

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

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Today, the life expectancy of the average person is at an all-time high and continues to increase. This accomplishment is partly credited to biomedical research, an area of science dedicated to acquiring data for the causes and cures of diseases. Medical advancements such as vaccines, organ transplants, and surgeries are possible because of biomedical research.

Basic, applied, and clinical research are the three main types of biomedical research. Basic biomedical research involves the study of how living things grow, function, repair, etc. This foundation of research is the cornerstone for other types of biomedical research. With applied biomedical research, scientists use concepts gained through basic research and develop specific experiments with a certain goal, such as finding a cure for a disease. Clinical research takes what is learned from basic and applied research to treat humans and animals, allowing scientists to study the outcomes of a treatment and its possible side effects. Research is one of the most crucial steps to the biomedical research process.

Animals play a major role in biomedical research and have helped save many lives. Some animals possess a similar genetic makeup to humans. Because of this, they are prone to many human diseases, even though their external appearances contrast greatly with the appearance of humans. Approximately 95% of testing animals consist of mice and rats. In addition, fish, cats, and dogs are sometimes used as test subjects. Scientists have figured out a way to safely breed mice with genetic adjustments that resemble human diseases. Ninety-nine percent of testing animals are “purpose bred”, meaning that they are bred and raised specifically for testing. In 1966, Congress passed The Animal Welfare Act, ensuring that animals used for research are housed, fed, given water, cleaned, and protected against harmful weather. Animal breeders, carriers, handlers, and dealers also have to obey this law.

To circumvent the use of animal research, computer models are often used to simulate behaviors of human vessels, organs, and other internal structures. This approach may one day eliminate the use of human and animal testing in some conditions. “In vitro” is Latin for “in the glass”, meaning that it is research conducted within glass. This method mainly involves bacteria, cell, tissue, and organ cultures. In human clinical trials, scientists test certain medications on human volunteers. Epidemiological research is the study of a disease's origin, development, and disbursement. This method works towards finding out a way to eradicate certain diseases.

During human testing, volunteers must be cared for under strict regulations. The Food and Drug Administration (FDA) inspects clinical and nonclinical trials. This inspection is carried out to guarantee that there are ethical guidelines used during human experimentation. The FDA requires companies to perform many successful tests before human trials are permitted.

One example of the success of biomedical research is the quality of life given to my grandfather after his surgery. He underwent a coronary artery bypass surgery when he was 70 years old and continued to live another 17 wonderful years. His surgery and expeditious recovery were possible due to the hard work of scientists and researchers in the cardiac field of biomedical research.

Biomedical research is undeniably evolving and improving as we strive to cure diseases such as coronary disease, cancer, and Alzheimer's disease. Hopefully, in the future, we will see new technologies that allow minimally invasive surgeries that can be done without a major incision to the body. If surgeons could take a vein from my grandpa's leg and put it in his heart in 1989, I can't wait to see what new innovations biomedical research will bring us in the future!

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