

**2023 New Jersey High School Essay Contest**  
**1<sup>st</sup> Place**

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The first time I asked my parents about my birth story, they told me I almost didn't make it. I was delivered through emergency c-section because I was suffering from a rare condition called fetal-maternal hemorrhage, which caused my fetal blood to flow back to my mom and therefore I was losing blood at an alarming rate. As a result of this, I was born with about a quarter of the normal amount of hemoglobin and needed four blood transfusions to stay alive. I spent the first two weeks of my life in the neonatal ICU, with different tubes connected to my body to get oxygen and nutrients I needed to survive. After I left the hospital, I had many lingering neuromuscular disorders, including muscle tightness, developmental delays, deficiency in gross and fine motor skills, eating disorders and visual difficulties. I also learned to walk much later than usual, and needed to wear braces for many years to correct my toe walking tendency. I had very weak core muscles, to the point that my parents had to put me in a laundry basket and put blanket and folded towels behind and around me in order for me to learn to sit up when I was nearly one year old. My right leg's hamstrings were very tight, which causes my right leg to be about 2 cm shorter than my left leg and need to be corrected with shoe lifts. This combines with my lack of depth perception in my vision to make it hard for me to balance and navigate uneven terrains such as walking up stairs. Throwing and catching was especially difficult for me because of the lack of eye-hand coordination and muscle tone imbalance throughout my body. At age four, I was formally diagnosed to have cerebral palsy as the consequence oxygen deprivation during birth.

A lot of research has been done about different therapies that help kids with cerebral palsy. One particular biomedical advancement that has helped kids with cerebral palsy is physical and occupational therapy. It helps them with coordination, balance, and flexibility. Physical therapy is usually one of the first steps to help someone with disabilities get better through effective and targeted exercises. Medical research has found that the most effective exercises for people who have cerebral palsy are CIMT (constraint-induced aphasia therapy), occupational therapy, and gait training. Physical therapy is also complemented well with occupational therapy, which works with the muscles in the patients' hands to build fine motor skills and hand muscles. This can help kids who have weak hand muscles improve doing tasks with their hands. I was fortunate to benefit from both physical and occupational therapies through New Jersey State's early intervention program and the individualized education program (IEP) since I was 9-months old. These treatments have allowed me to flourish as a high schooler despite numerous challenges that I had to overcome.

Over the years, biomedical research has enabled breakthroughs in medical treatments that help kids like me, who were born with disabilities. A big part of biomedical research is done

with the help of animals. This is especially true with cerebral palsy research, because researchers can use animal models to see how a certain treatment can possibly help brain development in animals with brain damage, and later apply the same treatment to kids with the same condition. A study done in 2016 used rodents with the same brain damage that children with cerebral palsy may experience in the third trimester of birth. Studying the similarities between brain damage of animals and can help scientists develop different exercises that trains patient's cognitive ability and muscular coordination. One of the treatments that were developed from these studies involves using treadmill exercise to improve a patient's locomotor adaptation and neuromuscular connections. For example, each leg of the patient is exposed with a different speed, or the patient is instructed to perform simple reading tasks when walking on treadmill. I personally benefited from such treatments during my three years of treadmill training with Dr. Joni Redlich at Kid PT in Raritan, NJ.

Going to physical and occupational therapies has been a life changer for me. From a kid who barely survived to now enjoying every day of my life in high school. I still use treadmill for exercise, but I am using it now to prepare for my first triathlon race this summer. With advancements of biomedical research, I believe we will have more living miracles like myself in the future

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