

**INSULIN : SCIENCE & TECHNOLOGY**

**NEWS:** On the heels of World Diabetes Day, the story of insulin discovery and the Flame of Hope

**WHAT'S IN THE NEWS?**

The discovery of insulin by Frederick Banting and his team in 1921 revolutionized diabetes treatment, making it manageable through hormone regulation. Modern advances, including recombinant DNA technology, have enabled mass production, ensuring insulin's affordability and accessibility worldwide.

**Insulin Discovery and Advances in Diabetes Treatment****Discovery of Insulin:**

- **Milestone:** Insulin was discovered in 1921 by **Frederick Banting, John Macleod, and Charles Best** at the University of Toronto, marking a transformative advancement in diabetes treatment.
- **First Injection:** Leonard Thompson, a 14-year-old with diabetes, received the first insulin injection in 1922, which successfully lowered his blood sugar.
- **Nobel Prize:** Banting and Macleod were awarded the Nobel Prize in Physiology or Medicine in 1923. Banting shared his prize money with Charles Best, recognizing his essential role in the discovery.

**Endocrine Glands and Insulin's Role:**

- **Endocrine System:** Endocrine glands release hormones in small quantities to regulate bodily functions. The pancreas, which has both endocrine (hormone release) and exocrine (digestive enzyme release) functions, plays a central role in blood sugar regulation.
- **Insulin's Function:** Insulin, produced by the pancreas, helps control blood glucose by allowing cells to absorb sugar from the bloodstream, thus providing energy and preventing hyperglycemia.
- **World Diabetes Day:** Celebrated on **November 14** each year to honor Frederick Banting's contributions to diabetes research and treatment.

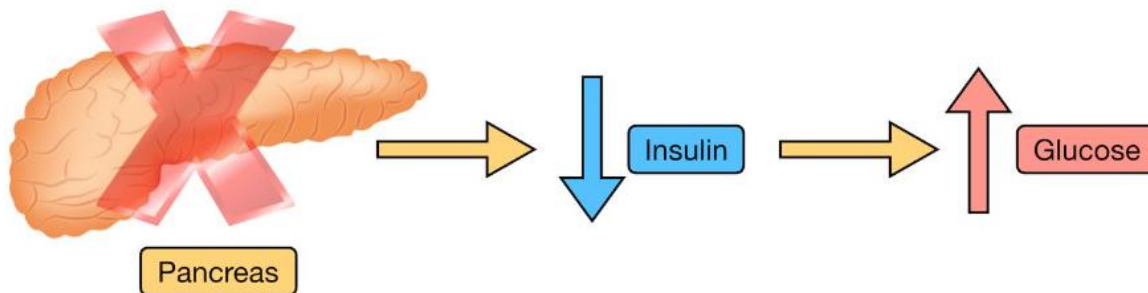
**Type 1 Diabetes Mellitus (T1DM):**

- **Nature of T1DM:** Type 1 diabetes is an autoimmune condition where the body attacks insulin-producing cells in the pancreas, leading to insulin deficiency.
- **Global Impact:** T1DM affects approximately 9 million people globally and primarily impacts children and young adults.

- **T1DM in India:** The incidence rate of T1DM in India is around 4.9 per 100,000 annually, with both genetic and environmental factors suspected to contribute to the disease.



**Type 1 Diabetes** - An autoimmune disease in which the insulin-producing cells of the pancreas are destroyed, leading to high blood glucose levels



#### **Mass Production of Insulin and Modern Technology:**

- **Patent and Accessibility:** Banting sold the patent rights to insulin to the University of Toronto for a symbolic fee of \$1 to ensure the treatment was accessible to all.
- **Recombinant DNA Technology:** In the 1980s, recombinant DNA technology enabled the mass production of human insulin through genetically modified bacteria, making insulin widely available, affordable, and consistent in quality.

#### **Legacy and Continued Research:**

- **Advances in Treatment:** Modern insulin therapies include rapid-acting, long-acting, and mixed insulins, giving patients flexible and effective options for managing diabetes.

**Ongoing Research:** Research into Type 1 diabetes continues, with scientists exploring artificial pancreas systems, stem cell therapies, and potential cures