

An Overactive Brain

It was a typical evening after dinner, my brother and I were clearing the dishes from the table. The light from the ceiling fan blinded me as I trudged into the kitchen with a full stomach. In front of me was my brother. We were both headed to the kitchen sink to deposit our empty plates when suddenly—*crash!* The ceramic plate hit the ground and impaired my ear drum. My eyes flew open wide, witnessing my brother as his body swayed, and he hit the ground. His body began to go into a convulsion. For once I stood above my older brother (uncle) helpless as his body trembled and shook involuntarily “*Help*”...I whimpered.

Everything went silent, as my eyes only saw my dad (grandfather) running into the kitchen. He lifted my brother’s head softly with his hands protecting his head from hitting the ground. “Mom!” I screamed. My mom (grandmother) came running into the kitchen. Kneeling down to my brother she turned him to his side. I looked down at him terrified and motionless, *what was I to do?*

I turned my head to look behind me, my sister was standing there ready to break down. I ran to her and pulled her into my parents bedroom. She looked at me, tears streaming down her face. “Shh” I reassured her, embracing her. To distract her I turned on the television and ran back to the rest of my family.

Coming back to the scene I saw him once again. On one knee he tried to push himself up, he looked at me with a terrified look in his eye. He was ready to bolt. “No Santiago, sit back down, you are okay you are safe.” my mother assured him. Disoriented, he stumbled up only to sit back down.

My older brother Santiago had just had a grand mal seizure. After being diagnosed with epilepsy his freshman year he continued to have seizures. Throughout high school my brother

continued to have different medications to control his seizures however he suffered from the side effects of the medications: forgetfulness, fatigue and drowsiness. The forgetfulness made it hard for him to learn math and remember homework assignments. He continued to try a number of medications before finding the right combination, however he still faces the possibility of having a breakthrough seizure if he forgets to take his medication, takes more than the recommended amount, or does not take care of himself and follow a self-care routine.

Epilepsy and migraines are both neurological disorders that are underdiagnosed, undertreated, and continue to be a mystery. Those with epilepsy and migraines tend to have increased neural activity and a lower action potential threshold. It takes their neurons a lot less to reach an activate an action potential compared to those who don't have an increased neural activity.

Last summer I had the opportunity to study the migraine pain pathway aura, in an effort to find a inhibitor to stop the migraine pain pathway from being activated. This research could not be conducted without the use of brains from mice. Using the brains from mice, I was able to slice the brain and induce cortical spreading depression using intrinsic optical signal imaging. The process starts with the removal of the brain, than placing it in ice to keep the cells alive and slow down their metabolism, it is then placed in an ACSF, or artificial cerebrospinal fluid to make the environment as much like the brain as possible. Inducing cortical spreading depression in the brain of a mice could be used to find an inhibitor to stop it from spreading. This inhibitor could be used to make medications to treat migraines and possibly even treat epilepsy without the harmful side effects.

Using animals for medical research is beneficial to finding medications and solutions to medical diseases like epilepsy and migraines.

Bibliography

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