



2019 PSBR 7th & 8th Grade Essay Contest
First Place

Lily S.

York Suburban Middle School
York, PA

Biomedical research is understanding the causes of disease, biological processes and how they are affected by disease. Using experimentation and laboratory work, researchers work to find preventions and/or cures for disease. Biomedical research consists of basic, applied, and clinical research. Basic research expands our knowledge of how processes in living organisms work. Applied research uses knowledge from basic research and focuses on specific objectives, like new drugs or medical devices. Clinical research determines if a new drug, vaccine, or medical procedure is safe and effective through studies done on humans and animals.

Because of ethics and concerns of human lives, animal models are often used in replace of people. Due to the vital information that these studies give and the major similarities animals has with humans, like body systems and susceptibility to the same diseases, animal models are an effective replacement. Small species such as rats and mice are commonly used as research animals. Larger species like pigs and primates are used less than 5% of all research animals. The majority of research animals are purpose bred by licensed vendors, agricultural sources, or Class B animal dealers who are regulated and inspected by USDA.

Regulations like the US Animal Welfare Act and the Health Research Extension Act of 1985 are very strict in order to insure the animals are being well cared for. Researchers are obliged to care for any laboratory animals since poor care can result in unreliable research. The three R's, reduction, refinement, and replacement, are a set of rules which any research including animals must comply to. Reduction means to use as few animals as possible to obtain more information in a study. Refinement means to improve animal welfare and procedures to eliminate unnecessary pain or distress to animals. Replacement means animal models must be replaced with alternative methods when possible.

Alternative methods, including simulations or computer models, in vitro tests, human clinical trials, and epidemiological studies, supply us with excellent information, but they have limitations that animal models can exceed. Simulations and computer models use data from animal studies to reveal holes for further study. In vitro tests studies tissues of cells from organisms instead of using an entire animal. Human clinical trials use humans to take a drug or compound through three stages to see if it can be submitted for approval. Epidemiological studies is research done over a group of organisms to study how a disease travels amongst the group. Biomedical research has greatly benefited both humans and animals by creating vaccines, cancer treatments, bioengineering advances, antibiotics, and many other things. It has led to preventions and treatments to disease among wild, laboratory, and farm animals, and

pets as well. Research helped to develop asthma inhalers, leukemia treatments, and organ transplant techniques.

Human experimentation is ethical as long as the test subject has volunteered and can abandon the process at any time. Without human experimentation drugs and other medical procedures would be untested and potentially unsafe and unreliable. One of the key issues facing biomedical research is the availability of funding, including grants for academic research. It will be important for the government to provide funding to support key issues such as treatments and preventions of various types of cancer, Alzheimer's or dementia. Biomedical research has been very important in developing drugs and treatments for human and animal diseases for many years. With the number of current disease threatening the health of humans and animals, it is important to allow biomedical research to continue finding new preventions and treatments.

Works Cited

The 3R's. www.psbr.org/animal-research/the-3r-s.

Animal Research Benefits Us- and Animals Too.
www.psbr.org/images/Educational_Materials/uar_animal_research_benefits.pdf.

The Animals. www.psbr.org/animal-research/the-animals.

Casey's Awakening. www.psbr.org/images/Educational_Materials/msmr_caseysawakening.pdf.

Epidemiology. pmep.cce.cornell.edu/profiles/extoxnet/TIB/epidemiology.html

Facts About Animal Research.
www.psbr.org/images/Educational_Materials/amp_facts_about_research.pdf.

Laws and Regulations. www.psbr.org/animal-research/laws-and-regulations.

Medical Benefits. www.psbr.org/animal-research/medical-benefits.

Research Methods. www.psbr.org/animal-research/research-methods.

The Use of Animals in Biomedical Research: Improving Human and Animal Health.
www.psbr.org/images/Educational_Materials/aalas_improve_human_animal_health.pdf.