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PBL-III

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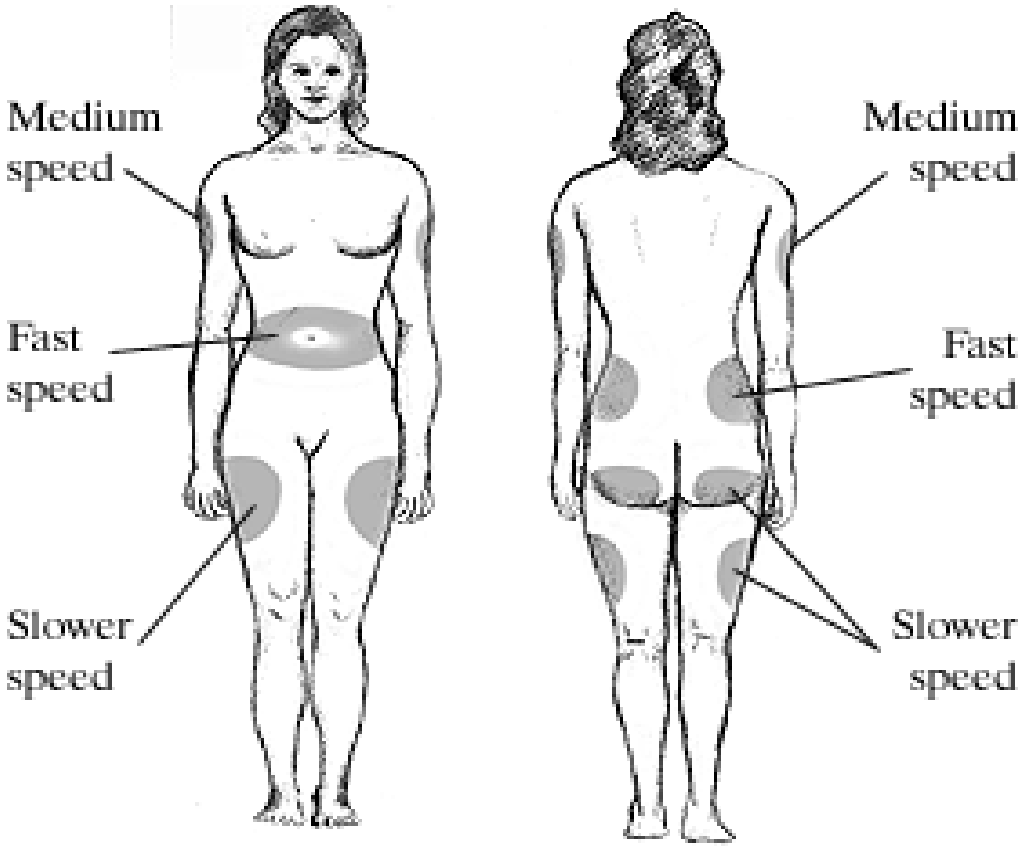
Insulin

Different types of Insulin

- Six different types of insulin:

1. Rapid acting
2. Regular
3. NPH (N)-slower and longer acting
4. Lente (L)- slower and longer acting
5. Ultralente- slowest and longest acting
6. Long acting basal-slowest and longest acting

Insulin Injection Sites



Insulin Pill

- The discovery of a new polymer that may allow development of an effective insulin pill was reported at a recent meeting of the American Chemical Society.
- When the polymer is used as a pill coating, it allows insulin to get into the bloodstream without being destroyed by the digestive system. So far it has only been tested in animals.
- Some experts question whether insulin in pill form will prove useful, since dosing is so critical and often variable.

Insulin inhalers

- Although daily injections of insulin would still be needed, inhaled insulin is currently in clinical trials and may be headed for a fast track approval by the Food and Drug Administration (FDA).
- These inhalers are about the size of a flashlight and uses rapid-acting insulin.
- The sprayed insulin is inhaled into the mouth and coats the mouth, throat and tongue. The insulin passes quickly into the bloodstream.

New formulations

- In the past year, three new formulations of insulin have become available which have been designed to offer the advantages of simpler regimens and better glucose control for people whose diabetes must be treated with insulin.
- All are human insulin analogs derived from recombinant DNA technology.

- Glargine (from Aventis Co.) is a basal insulin, offering a more continuous activity with much less of a peak than NPH insulin. It can be used with a very-rapid-acting insulin such as lispro or aspart, and should provide a flatter basal amount of insulin.

- Aspart (from Novo Nordisk) is a very-rapid-acting insulin that can be injected 15 minutes prior to eating. Its fast action also allows more freedom in the timing of meals and the amount of food eaten.
- Novelmix is a 75/25 lispro mixture is the first of the analog mixtures available (from Eli Lilly); it contains Lilly's very-rapid-acting lispro and a novel human insulin analog called NPL. It is designed for those who need better control after meals and want to use an insulin pen.

Advances in Management

- DPP-4 inhibitors include the oral drugs Januvia, Onglyza, and Tradjenta. These protect a natural compound in the body -- GLP-1 -- from breaking down. GLP-1 helps lower blood glucose.
- Incretin mimetics or GLP analogs include the injected drugs Byetta and Victoza. They use the body's own signaling system to boost insulin after meals.
- Other drugs includeSymilin, an injectable synthetic hormone. It helps lower blood sugar after meals in people with diabetes who use insulin.

- Combination drugs have made a huge difference.
- They join different medications in one pill -- often metformin and a sulfonylurea, a meglitinide, a DPP4 inhibitor, a thiazolidinedione, or a thiazolidinedione in combination with a sulfonylurea.
- This cuts down the number of pills a person has to take.
- Combination drugs include Actoplus MET, Avandamet, Duetact, Glucovance, Metaglip, and PrandiMet.
- There can be drawbacks. They tend to cost more than generic drugs. They can also make it harder to fine-tune the treatment.

- New types of insulin allow some people to take just one injection of a long-acting insulin each day. That can be much easier than multiple injections of standard insulin, says Cypess.
- Future medications. Other classes of medication are in development. One type doesn't affect insulin, unlike most diabetes drugs. It blocks the body from reabsorbing glucose from urine, says Kalyani. While the FDA has not approved any drug from this class, it could in the future.

Vaccine against Diabetes

- Researchers have produced a drug (essentially a peptide) that targets auto-immune diabetes.
- It interferes with the function of immune cells that attack the β-cells of the pancreas without affect the rest of the immune system.
- It thereby offers the possibility of preventing type 1 diabetes in people at high risk and of halting its progress in people newly diagnosed with it.

- Results published in a recent issue of *The Lancet* showed that three injections of the compound given within six months of diagnosis of type 1 diabetes successfully arrested the progression of the disease in newly diagnosed patients.
- After treatment, these patients produced insulin and required fewer insulin injections. They did not experience any harmful or major side effects.
- Studies are still underway to determine their efficacy and safety.

Islet cell transplant

- A new islet cell transplant technique has shown promise in people with Type 1 Diabetes.
- Called the 'Edmonton' technique, the transplants have resulted in seven patients becoming insulin free for up to 14 months after treatment.
- Clinical trials are now underway at 10 national diabetes centers to see if the insulin reversal can be successful with more patients.

- The Edmonton technique uses islet cells (cells from the pancreas) from two or more donor pancreases.
- Patients are required to take immuno-suppressive drugs for the rest of their life.

Differences between DM-I/II

	Type 1 Diabetes	Type 2 Diabetes
Onset:	Rapid (weeks)	Slow (years)
Symptoms:	Increased thirst & urination, constant hunger, weight loss, blurred vision and extreme tiredness	Feeling tired or ill, frequent urination (especially at night), unusual thirst, weight loss, blurred vision, frequent infections and slow wound healing
Dependency:	Insulin Dependent	Insulin Independent
Cure:	None	Physical exercise, healthy loss of weight & diet control
Treatment:	Insulin Injections,dietary plan,regular check up of blood sugar levels,daily exercise	Diet, exercise, weight loss, and in many cases medication. Insulin Injections may also be used
Glucose Channels:	Open and absorb glucose into cell to be utilized by processes after the induction of insulin	Are unable to open and absorb glucose, therefore glucose cannot be utilized by processes; as a result the glucose stays in the blood stream
Insulin Receptors:	Able to be sensitized and cause the opening of the glucose channels; however an injection of insulin into the body is needed for this to occur	They are unable to be sensitized as they have become resistant to insulin; therfore glucose channels are unable to open
Affected age group:	Between 5 - 25 (maximum numbers in this age group; Type 1 can affect at any age)	Until recently, the only type of diabetes that was common in children was Type 1 diabetes, most children who have Type 2 diabetes have a family history of diabetes, are

Estimated percentage of occurance:	5% -10% of the 171 million of people affected by diabetes in 2000	90% - 95%-of total cases. Although the projected number of Americans that will have type II diabetes in the year 2030 will double from 171 million to 366 million cases
You have this when:	Your body makes too little or no insulin	Your body either cannot produce insulin or does not use it properly
Common physical attributes found:	Mostly Normal or Thin	Mostly Overweight or Obese
Prone ethnic groups:	All	All but is more common in African American, Latino/Hispanic, Native American, Asian or Pacific Islander
Complication:	DKA (Diabetic ketoacidosis)	HONK (hyperosmolar non-ketotic state), also known as HHS (Hyperosmolar hyperglycemic state)
Mostly found in:	Children/teens - reason for other name "Juvenile Onset" before the age of 30	Adults - reason for other name "Adult Onset"
Affecting Factors:	Genetic, environmental and auto-immune factors	Genetic, unhealthy diet, physical inactivity & environmental

Thank You