation by proteases is unavoidable before they reach their site of absorption .[6] One study estimated that the prevalence of diabetes in person over 65 years of age increased 62% from 2003 to 2004.[7]

Type-3 designation refers to multiple other specific cause of an elevated blood glucose; pancreatectomy, pancreatitis, non-pancreatic disease, drug therapy etc.

Type-4 is gestational diabetes (GDM) defined as any abnormality in glucose level noted for the first time during pregnancy. Gestational diabetes is diagnosed in approximately 4% of all pregnancies in the united states. During pregnancy the placenta and placental hormones creates an insulin resist0ance that is most pronounced in last trimester.[8]

Hyperglycemia (fasting plasma glucose >7.0 mmol/l, or plasma glucose >11.1 mmol/l 2 hours after meal) occur because of uncontrolled hepatic glucose output and reduced uptake of glucose by skeletal muscles with reduced glycogen synthesis. When the renal threshold for glucose reabsorption is exceeded, glucose spills over into the urine (glycosuria) and causes an osmotic diuresis (polyuria), which, in turn, results in dehydration, thirst and increased drinking (polydipsia).[9]

Insulin

Insulin was 1st discovered by Banting and Best in the year 1921 [10]. Insulin is a polypeptide hormone that travel around the blood stream; insulin has molecular weight of (pork): 5777.66 [11], (beef): 5733.61 [11], Human (semi synthetic, biosynthetic): 5807.69 [11], consisting of two

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