



2014 PSBR 7th & 8th Grade Essay Contest
Second Place

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Bioscience research is a valuable and well-respected practice involving the use of living things to help produce beneficial medicine for humans. One person who has actively participated in the important steps of bioscience research is a famous cardiologist named Dr. Eugene Braunwald. He made some very important discoveries and contributions during his lifetime, including research to reduce the amount of damage to the heart during a heart attack. His work to understand cardiac function has helped millions of patients. Braunwald has published over 1,000 clinical articles based on his work researching heart disease. From these special achievements, Dr. Braunwald wrote the principal textbook on heart disease called "Heart Disease: A Textbook of Cardiovascular Medicine." He went on to found the Thrombolysis in Myocardial Infarction (TIMI) Study Group. This organization researches ways to prevent heart attacks and heart failure. The TIMI trials examined thrombolytic and antithrombotic regimens to sudden heart attacks. There were many TIMI trials, and the results of these trials have helped to prevent and treat many heart attacks.

In the world of bioscience research, there are three main types of research that can be done: basic, applied, and clinical. Basic research is when scientists improve their understanding of life processes and how diseases function. If this type of research did not exist, scientists would not know much of the information they do today. Applied research is when scientists use their current knowledge and apply it to find vaccines and other treatments to cure diseases. However, unlike basic research, this type of research is directed more towards manufacturing new drugs and treatments. Lastly, clinical research is when scientists use clinical trials to study a drug on humans. This research occurs in phases, where scientists look for different ways the drug reacts, and how the test subjects tolerate it.

Aside from these types of research, there are additional methods that scientists use. They are known as simulations, *in vitro* tests, animal models, human clinical trials, and epidemiological trials. Simulations are used to help scientists simulate living systems helping them solve problems and speak their mind about new research ideas. Simulations often require information from other methods like animal testing. *In vitro* testing, derived from the Latin word, "in glass," is the most useful in the early and middle stages of research. These tests use cells or tissues from a plant, animal, or human, which allow scientists to examine one single effect of a substance alone. The next method, animal testing, mimics how certain substances will react on living things. Scientists use animals, like rats and mice, instead of humans for these tests because it is too dangerous to test the unperfected drug on a human being. After the drug has been tested on animals and *in vitro*, human clinical trials occur. Scientists conduct a study on human volunteers to test the overall effectiveness of the vaccine or medicine. Finally, epidemiological trials are when scientists gather information on where and how people acquire a disease, and further identify the microorganisms to prevent people from receiving the disease in the near future.

Bibliography

<http://www.psbr.org/images/EducationalMaterials/ncabrwhatsthepoint.pdf>

<http://www.hup.harvard.edu/catalog.php?isbn=9780674724976>

<http://www.timi.org>