2023 New Jersey High School Essay Contest
2nd Place

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Glioblastoma is the most lethal and most common kind of brain tumor. Typically, with the current standard of care, the median survival rate for those with Glioblastoma is less than 15 months. Although it's considered incurable, there are currently several treatments to prolong a patient's survival time. One recent biomedical breakthrough for this specific kind of cancer is oncolytic virus therapy. It took years to arrive at this conclusion through animal trials and continuous research. Biomedical research on Glioblastoma has improved the life span of my late cousin, therefore improving my life and the life of other Glioblastoma patients. However, the high cost of this therapy can be inaccessible to those who are uninsured or have low incomes.

Typically, Glioblastoma is tedious to treat due to its spread. Since the tumor grows into healthy tissue, it is difficult to surgically remove it, as healthy cells would be removed along with cancerous cells. Additionally, other customary treatments for Glioblastoma include radiation therapy and chemotherapy. Although these treatments can elongate one's survival rate, the disease almost always prevails, and also does the pain of adverse side effects. Glioblastoma is also known as a "cold" tumor, meaning immunotherapy is ineffective in targeting its immune cells. Yet, clinical trials of oncolytic therapy proved its superiority in treating Glioblastoma.

Oncolytic therapy infects and breaks down cancer cells without affecting normal, healthy cells. For instance, 12 patients with newly diagnosed GBM were injected with oncolytic virus therapy called "NVV'' following surgical tumor removal. Two weeks later, patients began standard radiation and chemotherapy to ensure that NVV was safe. Researchers found that immune cells, cytokines, and antiviral antibody levels fluctuated, suggesting that the treatment worked as intended. Additionally, MRI scan results showed a decline in tumor severity before and after the treatment. While studies are still being conducted, "initial results suggest that adding NNV to the standard of care may provide a survival benefit; treatment resulted in a median progression-free survival of 9.1 months and overall survival of 18.4 months."(MD, 2022b). These results demonstrate how oncolytic virus therapy could be a potentially life-changing tool in cancer therapy. It's a tool that will eradicate the tumor while ensuring the patient's quality of life is not diminished.

Furthermore, without the use of animals, biomedical research wouldn't be possible. Animals make valuable research subjects since their body systems are very similar to the ones of a human. Although some believe that research harms animals, there is no other way to find treatments for diseases like glioblastoma. Without animal research, there would be millions of fatalities because many factors would be unpredictable. The testing on animals in biomedical

research is known as the preclinical trials. During glioblastoma's preclinical trials for oncolytic therapy, mice were implanted with diluted human tumor cell lines. Once a tumor was developed, the oncolytic virus was injected into the mice. Finally, the tumor mass and the life span of the mice are measured. Preclinical trials of oncolytic virotherapy demonstrated that "half the mice that received the treatment lived for an average of 40 days. Those who received the virus alone lived for 20, while untreated controls only made it to day 18."(Souped-up Oncolytic Virus Warms up Cold Brain Cancer Tumors, 2022). The elongation of survival time indicates that the tumor changed from "cold" to "hot," an advancement in oncolytic viruses toward glioblastoma. As a result, immunotherapy becomes effective in targeting the tumor's immune cells. Moreover, animal trials will allow scientists to expand their research toward cancer treatments and possibly even cures.

In general, Oncolytic virotherapy is a vital tool in the treatment of many cancers, including glioblastoma. It took years to reach this conclusion but with the aid of animal research, it became possible. My cousin Nicole was diagnosed with this aggressive cancer at the young age of 16. Doctors believed that she would only survive for as little as six months. However, her mother took Nicole to 4 different hospitals, met with hundreds of doctors, and traveled to 3 different countries. As a result, she lived for another 8 years after being diagnosed with glioblastoma. Although biomedical research is one of the best healthcare tools in the world, it's greatly underfunded and profits continue to be valued over patients. It pains me to imagine how many others like my cousin are unable to receive the life-saving treatment they need because such therapies often remain inaccessible. Hopefully, through biomedical research, a cure for conditions like Glioblastoma is on the horizon.

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