

**2023 PSBR Middle School Essay Contest**  
***Third Place***

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NASA often uses animal research to test hazardous factors during an astronaut's mission in space. They wanted to see if astronauts could survive. In fact, before humans, many animals went to space. Fruit flies, dogs, rabbits, mice, and rats all went to space. Because of these animals going into space, NASA collected enough data to send the Apollo 11 onto the moon. Another example is when biomedical research contributed to developing a vaccine for Covid-19 by testing prototypes on mice, rats, etc. We tested these vaccines on mice, rats, ferrets, and other animals. Animal research has significantly contributed to our understanding of knowledge by testing vaccines. Animal research has pushed us to our success and the solutions to many problems.

Biomedical research is where tests are run to find the causes of disease and how to fix them using animals. They make medicine and develop procedures to weaken and prevent sickness by finding a cure. Tests are mostly on animals closely related to humans. For example, mice, rats, and chimpanzees. 95% of the animals tested are mice, rats, and rodents. Scientists have been testing rodents to find cures and information about cancer, Alzheimer's, drug addiction, heart attack, and spinal cord injury. These tests involve the scientific method (observation, hypothesis, experiment, analysis, and conclusion). They also include in vitro (in the glass in Latin. Prokaryote and eukaryote cell culture in a test tube.), and in vivo (in the living in Latin. These are cell or organ samples. However, the organs are still in the animal.) Another way of examination is ex vivo research (out of the living in Latin. An organ unit is taken out of the animal and observed). Using these methods, biomedical research helps treat sickness for nature and helps advance our understanding of illness.

Biomedical research is grouped into many sections. So, many careers are involved in the research field. A team of biomedical researchers comes from various backgrounds with all different occupations. The group has everything from technicians to engineers and veterinarians, the technicians, computer scientists, and engineers help ensure that the technology has no bugs. The veterinarians assess how the animal's doing. Finally, the researchers set up the hypothesis, perform the experiment and analyze the results of the test. That's mostly how the lab goes, but the jobs are tricky. However, with the numerous jobs, biomedical research is quicker, more efficient, and safe.

Medicine needs to be tested for proof before treating humans. Some may ask why animals. Mice and hamsters are used because of how close they are to humans and are relatively cheap. Mice have an 80% genetic information similarity. This is important because of how small they are, how cheap they are, and how closely related they are to humans. Because of this, they're ideal for understanding disease and making cures. However, some people

protest for animal rights. Luckily, there's a law protecting animals from harm. It sets high standards on housing, cleaning, feeding, and ventilation. Luckily, animal researchers use the 3Rs as much as possible. The 3Rs stand for reduce, refine, and replace. Reduce stands for reducing the number of mice used. Refine means to provide livable conditions. Finally, replace is to use a computational model or an in vitro experiment if possible instead of the use of animals. This way, the animals won't be overused and treated in a humane way. Accurate results will also show up with animals are treated well. If animals get too stressed, then the results would be modified by stress instead of the prototype.

Without animals, modern vaccines wouldn't have existed. Humans would've been used for research, and the process of finding illnesses and curing them would've been much slower. Because of how unsafe for humans these tests are, fewer tests would be run. Would Covid-19 not have a vaccine, or would we not know about HIV and AIDS? Since some animals are abundant and cheap, humans have been able to run many tests and help boost our knowledge of diseases and cures. Would humans no longer roam the Earth if it weren't for research, or would the population drastically decrease?

#### Works Cited

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