

Schizophrenia: The Life of a Misplaced Cell

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Parts of me start to pull together. I am a single cell, lost in a dark space. At first, I am confused, unsure of what to do or where to go. But then, I feel a gentle tug. I look and see someone pulling me to the right. I look at this cell's name tag and it reads "Radial Glial." When I look at her, I remember the training. I have a distant memory of being trained for my job as a neuron in a brain. I know that for now, Radial Glial will take me where I need to go. I will remember the rest as I need to.1

Radial Glial reaches a hand out to me and I take it. Something inside me tells me where I need to go, but I know I need Radial Glial's help to get there. Suddenly, something happens—something wrong. Radial Glial starts pulling me in the wrong direction. I am a dopaminergic neuron, so I know I am supposed to be somewhere in the ventral striatum, but I am being pulled far away from that. Radial Glial seems to be pulling me to the front of the brain. No no no, this isn't right. But, I just have to go with it; there is nothing I can do to change it now. I can't oppose Radial Glial; she is much stronger than me and knows more than I do right now. My new home will be the prefrontal cortex and I will just have to do my job as best I can, even though I know this might cause issues down the road.

2. As I travel down the new path laid out to me by Radial Glial, I see other neurons being pulled to their places. I wave to them and they wave back. They are headed to the hippocampi like they are supposed to, but they don't seem happy.

Tightening my hold on Radial Glial to make sure I don't fall off my path, I lean to the left as another friend, led by his Radial Glial, is about to pass by. I yell at him: "Hey friend! What's wrong?"

The other cell turns toward me and responds, "I am totally lost, man! I know I am heading to the hippocampus like I am supposed to, but it doesn't feel right. I don't know what it is, but something feels off."3 "Hey, at least you're heading to the right place. I was supposed to go to the ventral medial striatum but I'm being taken to the frontal lobe instead." "No way! Good luck, man!" I wish him the same, and then we continue our journeys. I think about what he said and what this means for all the other neurons. If a lot of us aren't going to the right places in the brain, things can get tricky for this human.

I make it closer to my destination in the frontal lobe. The frontal lobe is an interesting place; a lot of processes happen here that directly affect our human's personality and ability to make decisions. I'm going to have to be careful. 4. Finally, Radial Glial gives me a look and I know that I have reached my destination. I look around me and see other pyramidal neurons happily taking their place in the cortical prefrontal cortex.5 They talk to a span of cells around them, so I follow their lead and initiate a conversation with the cells in front of me.6 We chat for a bit before the next phase happens: neuronal death.

I take a deep breath and prepare myself. All around me, I see cells collapsing into themselves and melting away. I grit my teeth and will myself to survive this. Since I am not where I am supposed to be, I know that I have a higher chance of dying—I probably should die so I don't cause issues later, but I don't want to. I want to survive this.

Before I know it, apoptosis is over. Part of me is a little surprised that I'm still alive—I'm in the wrong place and I thought I would be weeded out. 7 Now that this phase is over, the next phase starts, where I make connections with the other neurons around me. Then, our human will finally be ready to enter the world.

I look around me and notice that there are less neurons in the prefrontal cortex than I expected. Way behind me, I can see the ventricles of this brain developing. For some reason, they seem larger than I thought they should be.8 Pushing the thought aside, I focus on what I am doing. This human is about to be born.

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I am five years old. My human's name is Jenna. I have adapted to being in the frontal lobe and have assumed great responsibilities. For example, when Jenna experiences pleasure, such as when Jenna's mother gives

her a piece of chocolate, I release dopamine to allow Jenna to experience pleasure. My friends around me aren't organized too well; I have to reach farther than I want to get their signals, but I am making it work.

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I am fifteen years old. Some of the arms I use to receive information from other neurons are receiving a lot of mixed signals and I am having trouble understanding them. I seem to be receiving some signals from the ventral striatum as well as some mixed signals from cells in the left superior temporal gyrus. But they are just small things... maybe some whispers... Jenna will probably start to notice soon.

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I am sixteen years old. Jenna has noticed some odd things and wanted to get her ears checked. After explaining everything to her doctor, we sat there in silence. After some time, the Wernicke's area's neurons understood one word: schizophrenia. I decided that can't be it. It must be wrong.

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I am seventeen years old. Jenna has caught on to a few things. I try not to cause issues but problems have been getting worse. My pyramidal neuron friends are having some arguments; we just can't be organized. My dendritic arms are receiving too much input from the temporal lobe and even the ventral striatum.10 I've been trying to calm down my friends in the superior temporal gyrus, but they have been getting really paranoid. I am having trouble interpreting what is going on and know that it is my job to come up with conclusions.

But wait. What if they are paranoid for good reason?

What if life is not what I think it is?

I need to tell Jenna. This is important.

Jenna is in her room right now, so I decide to set off the alarms.

Things are not making sense. I am hearing things from all over, neurons are firing at different times, and there's too much activity. Jenna sets her elbows on her knees and holds her head. I hear her whisper to herself, "what are you saying to me?"

She's talking to someone. Or at least, she thinks she is. But she is right. She's talking to someone. Otherwise, she'd be talking to the wall. But I guess there could be someone in the wall she's talking to. That makes sense. People can get trapped in walls.

I feel my friends from the temporal lobe release more signals and Jenna responds to them, thinking that she's heard something. "Why are you talking to me? Find someone else to get you out of the wall. You should stay in the wall."

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I am twenty years old. I am waking to the sound of a high-pitched voice speaking quickly and urgently. Then I realize that it's Jenna's voice: "I'm telling you I hear them! They're in the walls and they're not leaving! Leaving is bad. Bad is not good. Good things don't just go!"

I'm trying to make sense of what's going on. I think I understand; the bad thing is that the voices are still in the wall. That's not good. "But you left the voices in the wall!" Jenna says aloud in response to my realization. Then, I hear other voices speaking. They are calm and official. The visual cortex, with help from the temporal lobe, identifies these faces;

I see doctors in lab coats around me. I must have gotten carried away. I feel the dopamine being released around me and look around at my friends in the prefrontal cortex. We are all so disorganized and confused. Poor Jenna.

Suddenly, I feel things calming down. I see a bunch of molecules around me with names tags that say "Valium" on them. Things go dark and Jenna goes to sleep.

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I am twenty-eight years old. Jenna has been taking anti-psychotics that have been helping prevent me and my friends in the ventral striatum from releasing too much dopamine. Thus, we neurons haven't

been as excited and out of control. I still have trouble telling the difference between hearing real and hearing imaginary things when my friends get too excited. I sometimes have trouble following a line of logical and organized thought, and when I get confused, Jenna can mess up her sentences. However, she is aware of her condition and tries to take her medication regularly. Things are better. I will continue to work hard here to give Jenna the best life possible.

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.

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