

2014 PSBR 7<sup>th</sup> & 8<sup>th</sup> Grade Essay Contest  
*First Place*

**James M.**  
St. Ignatius of Antioch  
Yardley, PA

My Grandfather slathers himself in sunscreen on a daily basis. He looks utterly ridiculous at times; literally covered in thick, white liquid. But, to be honest, I'm glad that he does this. Did you know that it has been proven through bioscience research that topical sunscreen can prevent skin cancer?

There are three categories of bioscience research: basic, applied, and clinical. *Basic* research essentially consists of scientists exploring and learning basic facts about life processes. *Applied* research involves applying the knowledge that a bioscience researcher has acquired, toward finding a cure or treatment for a disease. The third branch, *Clinical*, involves testing of possible treatments on humans. Using knowledge gained from all three types of research is crucial to understanding and treating a disease, such as skin cancer.

Generally, there are five methods of research which bioscience researchers use: Simulations, in vitro testing, clinical studies, animal studies and epidemiological studies. First, computer (and other) simulations help scientists to replicate how a human body functions. By doing this, scientists can try to solve problems which reveal themselves during a simulation. Second, in vitro testing consists of studies on living cells grown in lab dishes. The scientist will then add a substance to the lab dish and watch how the cells react. The ultimate type of research method involves testing on an actual live body which provides scientists very accurate information. Therefore, scientists use the fourth method, animal studies, to observe how a full living body reacts to a substance before trying it on humans. After the animal testing is successful, scientists will perform human clinical trials. The fifth method, epidemiological studies, is done last. Epidemiological research involves figuring out the possible causes of a disease by examining *who* gets it, *how* they get it and *where* they get the disease. By determining the answers to those questions, scientists can evaluate the association between these things and the disease itself.

In order to fully test the effectiveness of sunscreens, bioscience researchers employed all of their available five methods. For example, scientists conducted studies on animals in 2003 which showed that squamous cell skin cancer can be prevented by sunscreens. Also, in vitro studies were used to determine how human skin absorbs sunscreen. Further, in 2010, human clinical trials showed that regular sunscreen use helps prevent skin cancer. The scientists involved in this bioscience research must have been thrilled to discover the safe combination of chemicals which can prevent skin cancer!

Personally, bio research has been very important to my family because my Grandfather actually had skin cancer. I interviewed him about his diagnosis recently. In 2002, Grandpa's dermatologist discovered basal cell carcinoma, the start of melanoma, on Grandpa's hand. Luckily his doctor treated the cancer and removed it from Grandpa's skin. Thankfully, bio research was able to find a way to help him prevent his skin cancer from returning, and today my

Grandfather applies sunscreen every day. When Grandpa was my age, sunscreen did not even exist. We have come a long way in treating diseases through bio research!

### Bibliography

[www.psbr.org](http://www.psbr.org)

[www.kids4research.org/teens/toxicology](http://www.kids4research.org/teens/toxicology)

<http://www.cancer.gov/clinicaltrials/results/summary/2010/sunscreen-melanoma2010>

[www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed) [www.elsevier.com](http://www.elsevier.com) Article titled "Transdermal Skin Delivery: predictions for Humans from in vitro, ex vitro and animal models"

Interview with Joseph T. Carberry, in person on Feb. 9, 2014