



DIFFERENT TYPES OF DRUG THERAPIES IN DIABETES AND THE APPLICATION OF NANOTECHNOLOGY IN DIABETES

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ABSTRACT

This article describes about the most common disorder that is Diabetes in humans; now days which has been successfully inhibited by the various medications and looking further for the complete treatment by latest advancements and techniques innovatively brought into the usage. There are various methods of medication in the treatment of diabetes, the field that is chosen by the opinion of the patient whether it is Allopathic, ayurvedic or any other type of medication. The present article discusses about the treatment of diabetes by allopathic medication, ayurvedic medication and the application of nanotechnology in diabetes.

KEYWORDS: Diabetes, allopathic, Nanotechnology, ayurvedic treatment.

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INTRODUCTION

Diabetes mellitus is defined as a metabolic disease characterized by hyper glycemia that further resulting in the secretion of insulin in the body or affects the insulin action or sometimes both. In chronic hyperglycemia of diabetes it is further accomplice which leads high blood sugar levels and causes the failure and dysfunction of organs in the body, mainly the eyes, kidneys, nerves, heart and blood vessels. Diabetes is recognized as an disease entity in ancient Indian ayurveda. This disorder was named as Madhumeha(rain of honey) because of the sweet taste of urine attracting the ants and insects. Among various mehas characterized by polyuria they classified as udak(water), meha (diabetes insipidus) and isku (sugarcane); meha referring to the renal glyssouria. The madhumeha further considered to have the genetic basis, evidences from the family history and hence it was stated to be incurable.

Diabetes is characterized into two types:

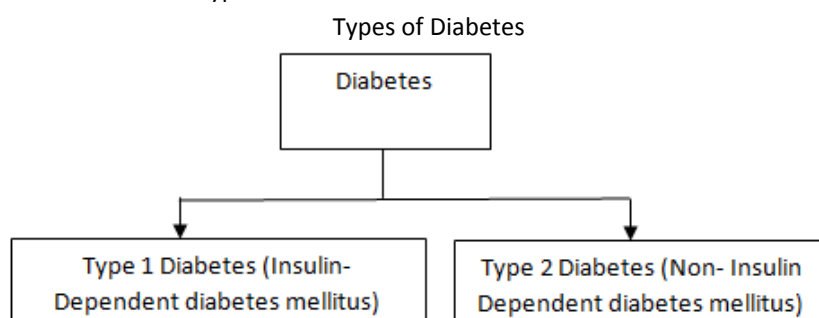


Fig.1. Types of Diabetes

The diabetes mellitus is classified as Type1 and Type 2 diabetes,

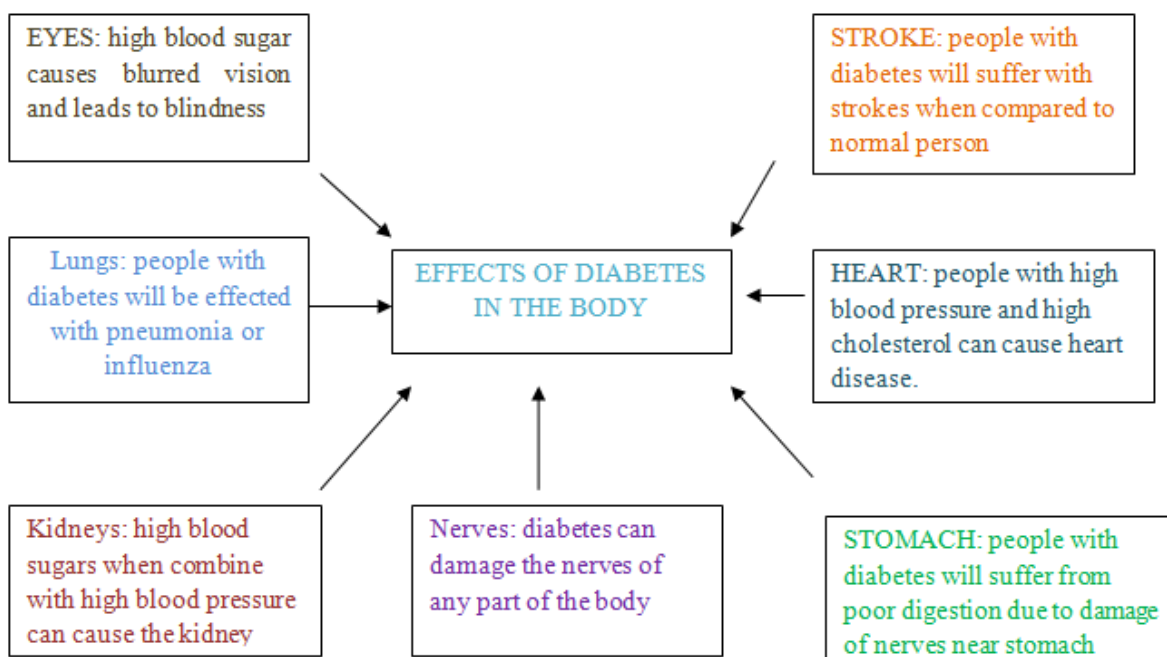
The Type 1 Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin to control the blood sugar levels in that body. The main cause for the type 1 diabetes is when our own body's immune system is attacked and destroys the beta cells in pancreas which are responsible for creating the secretion of insulin in the body.

The Type 2 diabetes is known as Non- insulin dependent diabetes that is a disorder that is characterized by high blood glucose in the context of insulin resistance and relative insulin deficiency. The main cause of type2 diabetes occurs when the pancreas doesn't make enough insulin or the cells of the body become resistant to insulin.

Hypoglycemia: hypoglycaemia is also known as low blood glucose or low blood glucose drops below normal levels. The main symptoms of hypoglycaemia are shaking, fast heartbeat, sweating, dizziness, anxious, hunger, impaired vision, weakness fatigue, head ache, irritable.

Hyper glycemia: Hyper glycemia is called as high blood sugar is a condition in which an excessive amount of glucose circulates in the blood plasma. The symptoms of hyperglycemia are extreme thirst, urination often, dry skin, hungry, blurry vision, drowsy, slow healing wounds.

EFFECTS OF DIABETES IN THE BODY:



TREATMENT OF DIABETES:

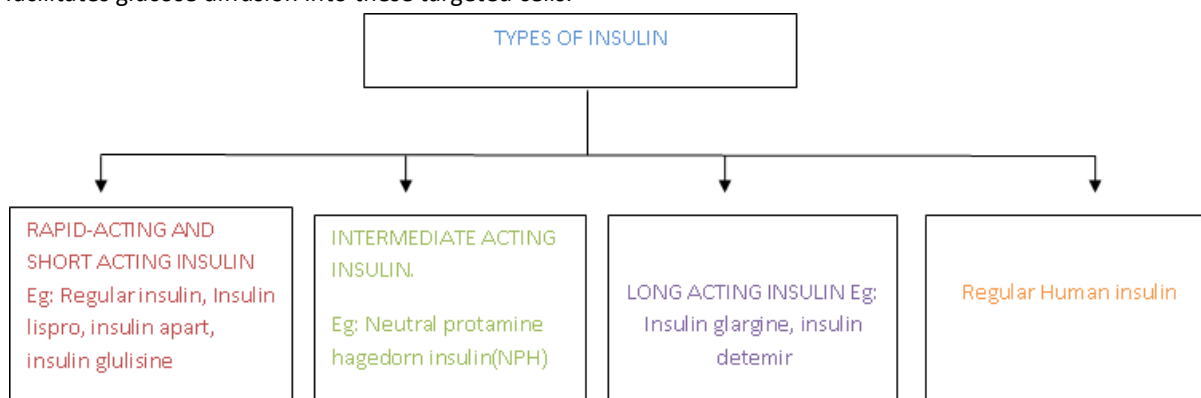
Oral hypoglycaemic agents:

- I. SULFONYLUREAS (1st Generation)
 - Eg. Tolbutamide
 - Chlorpropamide
 - Tolbutamide
- (2nd Generation):
 - Eg: Glipizide
 - Glyburide
 - Gliclazide
 - Glibenclamide
 - Glibornuride

- (3rdGeneration):
Eg: Glimepride
- II. THIAZOLIDINEDIONES:
Eg: Rosiglitazone
Troglitazone
Pioglitazone
Ciglatazone
- III. BIGUANIDES:
Eg; Phenformin
Metformin
- IV. A- GLUCOSIDASE INHIBITORS:
Eg: Acarbose
Miglitol
- V. MEGLITINIDES;
Eg: Repaglinide

INSULIN: Insulin is a polypeptide hormone with two peptide chains that are connected by disulfide bonds. The human insulin is produced by recombinant DNA technology using special strains of *Escherichia coli* or yeast that have been genetically altered to contain the gene for human insulin.

Insulin is a hormone secreted by the pancreatic beta cells that facilitates the uptake of glucose into skeletal muscle and adipose tissue by increasing the number of glucose transporters that facilitates glucose diffusion into these targeted cells.



AYURVEDIC MEDICINES USED IN DIABETES:

PLANT NAME	AYURVEDIC NAME/COMMON NAME	USES
<i>Annona squamosa</i>	Sugar apple	Hypo- glycemic and anti hyperglycaemic activities
<i>Artemisia pallens</i>	Davana	Hypo-glycemic
<i>Areca catechu</i>	Supari	Hypo-glycemic
<i>Bombax ceiba</i>	Semul	Hypo-glycemic
<i>Butea monosperma</i>		Anti -hyperglycaemic activities
<i>Capparis deciduas</i>	Pinju	Hypo -glycemic and hypo-lipidemic
<i>Emblica officinalis</i>	Amla	Antioxidant, Hypo-lipidemic
<i>Eugenia uniflora</i>	Pitanga	Hypo-glycemic and anti hyperglycemic activities

<i>Gymnema sylvestre</i>	Gudmar	Anti hyperglycemic activities
<i>Vinca rosea</i>	Sadabahar	Anti hyperglycemic activities
<i>Withania somnifera</i>	Ashvagandha	Diuretic, Hypo glyceemic, hypochlolestrolemic
<i>diabecon</i>		Hypo- glyceemic, hypochlolestrolemic
<i>Diasulin</i>		anti hyperglycaemic activities
<i>Epinsulin</i>	Vijaysar	anti hyperglycaemic activities
<i>Allium cepa</i>	Onion	Antioxidant and Hypolipidemic activities
<i>Caesalpinia bonducella</i>		Anti-hyperglycemic and Hypolipidemic activities

EXAMPLES OF HERBAL HOME REMEDIES USED IN THE TREATMENT OF DIABETES:

1. Take equal quantities of 100gms of dried fenugreek seeds powder and 100gms of dried karela powder and 100gms of cinnamon powder; mix them until they become uniform mixture. 5gms of this mixture should be administered daily once which balances the high sugar levels in the blood.
2. Take a handful of dried *Syzygium cumini* or jamun fruit and soak them in 250ml of water overnight and boil it till the mixture remains 15 ml (water gets evaporates) and filter this solution so that the slit will get remain and pure solution should be administered directly. It acts as ant hyperglycaemic agent.
3. Another best plant is stevia belongs to Asteraceae family and its scientific name is *Stevia rebaudiana*. The dried powder of this plant can be used as food supplement for diabetes patients instead of sugar. The 50gms of this powder is equal to 1000gms of cane sugar in sweetness.
4. Eating 10 fresh fully grown curry leaves of curry patta every morning for 3 months is beneficial to prevent diabetes.

NANOTECHNOLOGY

It is a branch of technology that deals with dimensions and tolerances of less than 100 Nano meters, especially the manipulation of individual atoms and molecules is called as nanotechnology. The term nanotechnology had been coined by Norio Taniguchi in 1974.

APPLICATIONS OF NANOTECHNOLOGY IN DIABETES:

The Nano pump

The Nano pump is a powerful device and has many possible applications in the medical field. The first application of the pump, introduced by Debiotech, is Insulin delivery. The pump injects Insulin to the patient's body in a constant rate, balancing the amount of sugars in his or her blood. The pump can also administer small drug doses over a long period of time.

Development of Oral Insulin: Production of pharmaceutically active proteins, such as insulin, in large quantities has become feasible. The oral route is considered to be the most convenient and comfortable means for administration of insulin for less invasive and painless diabetes management, leading to a higher patient compliance. Nevertheless, the intestinal epithelium is a major barrier to the absorption of hydrophilic drugs, as they cannot diffuse across epithelial cells through lipid-bi layer cell membranes to the bloodstream. Therefore, attention has been given to improving the Para cellular transport of hydrophilic drugs. A variety of intestinal permeation enhancers including chitosan(CS) have been used for the assistance of the absorption of hydrophilic macromolecules. Therefore, a carrier system is needed to protect protein drugs from the harsh environment in the stomach and small intestine, if given orally. Additionally, CS Nano particles (NPs) enhanced the intestinal absorption of protein molecules to a greater extent than aqueous solutions of CS in vivo.

The insulin loaded NPs coated with mucoadhesive CS may prolong their residence in the small intestine, infiltrate into the mucus layer and subsequently mediate transiently opening the tight junctions between epithelial cells while becoming unstable and broken apart due to their pH sensitivity and/or degradability. The

insulin released from the broken apart NPs could then permeate through the paracellular pathway to the bloodstream, its ultimate destination.

NANO ROBOTS FOR DIABETES- glucose monitoring: the diabetes patients must take small blood samples many times a day to control glucose levels, such procedures are un comfortable and extremely inconvenient, so we can use Nano robots with Nanobiochemosensors(hsGLT3) can be used for pervasive diabetes monitoring.

CONCLUSION

The diabetes should be cured completely by taking a correct medication, the steps in the field of pharmacy should enhance in developing suitable techniques for drug administration. The Nano medicine is a very good option for the administration of the drug because the delivery of the drug will be rapid and accurate as the Nano particle will start the action at the targeted cell. Here we have to bring new innovation in nanotechnology so that it can completely cures the disease.

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