

2020 PSBR High School Essay Contest
Finalist

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When I was younger, I didn't grow up as every other average person would. Around the age of 3 years old, I was diagnosed with a type of epilepsy called Childhood Absence Epilepsy (also called petit mal seizure). Childhood Absence Epilepsy (CAE) is a type of seizure where children have a brief staring spell that can occur randomly at any time during the day. CAE usually happens in children between the ages of 3-8 and normally disappears around puberty. Lucky for me though, during that time and with a little help from my pediatrician, I was asked to participate in a research study in Philadelphia. This is where the specialists would research to compare the effects of two commonly used anti-seizure drugs (lamotrigine and valproic acid) in children with epilepsy. The major purpose of the study was to try and identify the factors that explain why the patients respond better to certain medicines, in terms of better seizure control and fewer side effects than other patients.

Before any human clinical trial is available to test on patients like me, it first has to be tested on animal models. In this case, the animals that were tested were rodents, starting with the antiseizure drug lamotrigine (Lamictal), which was developed by GlaxoSmithKline and approved in 1994 for the use of treatment of partial seizures. The lamotrigine drug was found to work by preventing the voltage-dependent sodium channels from functioning, which then results in balancing out the neurons to decrease the release of the amino acids glutamate and aspartate. In some cases that tested this drug, the rats ended up producing resistance to lamotrigine. As a result of being tested on the rats, it ended up being approved for further testing on humans.

This is the part where I stepped in and became part of the testing for the anti-seizure drug lamotrigine. Starting with part one of my trial, I was given a blinded test. This is where neither my doctor nor I knew what drug I was taking. During this process, I was given a number of other tests to see if the "unknown drug" (lamotrigine, valproic acid, or a placebo) was working properly. I had to provide blood work to test the hormone prolactin in the blood, go through EEG (electroencephalogram) scanning to have the doctors evaluate the electrical activity in my brain, and had to do various tasks for behavioral observations. Similar to the rats, I too ended up producing resistance to the drug and continued to have seizures.

Given the research on rodents, scientists had to figure out a new type of anti-seizure drug to improve the results. The next type of drug that was tested was the valproic acid (Depakote). This type of drug has been on the market in the United States since 1983 as a treatment for absence seizures. One of the major actions of valproic acid is to increase the amount of gamma-aminobutyric acid (GABA) in the brain, which is then used to help calm and relax the nerves in preventing the brain signals that lead to seizures. In the research on rats, it

resulted in being highly effective in limiting the numbers of seizures to occur, which allowed the progression to human trials.

After the failure with lamotrigine, I was advanced to phase two, the unblinded part of the CAE drug trial. Here, I was given a type of Depakote Sprinkle Capsule that was only approved for treating patients with general epilepsy. As a result of using this drug, the number of seizure episodes I experienced decreased and eventually stopped. One of the side effects of valproic acid I noticed was moderate hair loss. During this phase, I went through the same tests as with lamotrigine, but the results of taking valproic acid proved to be positive and very effective.

If it wasn't for animal testing in research to see which drug would work best to prevent seizures, I would not be the same seizure-free person I am today. It was pretty interesting that I too was part of a clinical trial like the rats to help provide more information on the use of lamotrigine and valproic acid for the treatment of CAE. Animal testing has proven to be useful in finding the correct drug treatments for humans and animals diagnosed with many diseases including epilepsy.

Work Cited

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