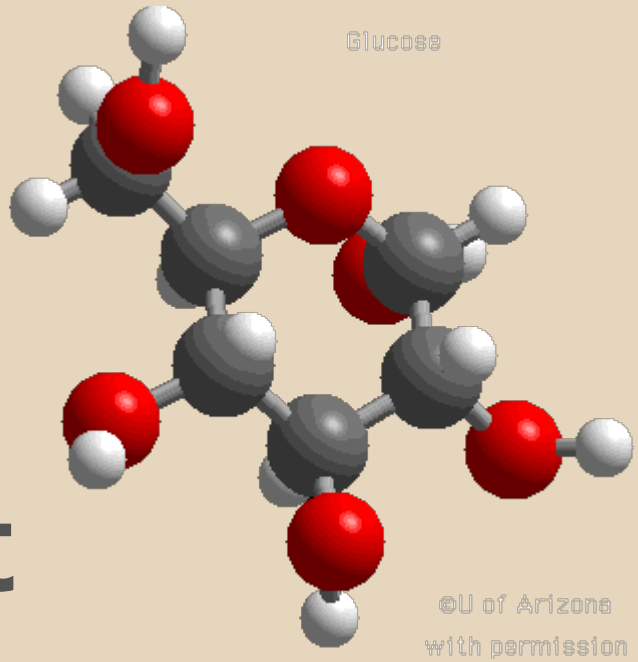
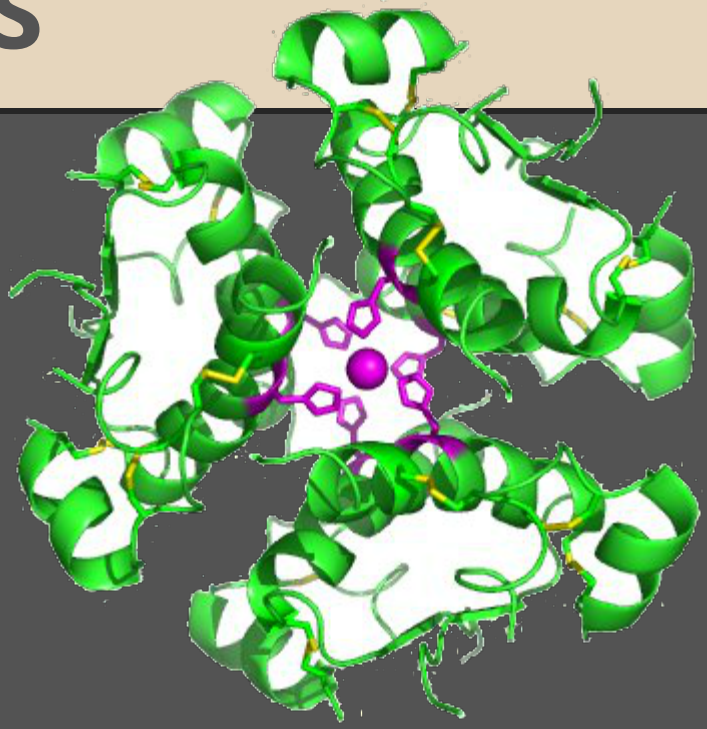


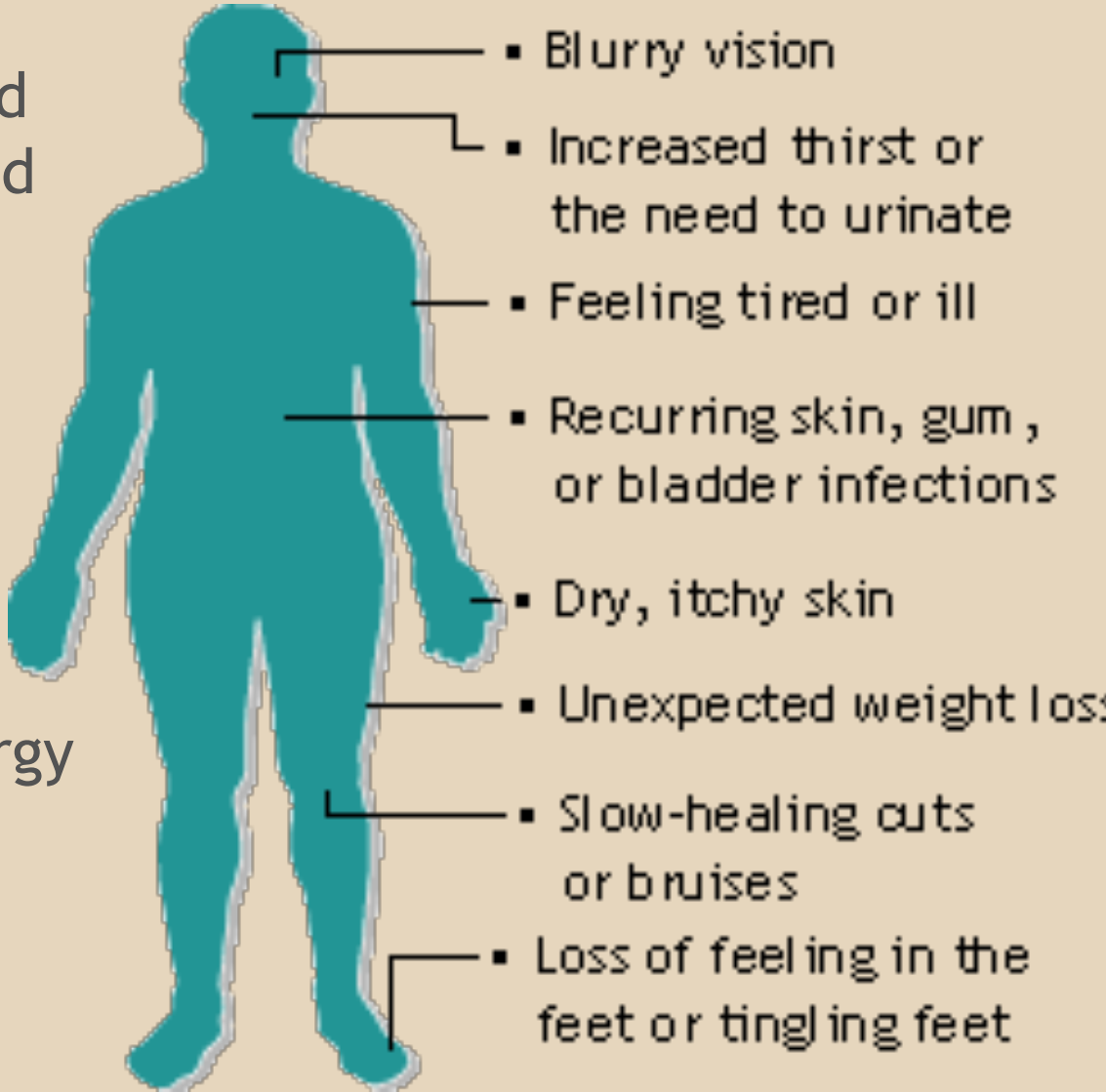
Insulin-Dependent Diabetes Mellitus

Ali Saad
Pd. 3 Genetics



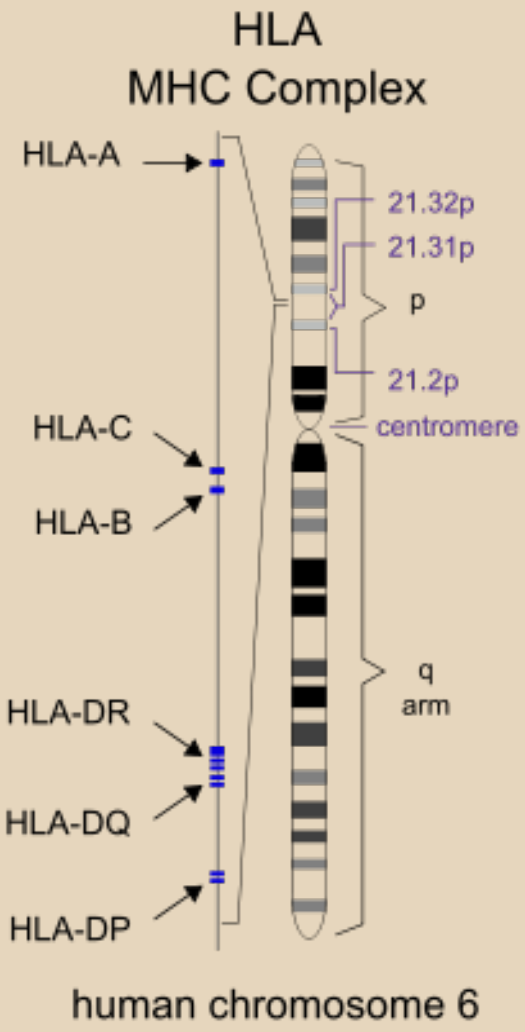
Physiology

- Every cell is affected because glucose used to make ATP is not produced, in particular the brain since 20% of energy expenditures in the body is due to the brain and the brain can only obtain energy from glucose.
- Early Onset



Molecular Cause

- Insulin and glucagon are not produced.
- The inheritance pattern is disputed/unknown because the disease is polygenic.
- One lesion studied in depth is the Human Leukocyte Antigen on chromosome 6. This is a cell surface antigen-presenting proteins and has is encoded by a large gene family that contains many genes related to the immune system. A mutation in this region, such as the HLA-DR3 and HLA-DR4 combining, leads to an autoimmune disorder.



Treatments

- Scientists have been successful in locating the gene responsible for the production of insulin. They have implanted this gene in bacteria and harvested the insulin.
- In the future, the same can also be done for glucagon. This would be beneficial because this would allow the liver to release its store of glycogen and prevent other symptoms resulting from excess glycogen in the liver.

Proposed Cure and Limits

- One problem with injections is the constant need to monitor your glucose level.
- An organ transplant for the beta-cells in the islets of Langerhans would enable the body to regain the functionality of producing insulin and glucagon.
- An alternative to that would be the use of stem cells to grow the islets instead of the need to wait for an organ donor and issues with compatibility but stem cell research is still fairly new.
- Antibiotics would be necessary to prevent the body from attacking the new organ in either of these situations.

Works Cited

The images linked to below were modified before being placed into this presentation.

- https://upload.wikimedia.org/wikipedia/commons/thumb/0/0d/InsulinHexamer.jpg/250px-InsulinHexamer.jpg
- http://staff.jccc.net/pdecell/biochemistry/glucose.gif
- http://www.doctorsvisioncenter.com/wp-content/uploads/diabetes-symptoms.gif
- http://upload.wikimedia.org/wikipedia/commons/thumb/7/77/HLA.svg/230px-HLA.svg.png
- http://a.abcnews.com//images/Health/abc_swine_flu_insulin_100119_mn.jpg