2018 PSBR 7th & 8th Grade Essay Contest
Second Place

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A month ago, my dog, Bucky, came back from the vet after having a sore removed from his leg. Thankfully, the surgery was a success, and he is already healed thanks to the efforts of biomedical research.

Biomedical research is the study of biological processes in order to help humans, animals, and the world around them. The medicines and procedures used to heal my dog were created with the help of biomedical research.

Biomedical research starts with basic research, simple observation of any subject that is not directed toward any specific question or goal. The next step, applied research, takes basic research one step further and gathers information to answer a question or achieve a goal. Finally, during clinical research human biological processes are studied via testing and observation.

There are many different types of testing and research, the first being done on animals. Scientists choose to use animals for several reasons. They are easy to work with, testing on them is easy to replicate and they can be bred so that they meet specific standards with optimal results. However, the main reason animals are used is because of their similarities to humans. For instance, mice have the same cell generation process as humans, and dogs react similarity to diabetes. However, animals still differ from humans, such as how sharks are immune to cancer but humans are not. The differences help scientists make new discoveries which benefit both humans and animals. All testing is done ethically, and steps are taken to ensure that animals are kept healthy and generally pain free. Scientists typically follow the three R's when working with animals: Reduction, Refinement and Replacement. Reduction means that as few animals as possible are used in testing, refinement means that animals are treated humanely, and lastly, replacement means that animals are replaced with alternative methods whenever possible. Laws, such as the Animal Welfare Act, help to make sure scientist follow these methods to keep animals healthy and safe.

As mentioned before, there are alternative methods to animal testing. Computer simulations and models are often used to answer questions. Scientists use them because they harmless, and can be repeated as many times as necessary. In vitro tests, or "in the glass" in Latin, are laboratory tests conducted on samples of bacteria, organs, tissues and cells. Since the samples are isolated, scientist can use these samples to see exactly what happens to them without interference from other bodily functions.

During clinical trials, scientists perform tests which are conducted on human test subjects who have volunteered to make sure the product or method is ready to be used on humans. Years of thorough research must come first however, to ensure that participates of

the trials are as safe as they can be. Laws, put in place by the Food and Drug Administration, ensure that all trials are conducted humanely and safely. Potential test subjects must also give informed consent to whatever tests they are doing.

Another type of research that involves human test subjects is epidemiological studies, studies done on large groups of people at a time. This helps determine how procedures or products will react to different genes and such. An example would be how women in China differ from those in America.

Biomedical research has done incredible things, such as providing transportable care for those with asthma and creating new vaccines for many diseases. However, this does not mean the process stops. Even now the flu runs rampant, and cancer still takes many lives. Biomedical research continues to expand everyday so that we can someday live our lives without these afflictions.

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Mrs. Valerio

Mr. Crosier