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Anorexia, Bulimia, and Crayfish (or, Why I Study the Pharmacology of Serotonin Receptors in Glutamatergic Invertebrate Systems)

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Anorexia, Bulimia, and Crayfish
(or, Why I Study the Pharmacology of Serotonin Receptors in Glutamatergic Invertebrate Systems)

Most of them threw up. Not all the time, but at least for a while. The rest of the time, they just starved themselves, controlled themselves with the discipline of a Tibetan monk. Most of them said that’s what it was all about — control. They didn’t have any. Their control was skipping lunch, saying they ate a big breakfast. A big nothing — nobody believed them. When teachers passed out cookies or whatever, trying to be nice, they handled it one of two ways: they’d say they couldn’t eat anything without something to drink and hide their water bottles in their book bags so nobody would point out that they were lying, or the craftier ones always had Kleenexes in their purses and spit whatever it was into a tissue, wrapped it up, and stuck it in their book bag. A trophy of their control. The worst part was that they wouldn’t throw the stuff out. Their book bags stank of half-chewed cookie rotting for a few days before the stench of their self-control was too much for even them to handle.

You couldn’t get near the girl’s bathroom at prom or sweetheart or homecoming. There was too much smoke. But the smoke wasn’t the issue. The problem was that if the smoke wasn’t there, you could smell the vomit. You could smell it on them when they came out, in velvet dresses, hair pulled up, smile on face, breath mint in mouth. But breath mints don’t cover up that sort of vomit, the sort of vomit that’s been there for months and months, the sort of vomit they flush down the toilet but never really goes away. Always there, reminding them that, if nothing else, they have control over what goes or does not go into their bodies. And they’re proud of it. It’s theirs, and nobody else’s.

Blame it on their parents pushing them too hard, on rap music videos, maybe even the Religious Right, or anybody else who tries to control eating, anxiety, and obsessive compulsive disorders, as well as controlling cocaine and alcoholic addicts is trazodone (or its metabolite m-chlorophenylpiperazine). It is considered a “dirty” compound because it binds to many different types of serotonin receptors and, in some cases, produces what is termed a “serotonin syndrome.” Garret Sparks has been investigating this compound in crayfish and fruit flies to further understand its mechanism of action. He discovered that it does not act as one would expect in humans and vertebrate models, but that it blocks conduction of electrical signals along neurons by an as yet unknown mechanism. Mr. Spark’s investigations remind scientists that pharmacological agents may work very differently in different organisms, but also that the possibility of primary actions in one organism might account for actions to a lesser degree in others. [Mr. Spark’s research was recently published in Brain Research 969:14-26 (2003) or on-line at http://www.elsevier.com/locate/publications/.../6/2/2/2/8/7/index.htm]
to define femininity in a way that tells girls that they’re supposed to be something they aren’t. But it’s more than just that. I saw it too much, smelled it too much to think that starving and vomiting are nothing more than just a girl trying to be what everybody tells her she’s supposed to be. It is something so much more basic to human nature. A desire for control. That’s sense enough to me.

I didn’t date much in high school. That was never really my decision. I was that guy who was every girl’s best friend. I was all right with that, it made sense enough to me. So maybe I learned somewhere in there to be a mother hen, to get upset every time I found out she was destroying herself from the inside out. And that she changed every few months, but it wasn’t really all that different. Another girl with her head over a toilet, telling me about it on the phone minutes after, sometimes sad, exhausted, but other times tickled pink and feeling more alive than she ever had before.

I wasn’t one to tell them how to be healthy. I was overweight enough myself — the fat, pimply, smart kid who could help them with their chemistry homework or their guy problems (usually my best girl friends dated my best guy friends, by whatever luck; small school, so it goes), but definitely not with the more important matter at hand: how do I make everybody love me?

I was a bottomless dumpster for getting things off their chests, a committed yes-man, the guy who told them everything they wanted to hear and then some. They didn’t really care what it did to me, how I fell in love with every one of them just because it killed me they didn’t love themselves enough to respect their own hearts, their own bodies. That was life.

That’s not to say there weren’t some variations in there, some good knock-down drag-out fights, some bawling. You haven’t lived until you’ve had a girl call you up on the cordless phone in the bathroom and vomit her dinner into the toilet, making sure you hear every last morsel splashing into the brownning water. Just because she knows you hate it, because she knows it will tear your heart in two, because you tried to take away that control from her, because maybe you tried to get her help, you tried to be there for her, or maybe you told her parents when you thought there was nothing else that could be done.

I came to college and was amazed. The girls around me were eating all of a sudden. I watched them closely, imagining they were about to make a bathroom run as soon as I turned my back. But, no, when they went to the bathroom, it was hours later, just like everybody else. It finally clicked that there was something rotten back home, that all those girls in an upper-middle class bubble were somehow caught in an indecent trap that emptied them of their dignity.

I admit that I’m speculating based on limited data, that watching my best friends starve themselves or vomit up their lunches doesn’t make me any sort of authority on eating disorders, doesn’t mean that I have a clue about how to fix the problem. But if nothing else, I understand what eating disorders have done to people I love, and that’s something important in itself.

About the time I was deciding on college things, school and major, etc., the cover story of Time magazine was all about eating disorders and how scientists were figuring out that by looking at certain brain chemicals, neurotransmitters, somebody someday might be able to explain a great deal about what causes eating disorders, and maybe even figure out a way to treat them.

Eating disorders are obviously more than simple neurophysiological anomalies; social factors do their fair share. But, if there were something in neuroscience that could help people who have those sorts of problems, I wanted to know about it. So I came to UK and decided to major in Biology and English, hoping I could learn something about humanity from what most people would say are opposite approaches. The sciences and the humanities are interested in many of the same issues — what it means to exist and, more importantly, to be alive — even if they disagree about the best ways to study those things.

I found out about Prof. Robin Cooper’s lab some time during my sophomore year. I was itching to get into research, because that seemed to be where people were actually doing biology instead of just reading about it in textbooks and on power point slides. Dr. Cooper was working with crayfish and fruit flies to investigate some very basic mechanisms of how neurons communicate with each other, the sort of basic science research that every once in a while has far reaching implications in the clinical research that finally leads to new treatments for diseases.

His laboratory was already full with more than enough students, and Dr. Cooper had teaching commitments and was applying for tenure that semester, so he politely deferred me and told me to check back later. For the spring semester and the summer, I went to another lab that was investigating some novel cancer treatments. I enjoyed the cancer work, but I still wanted to be in neuroscience.

By the fall, I had a project in the crayfish lab. It wasn’t working specifically on a treatment for eating disorders, but the field of neuroscience had already become so much bigger to me than just that. The sort of work I would be doing with Dr. Cooper would involve trying to figure out the answers to very small pieces of an extremely large puzzle. Put all the small pieces of all the researchers working everywhere together and you start to see a fuzzy picture of the workings of nervous systems. The more research, the clearer the fuzzy picture becomes.

While a clear picture of the nervous system won’t mean that we are any closer to solving all the world’s problems, there are individuals who will benefit from specific treatments for disorders related to the nervous system, whether it might be an eating disorder, depression, anxiety, attention deficits, schizophrenia, post-traumatic stress, Alzheimer’s, Parkinson’s, or whatever. And, to a person who would like to see the human condition a little less full of suffering, that seems like a noble enterprise.