

Locked In

Emma Kuhr

Department of Biology
Lake Forest College
Lake Forest, Illinois 60045

I can remember the day I was born. I came into existence in a warm and dark place, my nucleus filled with the memories my mother had passed on to me when she had split. There were lots of us, all gathered together, all still new to the world. I huddled with my newfound friends, speculating what we would one day be.

Jessica, a rather ambitious cell, had it all planned. "As soon as it's my turn to go, I'm heading straight for the frontal lobe," she informed us one afternoon.

Billy curled his microtubules in distaste. "No way! I want to see things! Occipital lobe, here I come!"

Luz, a quiet cell just to my left, asked me what I wanted to do. "I like the pons," I said. "I'd like to help Tom move around." Tom was the name we had affectionately given to our human.

As time passed, I began to grow restless, with wanderlust stirring in my cytoplasm. Many of my friends had moved elsewhere. Jessica and Billy, still arguing, hung out with the Forebrain cells. Luz, shy as ever, had a smaller group of friends: the Midbrain cells. I found myself socializing with a group of cells that called themselves the Hindbrains. Even so, I still felt restless. I felt like I wasn't home yet, even though I had lived in the neural tube my whole life. Some memory, hidden deep within the recesses of my nucleus, was letting me know it was time for a new adventure.

Some of the more adventurous glia were starting to branch out and explore. Glia were a little different than us and these were more mature and developed; as they created chains and bridges, they called out to us, encouraging us to follow them into the unknown. At first I was nervous, but finally I worked up my courage and made my first movements toward what would eventually be my home.

I dragged myself out of the thick clusters of scared cells huddling together and into cells that had only had to move a little way to find their home. I pulled myself along, clinging to the glial cells that were my only tether to the life I was leaving behind.

Fortunately, I didn't have to move far. After only a short journey, I reached a place that felt strangely familiar, buried in my memories. "Hey, Tam," cells called out, welcoming me. This place was radiating a feeling of comfort and security. As I nestled my way into an empty place that I recognized as mine, I felt a profound sense of belonging. This was the pons, my home. I was here at last.

Once I had settled into my home, I found myself beginning to grow. As my friends began their own changes, they gave me food that helped me change with them. My dendrites began to branch out from my body, and my axon lengthened. As I matured, my dendrites grew more complicated, ready to help me make new friends.

"Hey!" a cell called out from nearby. "I'm Lucy! What's your name?"

"I'm Tam!" I called back, reaching out blindly. "Where are you?"

"This way," she said. "Here, I'll lay out some markers for you."

As I reached out, my axon hit the familiar shape of a marker, and I extended further to find another, and then another. As I followed the markers to their source, I accidentally bumped into a cell.

"Hey!" Lucy's voice rang much clearer now that my axon was nearby. "Watch it!"

"Sorry!" I pulled back a tiny distance. "Is that better?" She waved her dendrites in assent.

Other neurons were calling out for friends and I laid some markers for them, inviting them to join me. As we all grew, our dendrites continuing to thicken, some friends left and others joined me. Tom, we noticed, was growing too. Rumors spread that Billy and his friends in the occipital lobe were getting constant input now. Tom, like us, was finding his place in the world.

As time passed, things in the pons settled down. I knew other cells like Jessica would still be maturing, but for my friends and I, life became a routine of passing along whispered messages to one another to create many of Tom's movements. It had been a little while since Tom had stopped growing when disaster struck.

One day, as I was going about passing various messages to Lucy, a massive explosion occurred. Blood cells flew everywhere, scream-

ing at us to take cover. Chaos filled the air around us.

As the air cleared, I realized that a blood vessel upstream had burst. As I watched in horror, many of my friends began to gasp for oxygen, their membranes twitching grotesquely. They shivered and wilted, and then stilled.

"Hello?" I called out tentatively. There was no response. Carefully, I twisted one of my dendrites upward and prodded Jerry, the closest neuron. Nothing.

For a while those of us remaining huddled in silence. I was starting to feel weak. With no messages coming through, I couldn't exchange them with Lucy for food. It didn't help that we could hear nothing from other parts of the brain. We were completely cut off.

After some time waiting, I finally managed to catch a couple of whispered words from a circuit nearby. Locked-In Syndrome. I had no idea how I had managed to hear them. Nor did I know what the words meant.

Something I did know very acutely, however, was that I could not feel Tom moving. The few times his body shifted, I could not hear the warm hum of neurons passing messages along to the body. Lucy said that many of the muscles were complaining that we weren't doing our jobs.

"We can't," I fumed, my frustration at our predicament finally getting the better of me. "Don't they get it? We're stuck! We can't do anything!"

"I know," Lucy said faintly. She wasn't getting food either, I recalled. "I wonder if Tom feels as sick as we do?"

"I'll bet he feels as trapped as we do," I replied bitterly.

As the days dragged on and I clung to life, I began to catch whispers of a new and horribly frightening problem. "Lucy," I whispered tiredly, "Tom has pneumonia."

"Oh, no..." Her dendrites twisted in despair. We both knew what that could mean.

Without us to help Tom cough, he would have a very hard time fighting it off. He must have doctors- how else would I have heard about Locked-In Syndrome? - but I didn't know how much help they could give.

We waited with bated breath. Rumors of a massive battle going on in Tom's body tricked up to us. And then, shortly later, the rumors ceased altogether. I knew what that meant.

The comforting feeling of blood flowing past slowed and stopped, and everywhere I could hear dying cells crying out.

Weakness stole over my body. A suffocating feeling of exhaustion and grief grew within me. I'm sorry, Tom, I thought groggily. As darkness crept over my thoughts, I wondered if he had truly lost the battle with pneumonia or had just given up.

Note: Eukaryon is published by students at Lake Forest College, who are solely responsible for its content. The views expressed in Eukaryon do not necessarily reflect those of the College.

References

- Kolb, B., Whishaw, I. Q., & Kolb, B. (2013). *An Introduction to Brain and Behavior, Fourth Edition*. New York: Worth.
- Pinel, J. P., & Edwards, M. (2008). *A Colorful Introduction to the Anatomy of the Human Brain: A Brain and Psychology Coloring Book, Second Edition*. Boston, MA: Allyn and Bacon.
- Schnabel, J. (Director), Kennedy, K., & Kilik, J. (Producers), & Harwood, R. (Writer). (2007). *The diving bell and the butterfly* [Motion picture]. United States: Miramax Films.
- David Grubin Productions in association with Thirteen/WNET New York. (2002). *The secret life of the brain*. [Alexandria, Va.]: PBS Home Video
- Cooper, J. A. (2013). *Mechanisms of cell migration in the nervous system*. *J Cell Biol The Journal of Cell Biology*, 202(5), 725-734. doi:10.1083/jcb.201305021
- Khanna, K., Verma, A., & Richard, B. (2011). "The locked-in syndrome": Can it be unlocked? *Journal of Clinical Gerontology and Geriatrics*, 2(4), 96-99. doi:10.1016/j.jcgg.2011.08.001
- 1 PYRAMIDS - CORTICOSPINAL FIBERS. (n.d.). Retrieved from <http://www.neuroanatomy.wisc.edu/coursebook/webstem1-3.pdf>