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Finalist

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Days Marked with Hope

My grandmother had always been a healthy, active person. At the age of 75, she was always busy tending to her garden and cooking for the neighborhood. Suddenly, she began acting out of character; she lost her appetite, lost a significant amount of weight, and experienced frequent chest pain. After three months of worsening symptoms, my grandmother was diagnosed with stage three esophageal cancer on January 12, 2018. This heartbreaking news shook my family, but we knew we were not struggling alone. Although esophageal cancer only accounts for 1% of all new cancer cases, the deadly disease of cancer itself is the second leading cause of death in the U.S.

However, there is hope in the near future that cancer will not necessarily mean a death sentence. Today, biomedical research, possible through animal testing, has found numerous life-saving treatment options. Already, the mortality rate for cancer in the U.S. has decreased by 26% from 1991 to 2015 according to the SEER Cancer Statistics Review. Clearly, biomedical animal testing is enabling the human race to come closer than ever every day to defeating cancer.

Cancer is a disease where abnormal, mutated cells divide uncontrollably and destroy surrounding body tissue. The cause is unknown, but it has been linked to genetics, diet, and lifestyle. As the cancerous cells divide, they form a mass called a tumor. Cancerous tumors are called malignant, while inactive tumors are called benign. However, some cancers like leukemia, cancer of the blood cells, do not cause tumors. In both cases, cancerous cells can spread to throughout the body through the bloodstream or lymphatic system, called metastasis. For this reason, cancer is best treated at an early stage when it is still isolated. Additionally, there are over 100 different types of cancer that differ from case to case. These variances make the disease exceptionally challenging to cure. Nonetheless, biomedical animal testing has yielded major advancements in the understanding and treatment of cancer throughout the years.

For example, in 1976, researchers Dominique Stehelin, Harold Varmus, J. Michael Bishop, and Peter Vogt discovered a gene in normal chicken DNA related to the oncogene. Oncogenes are cancer-causing genes. Surely enough, the identified gene in the chickens caused avian sarcoma virus, a type of cancer in chickens. Furthermore, a 1984 study in rats with an oncogene called the “neu” confirmed the presence of oncogenes. These findings were integral to the discovery of human oncogenes, like TP53 in 1979. TP53 is the most commonly mutated human tumor suppressor gene and is often the target of many cancer treating therapies today.

In addition to advancing cancer research, biomedical animal testing founded major treatments for cancer as well. Innovations in radiation therapy, vaccines, and immunotherapy for cancer were all tested on mice and animals before administered to humans. Specifically, mice were vital in founding chemotherapy, the use of drugs to attack and damage cancer. In the 1950s, The Institute of Cancer Research began work on a family of chemotherapy agents. It was primarily based off a study at Yale University on nitrogen mustard, a derivative of mustard gas, that reduced the size of tumors in mice. Once human clinical trials confirmed the effects, chemical drugs became a common cancer treatment.

Moreover, Charles Huggins realized the use of dogs as models for the treatment of prostate cancer in humans in 1941. By studying dogs, Huggins discovered that natural hormones in the body allowed tumor growth. This meant increasing female hormones while reducing male hormones would treat prostate cancer. Furthermore, what he had found was the concept of hormone therapy, an effective treatment utilized today to treat some cancers. For his work, Huggins was awarded the 1966 Nobel Prize in Physiology or Medicine.

As a result of those listed and countless more biomedical animal testing studies, my grandmother was able to receive immediate treatment for cancer. Against the odds, my grandmother's stage three cancer improved by eighty percent through chemotherapy and radiation, and she was expected to make a full recovery after surgery. Similarly, animal testing has improved, extended and saved countless other lives of both humans and animals as well. Unfortunately, a massive heart attack took my grandmother's life due to elevated blood pressure right before her surgery to remove the reduced tumors. Until the end of her battle, in thanks to biomedical research, my grandmother's last days were marked with hope.

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