

**2020 PSBR High School Essay Contest**  
***Finalist***

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The effect of biomedical research on the scientific community at large is insurmountable when considering the advancements made. From cancer research to vaccines, animal testing has changed the medical landscape for the better. One of the best examples of this research being used in practice is organ transplantation. Without the use of biomedical research, organ transplantation could never be tested, researched, or utilized to save the lives of millions.

Organ transplantation is a procedure that has benefitted countless individuals for decades. According to the Cleveland Clinic, “Organ donation is the process of surgically removing an organ or tissue from one person (the organ donor) and placing it into another person (the recipient).” Transplants become necessary due to disease or injury causing an organ to fail or become damaged (“Cleveland”). The impact biomedical research has had on developing transplantation is monumental, as all transplants that are currently performed were tested on animals prior to their use among humans. For example, the first human cornea transplant was performed approximately 100 years ago, using research done with rabbits (“Understanding”). Using that breakthrough, more than 40,000 corneal transplants restore vision each year in the United States alone (“American”). Furthermore, the first successful heart transplant was performed on dogs and cats in 1912 (“Animal”). Without the attempts on animals, it would never be a safe option for humans. Currently, 95% of heart transplant patients will survive for at least five years following the procedure (“Animal”). The impact of animal research is the extension of life for millions of people each year.

The surgery itself is not the only thing that biomedical researchers study in terms of organ transplantation. Organ rejection is defined as “a process in which a transplant recipient's immune system attacks the transplanted organ or tissue” (“Medline”). Chronic rejection—or rejection that takes place over many years—is the leading cause of transplant failure (“U.S.”). Animal research has been used to understand this process so that scientists can engineer treatments against it. According to the National Kidney Foundation, “Understanding the immune basis for how the body rejects transplanted tissue emerged from studies in mice and guinea pigs.” Because scientists understand how and why the body attacks itself, treatments have been developed to wean the effects of rejection. All transplant patients take immunosuppressant medications that lower the body's natural immune response to foreign tissues and antigens (“U.S.”). These medications were developed solely due to the use of animal research. Understanding Animal Research states, “...methods of tissue-typing and anti-rejection drugs were developed using dogs, rabbits and mice from 1950 onwards.” Creating these medications is an advancement that has extended millions of lives since the first successful kidney transplant in 1954 (“United”). They are absolutely vital for the success of transplants. In

fact, according to the U.S. National Library of Medicine, "If these medicines are not used, the body will almost always launch an immune response and destroy the foreign tissue." Therefore, between the understanding of organ rejection to the medications used to fight it, animal research has provided immeasurably valuable information.

Biomedical research has affected my life because my mom received an intestinal transplant in 2013. Without this procedure, I would have lost my mom before I had the opportunity to even understand what was happening to her. It extended her life by nearly five years—a trivial amount of time to some, but one that families of transplant recipients learn to cherish. The only reason that I was able to have my mom at my orchestra concerts, my middle school dances, or have four more Christmases with her is because of the medical breakthroughs that have been derived from animal research. Though my mom passed away of chronic rejection in 2018, I am beyond grateful for the gift of those five years. I love her more than anything, and to be given more time with her is a treasure that I will appreciate for the rest of my life.

Overall, the role biomedical research has played in organ transplantation is one that better the lives of countless individuals. Without the utilization of this research, transplants themselves, as well as necessary supplemental treatments would never have come to fruition. Animal testing has provided scientists with a greater understanding of the body, and this understanding has led to hundreds of crucial medical breakthroughs that many of us literally cannot live without.

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