

GLOSSARY

Animal model

A laboratory animal useful for medical research because it has specific characteristics that resemble a human disease or disorder. Scientists can create animal models, usually laboratory mice, by transferring new genes into them.

Apoptosis

Programmed cell death, the body's normal method of disposing of damaged, unwanted or unneeded cells.

Assay systems

Any combination of targets and compounds which is proposed to a detection device to measure chemical or biological activity.

Autoimmune Disease

disorder of the body's immune system in which the immune system mistakenly attacks and destroys body tissue that it believes to be foreign.

Beta-Cells

Cells of the pancreas within discrete endocrine islands (Islets of Langerhans) producing insulin.

Biologicals

Proteins

Blood Glucose Level

the amount of glucose in a given amount of blood. It is noted in milligrams in a deciliter, or mg/dL.

BMI - Body Mass Index

Body Mass Index or BMI is a tool for indicating weight status in adults. It is a measure of weight for height. For adults over 20 years old, BMI falls into one of these categories:

Below 18.5 Underweight

18.5 - 24.9 Normal

25.0 - 29.9 Overweight

30.0 and Above Obese

BMI correlates with body fat. The relation between fatness and BMI differs with age and gender. For example, women are more likely to have a higher percent of body fat than men for the same BMI. On average, older people may have more body fat than younger adults with the same BMI.

Chromosome

Single DNA molecule; the DNA bearing structure that carries the inheritable characteristics of an organism.

Complications

harmful effects of diabetes such as damage to the eyes, heart, blood vessels, nervous system, teeth and gums, feet and skin, or kidneys. Studies show that keep blood glucose, blood pressure, and low-density lipoprotein cholesterol levels close to normal can help prevent or delay these problems.

Congenital

Any trait or condition that exists from birth.

Diabetes mellitus DM

Although all forms of DM are characterized by **hyperglycemia**, the pathogenic mechanisms by which hyperglycemia arises differ widely. Some forms of DM are characterized by an absolute **insulin** deficiency or a genetic defect leading to defective insulin secretion, whereas other forms share

insulin resistance as their underlying etiology. The broad categories of DM are designed **type 1** and **type 2 diabetes**.

DNA

Deoxyribonucleic acid; carrier of genetic information and blueprint of proteins.

Functional genomics

Assignment of a role or function to genes. Gene Unit of inheritance; a working subunit of DNA containing the code for a specific product, typically a protein such as an enzyme.

Gene Expression

Process by which a gene's coded information is translated into the structures present and operating in the cell.

Genome

All the genetic material in the chromosomes of a particular organism.

Genomics

Identification and functional characterisation of genes.

Glucagon

A hormone secreted by the cells of the Islets of Langerhans in response to a fall in **blood glucose levels**. Raises blood glucose levels.

Hyperglycemia

Too high glucose (sugar) level in the blood can be a sign that diabetes is out of control.

Immortalization

The ability of a genetically engineered cell line to reproduce indefinitely. The cells escape from the normal limitation on growth of a finite number of division cycles.

Insulin

A hormone found in both vertebrates and invertebrates. Secreted by the beta-cells of the pancreas in response to high blood glucose levels, it induces a lowering of glucose levels.

Insulin-Dependent Diabetes Mellitus (IDDM)

former term for **type 1 diabetes**.

In-vitro

In a test tube.

In-vivo

In a living cell or organism as opposed to *in-vitro*.

Islets

groups of cells located in the pancreas that make hormones that help the body break down and use food. For example, alpha cells make glucagon and beta cells make **insulin**. Also called islets of Langerhans.

LADA

Latent Autoimmune Diabetes in Adult (LADA) is an **autoimmune disease** that occurs when the insulin-producing beta cells of the pancreas are mistakenly attacked and destroyed by the immune system. LADA patients' survival depends on multiple daily insulin injections. LADA belongs to the **type 1 diabetes** group.

**Metabolic Syndrome**

the tendency of several conditions to occur together, including obesity, insulin resistance, diabetes or pre-diabetes, hypertension, and high lipids.

Mutant

A permanent transmissible change in the genetic material, usually in a single gene. Also, an individual exhibiting such a change.

Nucleus

the organelle that houses the genes.

Obesity

An increase in body weight beyond the limitation of skeletal and physical requirement, as the result of an excessive accumulation of fat in the body. More severe than overweight; having a **body mass index** of 30 or more.

Overweight

an above-normal body weight; having a **body mass index** of 25 to 29.9.

Patent

A patent for an invention is the grant of a property right to the inventor, usually granted for 20 years. The right conferred by the patent grant is to exclude others from making, using, offering for sale, or selling the invention.

Pancreas

A tongue-shaped glandular organ lying below and behind the stomach. It secretes the hormones **insulin** and **glucagon** (both regulate blood sugar), in addition to pancreatic enzymes involved in the digestion of fats and proteins in the small intestine.

Pathogen

An organism that causes disease, especially a microorganism.

PAX

PAX is the name for proteins that are member of a family of transcription factors, which have among other functions restricted expression and essential functions in the developing **pancreas**. For example, mice without PAX4 do not develop pancreatic beta and delta cells and thus die after birth due to diabetes.

Phenotype

The observable traits or characteristics of an organism, for example hair color, weight, or the presence or absence of a disease. Phenotypic traits are not necessarily genetic.

Protein

Large complex, molecule composed of amino acids. Proteins are essential to the structure, function and regulation of the body.

Receptor

A molecular structure in a cell or on its surface that selectively binds a specific substance (ligand). Upon binding its ligand the receptor triggers a specific response in the cell.

Recessive gene

A genetic disorder that appears only in patients who have received two copies of a mutant gene, one from each parent.

Recombinant DNA technology

Procedures used to join together DNA segments *in-vitro*.



Small molecules

Synthetic molecules

Target

Specific biological molecule, such as an enzyme or receptor, assumed to be relevant to a certain disease. Most drugs work by binding to a target, thereby affecting its biological function.

Target Identification

Identifying a molecule (often a protein) that is instrumental to a disease process (though not necessarily directly involved), with the intention of finding a way to regulate that molecule's activity for therapeutic purposes.

Target Validation

Crucial step in the drug discovery process. Following the identification of a potential disease target, validation verifies that a drug that specifically acts on the target can have a significant therapeutic benefit in the treatment of a given disease.

Tissue

A group of similar cells united to perform a specific function.

Toxicology

Scientific discipline concerned with understanding the mechanisms by which chemicals or biological substances produce noxious effects on living tissues or organisms.

Type 1 Diabetes

Type 1A diabetes results from autoimmune **beta cell** destruction, which usually leads to **insulin** deficiency. Type 1B diabetes is also characterized by insulin deficiency as well as a tendency to develop ketosis. However, individuals with type 1B diabetes lack immunologic markers indicative of an autoimmune destructive process of the beta cells. The mechanisms leading to beta cell destruction are unknown. It is estimated that 5-10% of Americans who are diagnosed with diabetes have type 1 diabetes.

Type 2 Diabetes

Type 2 diabetes is a heterogeneous group of disorders usually characterized by variable degrees of **insulin** resistance, impaired insulin secretion, and increased **glucose** production. Distinct genetic and metabolic defects in insulin action and/or secretion give rise to the common **phenotype** of **hyperglycemia** in type 2 diabetes.

Approximately 90-95% (17 million) of Americans who are diagnosed with diabetes have type 2 diabetes.