**Human Insulin research report**

Respond to the five (5) points below. When you are done, submit your paper as an email attachment. Include your name and date (3 pts) on the top sheet.

(100 points total)

Background

Our bodies use Insulin, a protein signaling molecule (hormone) made in the Pancreas, for the proper regulation of glucose in the blood. Without Insulin, a life-threatening condition known as Diabetes Mellitus results. In this class we have already studied Diabetes and the role of Insulin in the body, so you should be somewhat familiar with the topic.

Historically, people with Diabetes did not live a healthy life. In 1921, Banting & Best showed that Insulin could be isolated and purified from a dog’s pancreas. This meant people could inject animal insulin as treatment for Diabetes. Over the ensuing years, improvements were made in the process, but you were still injecting Insulin derived from cows and pigs. This caused a negative immune response or allergic reaction in people, and so it was not ideal.

By the 1970’s, we had located the gene for Insulin in humans (on chromosome 11) and determined the exact amino-acid sequence of the Insulin molecule. In 1978, Genentech successfully copied (cloned) the human Insulin gene by splicing it into the *E. Coli* bacterial genome, and then used the *E. Coli* bacteria as a ‘factory’ to produce lots of the Insulin. In 1982, Ely Lilly received FDA approval for Humulin (artificially made human Insulin). This was the World’s first drug produced by recombinant-DNA (genetic engineering) methods!

Assignment instructions

Do Internet research and prepare a 2-page report on the topic: “How Human Insulin is Made”

YOU MUST ADDRESS THE FOLLOWING at a minimum:

1. Brief history of Insulin production from animals. Use lots of dates and who-did-what.
2. Show images of the Insulin protein itself, and what it looks like. You can show a picture of chromosome 11, with the Insulin gene identified somehow.
3. How we use ‘genetic engineering’ and ‘recombinant DNA’ methods to make human Insulin today.
4. Show graphics/images of the process itself. How is it made? What does the process consist of? Go into each step a little bit… (this should constitute about 50% of your report)
5. What does the future hold? See if you can describe ‘analog Insulin’ or any other future drugs.

Report length: I would like to see at least 2 pages.

Use bullet points together with get-to-the-point, informative sentences. Avoid long, wordy narrative. Use lots of diagrams and graphics to convey information quickly.

When finished, submit your work as an email attachment.

TIPS: There’s lots of information on the Web. Search: “how human insulin is made” “insulin recombinant dna methods” “genetic engineering of insulin” “history of insulin” and so forth.