

Thesis Portfolio

Manufacturing an RNA Therapeutic for Duchenne Muscular Dystrophy
(Technical Report)

Sociotechnical Construction of Biosimilars in the United States
(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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Spring, 2021

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Sociotechnical Synthesis

With the massive influx of research effort into gene therapies, new pharmaceutical drugs are being developed to aid and potentially cure a wide new range of disorders. My technical capstone project involves the development of a novel therapeutic drug to treat Duchenne muscular dystrophy. The therapeutic of choice will be an antisense ribonucleic acid (RNA) oligonucleotide. This technical project addresses the need for an orphan drug therapeutic from a purely one-dimensional technological problem.

However, there is a larger societal problem that emerges from the implementation of novel biologic drugs. Due to the high research and development costs and long regulatory timelines associated with producing a novel therapeutic, the price of these “wonder drugs” has greatly outpaced any other commodity or service in the United States. These drugs were aimed at addressing many major diseases areas such as cancers, respiratory illnesses, and diabetes. However, there have been noticeable adverse effects on the American healthcare system. While some biologics are capable of greatly reducing patient mortality, their shrinking affordability has limited the availability and quality of healthcare. Biosimilars are biologic drugs with high similarity to patented, reference biologics. They have been touted as a potential solution to the rising drug prices, with many claiming that they could cause drastic drops in biologic drug prices similar to those seen with generic small molecule drugs. Biosimilars are an emerging technology with the intention of solving a societal problem and must therefore be studied from an interdisciplinary perspective focused on the interactions between science, technology, and society. This societal project investigates the societal construction of biosimilars and their impact in aiding healthcare reform in the United States.