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Deep Brain Stimulation and My Life

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Parkinson's Disease, or PD, is currently affecting six million people worldwide. It is a difficult disease to diagnose, so the numbers could be much higher. My grandfather was diagnosed with PD in 2000, and three years ago he was diagnosed with Dystonia (another crippling movement disorder). Deep Brain Stimulation is a procedure that was created to help control all sorts of movement disorders including PD and Dystonia. Deep Brain Stimulation, or DBS, was first used to treat PD in 1987, although reports weren't published until 1993. It has now been almost a year and a half since my grandfather underwent Deep Brain Surgery to treat his disorder. The procedure involves placing two electrodes on either side of the brain and then running a wire connecting the electrodes to two battery packs located under the skin on either side of the chest. This innovative surgery is offering hope to PD patients who have reached a point of desperation.

DBS is a great example of interplay between basic and clinical science as a two-way process. A study involving drug addicts with Parkinson-like symptoms led to a perfect monkey model for PD, and after four years of intensive studying, brought out an approach for patients. In 1983, the compound MPTP was discovered to be the source of PD-like symptoms in drug addicts. Later on that year, scientists were able to create a primate model for PD testing by injecting MPTP into monkeys and selectively destroying some of the monkeys' dopamine producing neurons.

Observations were made of the basal ganglia (a group of structures linked to the thalamus in the base of the brain and involved in coordination of movement) of both normal monkeys and the MPTP-injected monkeys. These recordings showed that the MPTP monkeys had a pronounced over-activity of the subthalamic nucleus (or

STN) portion of the brain. In 1990, electrical stimulation of the STN proved to reverse the effects of the dopamine-killing MPTP. These findings in Monkeys led to the first DBS surgery on human patients with PD. The procedure was carried out on three different people, with DBS electrodes placed on either side of the brain, which is now the standard approach in PD patients. In 1997, the FDA approved DBS surgery in the thalamus and then in 2001, approved DBS in the STN as well. Almost all of the evidence to support these procedures came from the animal trials.

My grandfather was diagnosed with Parkinson's in 2000 and with Dystonia in 2007. Before he turned to DBS, he had tried many procedures to treat his PD and Dystonia. He had gone to over a dozen different chiropractors, had Botox injected into the muscles in his back, and even tried several acupuncture techniques. He was on nine different medications, which were having serious side effects, including terrible hallucinations and extreme fatigue. When nothing worked, he started to look into DBS. He underwent the surgery in November of 2008 and experienced some major improvement in his condition. He was able to completely come off three of his medications and the remaining ones have been reduced by over fifty percent. His tremors have completely stopped. Although the Dystonia hasn't improved yet, my grandfather is still patiently waiting. A man in the Midwest with Dystonia underwent the same procedure and didn't see improvement until three and a half years later; so there's still hope.

DBS is now used worldwide. Current estimates are that about 20,000 people have been treated with DBS. It is not a cure for PD but it can alleviate some of the most obvious symptoms giving patients a much-improved quality of life. DBS has

greatly helped many people with their movement disorders and their families;
including mine.

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Through researching and writing this essay I have learned how DBS surgery can improve the lives of suffering people. I am so grateful for all it has done for my grandfather and the hope it has given him. DBS has also provided hope for thousands of other people desperate for effective treatment for their debilitating movement disorders. Innovative medical breakthroughs, such as DBS, would never happen without the painstaking work of research scientists who are challenged to discover new treatments. Who would have ever thought that you could place electrodes directly into the brain and use that electricity to treat diseases? It certainly makes you wonder what's next.