**Diabetes Mellitus research assignment**

Background

In class we reviewed the causes (etiology) of Diabetes Mellitus, and the differences between Type 1 and Type 2 Diabetes.

We learned that in a normally-functioning body, after you eat a meal (and your blood glucose rises naturally) your pancreas produces a hormone called Insulin which quickly circulates throughout the body via your bloodstream. The Insulin molecule (a 51-amino acid polypeptide, or protein molecule) is designed to dock at special receptor molecules (transmembrane protein molecules) which stick out from the surface of each of the trillions of cells in your body (for example muscle cells). When the Insulin docks on a receptor, a “signal cascade” takes place down below in the cytoplasm of the cell, which instructs the numerous glucose transporter proteins (named GLUT4) - which are themselves embedded in the cell membrane - to open and allow the glucose to leave the bloodstream and enter the cell – where it is then used to produce energy for your body (this is called the cell membrane transport system).

With Type 1 Diabetes, the Insulin-producing cells in the pancreas (called Beta cells) are destroyed by the person’s own immune system, resulting in Insulin dependence. Type 1 is usually diagnosed in children and younger people.

With Type 2 Diabetes, the pancreas produces Insulin, but the body’s receptor proteins have lost the ability to respond to the Insulin. Over time, the pancreas responds by shutting down Insulin production. Type 2 is usually diagnosed in adults, and is linked to obesity, family history & genetic factors, physical inactivity, and race/ethnicity. In the U.S. we are currently undergoing an epidemic in Type 2 diabetes in children.

Diabetes is an excellent launching-pad for learning about the cell’s many processes.

**Your assignment**

Use the Internet or other resources to research an aspect of Diabetes Mellitus which is of interest to you, and prepare a 2-page summary of your findings. You may include pictures, diagrams, and/or sketches. You won’t be asked to present this in class, but the papers will be posted on the class website so others can learn from your research! Submit your completed work as a PDF or Word or Google Docs file. Your name and date submitted should always be at the top of your work (3 points).

Here’s a few ideas. You are not limited to these!

1. Causes of Type 1. What exactly causes your immune system to wipe-out your own Beta cells?
2. Causes of Type 2. What exactly causes your cell receptors to stop responding to Insulin?
3. What are the modern treatment options for either Type 1 or Type 2. Self-injections? Automatic injection pump? Others?
4. Any new drugs being developed for Diabetes which would make a person’s life easier? Go into detail about how they supposedly work… and what stage of development they are in.
5. Find a company which is developing a drug for Diabetes. Research who they are, and what exactly they hope to produce. Who is funding their research? (if you can find out)
6. Do research and develop a recommended diet plan for someone with Type 1 or Type 2.
7. Why is Diabetes an ‘epidemic’ in the U.S.? Research and elaborate…
8. Research the actual insulin receptor proteins, or the glucose transporter proteins, or the Insulin molecule itself; explain how they work at a molecular level… OR, explain how they are made and what gene is responsible for making them.