2016 PSBR 7th & 8th Grade Essay Contest
Third Place

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Biomedical research, whether we know it or not, has touched almost all of our lives, including my own. My grandmother recently received eye surgery to prevent potential blindness. My grandfather, who I never met, had lung cancer. Research gives families hope. If you skip back in time to less than 100 years ago, childhood illnesses such as polio, smallpox, and typhoid fever were not only common, but fatal in adults and children alike. These maladies are now close to being completely banished in the United States as a result of biomedical research.

A positive effect of research has been on various endangered species. Today, many animals have escaped extinction and strengthened their populations. Animals such as the California condor were once threatened but have been rescued by research. Reproduction techniques found through research were applied to the condor, allowing its numbers to grow once more. The research process follows a guided series of experimentation to remedy various diseases in the most humane way possible.

Biomedical research is defined as the area of science that searches for ways to prevent and treat diseases through laboratory experimentation. Although biomedical research is sometimes thought of as animal experimentation, it can be conducted in various ways such as *in vitro* and computational modeling. *In vitro*, a Latin phrase meaning "in the glass," conducts experiments using cells and tissues within a petri dish and test tubes in laboratories. Computer models can also be used to create simulations that can help scientists and surgeons discover safer and more efficient methods to rectify diseases and perform surgeries.

In addition, animal experimentation is used in research. Although many people see this as inhumane, the animals are treated well. In addition, the results from experiments performed on animals help battle diseases in both humans and other animals. Mice and rats are the most commonly used animals due to their genetic and physiological similarities to humans. The rodents' lifespans allow scientists to observe effects over multiple generations. These animals are bred specifically for experimentation. Another method of research is human experimentation. However, to ensure the safety of the clinical trial participants, this is only permitted following multiple stages of animal and *in vitro* trials.

Many afflictions have been or are almost eliminated from society as a result of biomedical research. Smallpox and rinderpest are two examples. Smallpox was a notorious virus that was cured mainly through a vaccine created from inactive cowpox. Tracing back from the 12th century, rinderpest was a viral disease targeting cows primarily. Using a vaccine created through working with recovered cows, the disease was confirmed to be completely eradicated in 2011. Other diseases are also on the path of eradication. Treatments for various cancers have been developed through studies in mice. Another area research has impacted is organ transplants. Transplants were originally practiced in dogs, making the process in humans and animals alike safer.

Biomedical research has been important in defending against various diseases throughout recent centuries. It has played a crucial role in ending diseases and will continue to impact the fight against both animal and human diseases.

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