

2018 PSBR High School Essay Contest
Finalist

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Biomedical research is a relatively broad branch of science, which looks at preventative treatment for illnesses and diseases, such as surgeries, transplantations, pharmaceutical drugs, and medical technology that is being developed every day. In many cases, some aspect of research or testing includes the involvement of organisms other than humans. Animals are commonly used in research because many species are susceptible to the same diseases and illnesses that humans are. Because many of the animals tested have relatively shorter lifespans compared to our own, it is very easy to test treatments over a single life cycle or through entire generations. Additionally, factors such as food, lighting, and temperature can be controlled very easily. Around ninety-five percent of animals bred for laboratory work are rodents, such as rats and mice. However, due to certain biological requirements when testing different treatments, some research is conducted on animals such as dogs and cats as well.

In some cases, a drug or treatment may be discovered even without the assistance of animals, through the use of alternative research methods. Usually however, when a new therapy or treatment is discovered, it is tested in animals for its level of effectiveness. If the results are positive, scientists may then proceed in conducting a human clinical trial. The benefit of using a living creature lies in recent advancements in biomedical technology and our ability to observe and analyze the function of cells. While treatments could be tested with cells on a petri dish, looking at a living organism provides the benefit of being able to understand how treatments affect individual cells within a complex network of other cells within the body. Understanding this relationship is key in understanding how a drug can affect an organism as a whole, as well as test its true level of effectiveness before moving on to human trials. This intermediate stage in testing new treatments provides a crucial step needed to ensure the health and wellness of millions of people every year. It is essential that a drug's effectiveness is tested for before being released to hospitals and the pharmaceutical market. However, many in the scientific field consider using humans for those initial trials to be inhumane, and they therefore view trials on animals as a necessity.

The effects of biomedical research have made a significant impact on the lives of me and my family. Nearly five years ago, my grandfather suffered from health issues involving life-threatening blood clots. One solution he sought was regular blood tests, which were costly and time-consuming. To treat his blood clots, my grandfather used Coumadin, a brand of warfarin, which is a blood-thinner meant to treat conditions such as deep vein thrombosis and pulmonary embolism. Through this treatment, his blood pressure was lowered to a point where he was healthy enough to no longer need to take those timely blood tests nearly as often and

move on to another medication. This treatment essentially saved my grandfather's life as well as prevented him from having much more serious health issues down the road.

It is because of the biomedical research conducted every day by medical experts that we are beginning to understand more about why conditions like these occur. In 2016, Medical Doctor David Ginsburg worked alongside the Howard Hughes Medical Institute in a study of abnormalities in the blood clotting factor known as the von Willebrand factor (VWF). They looked at the effects genetics may play on differences in VWF levels among inbred mice. They discovered several evolutionary changes among mice in different locations from around the world, with at least six noticeable VWF modifier genes. With the help of recently developed genomic technology, it is now possible for this testing to be done directly on human volunteers. The ability to recognize alterations to the VWF now lead to a faster diagnosis and prediction of risks for blood clotting. If it weren't for the important work done by scientists and biomedical researchers, new, life-saving developments wouldn't have been available to people like my grandfather. Due to advancements like these in biomedical research, such as looking at different treatments and animal research, our average life expectancy in the United States has increased and is predicted to increase significantly within the next decade. Moving forward, biomedical research will continue to grow and positively shape how we cure disease.

Works Cited

https://www.youtube.com/watch?v=iA_FfVuTfoM

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