Thesis Project Portfolio

Design of an Insulin Glargine Manufacturing Facility in Singapore to Target the Rise of Diabetes Cases in Asian-Pacific Countries

(Technical Report)

Gene Editing Technique Influence and Position to Human Society

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

Due to the rising diabetes cases in Asia and the high cost of insulin products in those developing areas, it is appropriate to produce insulin products for the Asian market. The technical thesis will be focused on insulin glargine production, which is a slow-release pharmaceutical product for diabetes patients, as previous research has shown that 80% of diabetes is type 2 diabetes. In the first half of the technical thesis, the research group will investigate the whole upstream and downstream insulin glargine production process, based on previous years' reaserch papers, together with one previous capstone project on insulin production. In the second half of the technical thesis, the technical thesis will also analyze the economic feasibility of building an insulin glargine production plant in Singapore. In this part, production cost and revenue will be estimated to provide the final suggestion.

Through the technical thesis research, I find that gene-editing technology has been already used in the pharmaceutical area. In recent years, gene-editing technology is one of the most controversial topics, both in technical, social, and ethical aspects. All these information brings my interest and the STS thesis will be focused on discussions around gene-editing techniques. In the STS thesis, I will investigate the gene-editing techniques' influence and position to human society. The Social Construction of Technology framework will be applied to analyze the relationships between gene-editing techniques and several different social groups. Through the STS thesis, final suggestions about where gene-editing techniques should be situated in society will also be discussed.