



2015 PSBR 7th & 8th Grade Essay Contest
Second Place

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What is Biomedical Research?

Biomedical research is an invaluable area of biology that often involves the use of animals to investigate biological processes. This field produces medicinal products and procedures that will benefit humans, animals, and other organisms. Without the direct intervention of biomedical research, my younger brother, Tyler, may not be alive today.

The field of biomedical research is split into three categories: basic, applied, and clinical research. Basic research is conducted to expand our base of knowledge about biology in general. The knowledge gained from this type of research is used as a resource to bolster the speed and accuracy of applied research, which is conducted with a specific goal in mind. For example, basic research was done on steroid hormones that are produced in the adrenal cortex of vertebrates. The knowledge gained from this research went on to be used in applied research to manufacture betamethasone, a corticosteroid that is administered to mothers at risk of having premature babies in order to promote surfactant production in the babies' lungs. Clinical research was then done on human volunteers to determine its effectiveness as well as its safety. This drug was given to my mother and helped saved my brother's life. Without any one of these forms of research, he may not have survived.

One of the most controversial topics concerning biomedical research is the use of animals for testing purposes. Although a wide range of animals are used, it is estimated that over 50 million vertebrate animals are experimented on annually in the United States. Most of these are rats and mice, due to their biological similarity to humans and the fact that they progress through the infectious cycle of a disease much faster because of their rapid metabolism. Pre-clinical testing on animals also enables us to avoid the ethical considerations that come with immediate testing on humans. There are no good substitutes for a living organism to test the effectiveness and potential toxicity of treatments due to the complexity of living systems. However, it is important to institute regulations to ensure the humane treatment of test animals which is why the Animal Welfare Act was signed into law in 1966. Scientists also practice reduction, refinement, and replacement.

Opponents of animal research claim that computer simulations, in vitro tests, and epidemiological studies can act as a substitute for extensive animal testing. Computer simulations and epidemiological studies excel at tracking the spread of a disease within a population. In vitro testing can help to determine the virulence of a particular strain of virus. But, these methods cannot hope to account for all of the variables present in a living creature.

Biomedical research is a field of paramount importance that has improved the quality of human life. I can personally attest to the fact that my life has been enhanced by the development of the drug that enabled my little brother's lungs to develop normally. More funding and reduced restrictions on animal experimentation will enable medicine to advance in ways we never thought possible.

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