

2021 PSBR High School Essay Contest
Finalist

Audra F.
Norwin High School
North Huntingdon, PA

A short time before I was born, my grandfather was diagnosed with lung cancer. The probability of him surviving more than five years was extremely low, nearly 5%, especially considering that his cancer was not identified in a very early stage. He should have died before I could even talk! Although he is no longer with us today, he managed to survive longer than the five years which were anticipated. I have biomedical research to thank for giving me the opportunity to spend a few valuable years with him.

My grandpa had smoked for much of his life; since cigarette smoke carries many carcinogens, he became susceptible to lung cancer. He had small-cell lung cancer (SCLC), meaning the shape of the cancerous cells appeared small and round through a microscope. SCLC is said to be the more aggressive form of lung cancer, and because of this, the best doctors could do is help him live as long as possible. He was predominantly treated with chemotherapy, which is the use of drugs to target and kill rapidly dividing cells, but also participated in a clinical trial which involved a mouse model system.

The use of animals in biomedical research has resulted in substantial advancements in the field of cancer treatment. Over a century ago, a method of growing tumors originally from humans into mice began to form. This proved beneficial as malignant tumors grow quite similarly in both humans and mice. Additionally, mice are an ideal model system because they are easy to manage, and grow and produce offspring quickly. However, humans and mice are different species, so cancerous tumors in mice do not always develop identically to the patient's cancer, especially with the intricacy of lung cancer. The main objective to improve the model system has been to find a way to genetically modify mice so that they form tumors as accurate as the source they came from. However, the progress that has been made to achieve this objective has been so tremendous that this model system will surely continue to dominate the scene in cancer research.

The basic idea behind this mouse model system is to take tissue from the tumor of a specific patient and insert it into a mouse. These mice used in the lab have genetically modified immune systems to ensure that there is as little interference with the development of tumors as possible. From the mouse, researchers are able to observe how the tumor begins and progresses, and they can test which drugs have the best effect on reducing the tumor; it's information that cannot usually be gathered directly from the patient. Mouse models are used when a patient participates in a clinical trial, so new chemotherapeutic drugs can be tested on those mice to create the most ideal treatment for a patient. It allows many drugs to be tested at the same time using multiple mice so that a patient isn't required to withstand so many intense medications.

I am so grateful that the mouse model for lung cancer increased the lifetime of my grandpa so that I was even able to meet and spend time with him. In fact, the enhancement and effectiveness of cancer treatment has been made entirely possible through the assistance of animals in testing and research. This goes to show that biomedical research will continue to be applied in the medical world, especially to improve medicine. The study of tumors in mice has greatly helped those who have experienced this once seemingly incurable disease of cancer, including my grandfather.

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