Diabetes Mellitus, type 1

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The disease

- 23.6 million people in the U.S. affected (7.8% of population)
- Previously known as “Juvenile Diabetes”
- Defect in insulin secretion or action
- Can lead to blindness, kidney failure, heart disease, and nerve damage

- Increased thirst
- Increased urination
- Weight loss
- Fatigue
- Nausea
- Blurred vision
- Slow-healing infections
- Numbness, tingling, and pain in the feet
Symptoms

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Diagnosis

Fasting blood glucose:

- Overnight fasting and through urine analysis
  - Normal fasting plasma glucose levels are less than 100 milligrams per deciliter (mg/dl).
  - Fasting plasma glucose levels of more than 126 mg/dl on two or more tests on different days indicate diabetes.
  - A random blood glucose test can also be used to diagnose diabetes. A blood glucose level of 200 mg/dl or higher indicates diabetes.
Classical treatment

- Monitor blood glucose
- Healthy diet
- Insulin therapy
- Kidney and pancreas transplants
Genetics

- Complex trait
- Inherited risk and environmental effect
- About 18 regions of the genome linked with type 1 diabetes (IDDM1 to IDDM18)
- Most well studied is IDDM1, which contains the HLA genes that encode immune response proteins.
New diagnoses and therapies

- Beta cells transplant

- Improved control of glucose and blood pressure and the use of specific antihypertensive drugs called ACE inhibitors and ARBs prevent or delay the progression of kidney disease to kidney failure.

- Genetically engineered human insulin in a variety of formulations, e.g., rapid-acting, intermediate acting, and long-acting insulin, etc.

- Future of diabetes: Predict, preempt, and personalize

- Recent studies:
  
  - [Immune System Genes Show Links to Type 1 Diabetes](#)
  
  - [Long-Term Type 1 Diabetes 'Survivors' Give Clues to the Disease](#)
Resources

- MedlinePlus
- NCBI Genetics Home Reference
- NCBI OMIM Database
- American Diabetes Association
- The Genetic Landscape of Diabetes
- National Institute of Health