

# PRODUCTION OF INSULIN



Leonard Thompson, 14 year old with diabetes, was the first person to receive an insulin injection.

Prior to Thompson, the injection had never been tested on human's.

Leonard's recovery led to news about insulin spreading like wildfire and gaining recognition



At first, the insulin failed to improve Leonard's condition.

However, after a purer form was administered, his blood glucose levels returned to normal



## INSULIN PATENT SOLD FOR \$1

With commitment to advance medical research, Banting sells insulin patent to University of Toronto for \$1 in 1923

## The Nobel Prize in Medicine



Banting & Macleod receive a Nobel Prize for their discovery



"Insulin belongs to the world, not to me" - Banting

With the Patent sold, production, research and distribution becomes widespread

## PRODUCTION OF INSULIN



### FIRST PRODUCTION

1923

Medical firm, Eli Lilly, begins mass producing insulin, supplying diabetics across North America



### SLOWER-ACTING INSULIN

1936

To reduce the number of injections required daily, researchers at Novo-Nordisk worked to prolong insulin's duration of action

### FIRST PROTEIN SEQUENCED

1955

Insulin is sequenced by British biochemist Frederick Sanger, and is the first protein to be fully sequenced.



### SYNTHETIC HUMAN INSULIN

1982

Insulin was being developed from cattle and pigs, treating millions, but also causing allergic reactions.

Genentech used E.coli bacteria to genetically engineer synthetic human insulin

Eli Lilly sells the first commercially available biosynthetic human insulin.

Human insulin is sold under the brand name, Humulin



## DIABETES COMPLICATIONS

As insulin research continues to develop and became more widespread, patients with diabetes started to live longer, contributing to the discovery of chronic complications of diabetes

