

2023 New Jersey High School Essay Contest
3rd Place

Nitin B.

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Biomedical Research and My Life

When I saw that this prompt included the benefits of biomedical research on pets, I knew I had to write about my dog. Around 15 years ago, when I was 1 year of age, my family got a dog named Buddy, and my memories with him were some of my favorites from my childhood. However, in 2011, Buddy started displaying some strange behaviors and symptoms, which concerned us. He was vomiting, had a high fever, and had bloody stool. We took him to the veterinarian, who told us that the dog had acute enteritis and thought that he also had a disease known as Canine Parvovirus. We did not know what that was at the time and were not aware that a vaccine for such a disease was available. Immediately, the vaccine was administered to our dog and after a few weeks of treatment, he was back to normal. The vaccine had saved his life. The Canine Parvovirus vaccine is considered one of the core vaccines for dogs since the virus itself is one of the most contagious and deadly. This memory stuck with me and recently popped back in my head when I saw the prompt for this essay, since Buddy just died recently in India while living with my extended family there. Canine Parvovirus type 2 (CPV) is the virus responsible for the disease commonly known as "parvo". It first emerged in dogs in Europe in 1976, and by 1978 it had caused a global epidemic of myocarditis and gastroenteritis. In 1979, scientists at Cornell University's Baker University discovered a vaccine for CPV and subsequently, in 1981, created an improved attenuated vaccine. Research is ongoing to study the virus and its evolution, as well as to determine whether current vaccines provide adequate protection against modern strains of the virus. To develop the vaccine for CPV, a fecal sample was taken from dogs to determine the presence and type of Parvovirus, with type 2 being the dangerous one that required a vaccine. Different vaccines were tested on dogs to assess their efficacy in providing protection. In one study, an attenuated virus vaccine was administered orally to seven male beagle dogs aged 6 to 8 weeks, which were divided into three groups. Group I was the control group and received a saline solution, while group II was given the clinical isolate, and group III received the attenuated virus two weeks before the clinical isolate challenge. The dogs' clinical condition was monitored daily, and blood and fecal samples were obtained every two days to detect viremia, antibody levels, and fecal shedding of CPV using PCR. On the day of death or 11 days after inoculation, various anatomical samples were taken and analyzed by PCR to evaluate histological changes. An oral food challenge was also conducted to rule out any external factors in the dogs' clinical condition. Without the use of dogs in this experiment, it would not be possible to replicate this type of study elsewhere and it certainly would not have been possible to eliminate such a deadly virus. Some of the

processes utilized in this study were some that I had already experimented with and known about, such as PCR, which I utilized in my medically-oriented classes. Others, like the sequencing technology used to clone the VP2 gene, were new to me and taught me new methods of research. In the end, the experiment ended as a success in determining that the attenuated virus vaccine helped prevent the Canine Parvovirus from killing dogs. I truly understand the importance of animal research and trials in these types of studies, especially when put in a context that involves a loved one like my pet dog. Knowing that Buddy would have died without this biomedical breakthrough makes me grateful that something like this was created and with the help of animals. Even now, through the coronavirus pandemic, mice were used to make the vaccines which saved millions of lives around the world. It goes to show how animal research can advance medicine and science in order to create all these life-saving technologies.

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