**Analogies**

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I like to use analogies to explain pathophysiology to patients. I do so because I use them myself to understand these processes. I think of them as being like the cartoons used in scientific articles showing cell receptors being pinged by chemical stimulators/inhibitors shaped like darts. One time when I used the hurdler analogy, a family member of the patient, a neuroscience teacher at a college, said he was going to use the analogy, plagiarism as the most sincere form of flattery.

The hurdler

Almost all of my patients have progressive neurologic disorders. And we all age, whether or not there’s anything wrong with us, and normal aging has a significant overlap with the progression of Parkinson’s and related disorders. I sometimes see patients in follow-up who tell me that they’ve had a tremendous decline in mobility in the past few weeks, yet, when I examine them, their exam looks pretty much like the way they appeared four months prior. When I point this out, they say, “Well, two weeks ago I could get out of a chair without using my arms and now I have to push myself up.” So, I point out the analogy with the hurdler who is on the downslope of her career. As she starts to worsen, in addition to getting slightly slower, she starts to clear the hurdles by less and less, until one day she fails to clear the hurdle and she hits it. “What a change,” she thinks, “yesterday I cleared it, and today I hit it. I must be having a bad day.” Her coach, on the other hand, saw it coming, watching her clearance worsen each day. This translates into slow declines often being perceived as step-wise losses of function. Patients appear to appreciate this analogy, which makes functional declines less frightening, as they are less random and less indicative of a major worsening of disease.

Software vs. hardware for psychogenic disorders

Studies in movement disorder clinics in the U.S. have shown that about 2–5% of new patients have psychogenic disorders, typically tremors or gait problems, but virtually any movement that a person can make. These are typically conversion disorders, in which, presumably psychic distress is “converted” to an organic disorder, in these cases movement disorders, rather than paralysis, muteness, blindness, GI distress or headaches. In explaining the problem to the patient it is important to stress that anxiety, depression, and stress of all types are distracting, interfering with concentration and the problem is not due to a structural malfunction in the brain, like a stroke or brain tumor, but a neurotransmitter problem, a biochemical problem induced by psychic but uncontrollable factors, like PTSD, which all my patients have heard of. The analogy, of course, is to a software problem versus a hardware problem. In the latter, the problem requires hardware replacement, a circuit board is broken or shorted out, whereas with a software problem, the malfunction is in the program itself, an error that is theoretically fixable with a re-programming patch, which is obtained by psychotherapy.

Anxiety and depression as pain

It is common for people to see their doctors, especially neurologists, with concerns for a memory disorder. This is certainly a pressing concern for most elderly people, as the incidence of Alzheimer’s disease is very high in the elderly, but many younger patients, often in middle age, report what has been recently labeled as “subjective memory loss.” And, while Alzheimer’s disease and other dementing illnesses may occur in people in their 50s and 60s, it is, luckily, very uncommon, so that most younger patients with subjective memory loss do not have a neurological problem and their dysfunction is best explained by stress, anxiety or depression. The analogy is that anxiety, depression, and stress of all types are distracting, interfering with concentration...
and impaired concentration results in worse memory. I note that when they were in school they did worse on exams if they had a headache or back pain, or had a bad night’s sleep. I point out that depression is emotional pain, just like headache or joint pain is somatic pain. All pain is distracting, interfering with attention and without attention, memory traces and memory access pathways are all subverted, leading to bona fide memory impairment, but not necessarily Alzheimer’s disease. Anxiety, similar to pain, is an interference with the memory process, acting just like pain. How can you remember something if you’re worried that your grandchild is ill, or that you may not be able to pay the next mortgage? Life distracts, especially with threatening concerns.

**Dopamine cells as gas tanks**

Patients with Parkinson’s disease wonder why their medicines work less well and for less time as the illness progresses. To explain, I use the Mickey Mouse model of dopamine brain cells working like chemical factories and storage tanks. Since L-Dopa, our main drug to treat PD, is not itself an active drug, it must enter a dopamine-containing cell to be metabolized to dopamine, and then released. So, if we consider each such cell as a dopamine factory and these cells are under attack and die, the number of “chemical factories” declines in time so that no matter how much L-Dopa is provided, the cells can only produce a limited amount of the neurotransmitter. Furthermore, since the number of cells is greatly reduced with time, the ability of the brain to store the dopamine provided by the L-Dopa is greatly reduced. There are fewer “gas tanks” to store the chemical, so that mobility more closely reflects the amount of drug in the blood, unlike the early years, where storage capability was much greater.

Perhaps my most important homily/analogy is to tell all patients that exercise is an investment in the future, just like an investment in the stock market or real estate. It doesn’t help today or tomorrow, but it will in 10–15 years.

I don’t know how useful analogies are in other areas of medicine, just as I don’t know how often my colleagues use analogies. I like them because I actually think in these terms, although I know better than to think these are accurate renditions of what is really taking place, and because I do, I believe that patients do not find me condescending.

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