



# Parkinson Association of Orange County

## The Human Brain Mapping Project

The Obama administration is planning a 10-year scientific effort to examine the workings of the human brain and build a comprehensive map of its activity. Details of how it will be funded are part of the president's budget and the price tag is expected to be in the billions of dollars. Will it be worth it and will it help people with Parkinson's Disease? According to Timothy Otto, professor and director of the Behavioral and Systems Neuroscience program at Rutgers University, it is very important indeed.

"The ultimate goal of this initiative is to provide a detailed "map" of the ways in which our 100-billion brain cells are interconnected and how activity within networks of brain cells gives rise to thoughts, feelings, actions, perceptions, memories and ultimately, consciousness", Otto said. "Clearly these are incredibly important questions. Equally important, is the flip side: fully understanding normal brain function will reveal the underlying causes of many forms of brain dysfunction including Parkinson's Disease. This initiative has tremendous potential not only for discovering and fully understanding the complexities of the human brain, but also for developing treatment strategies directed toward alleviating the debilitating effects of such nervous system disorders."

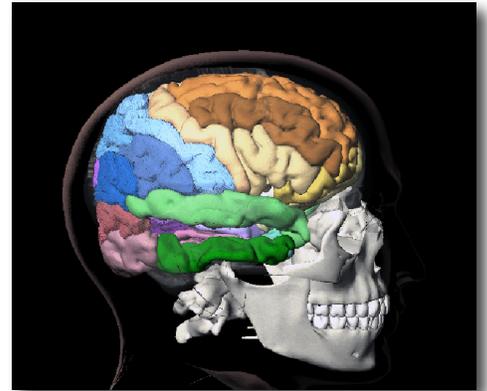
When asked whether we could afford such an ambitious project, Otto replied: "During the mid 1990s through 2003, over \$3 billion was invested in the Human Genome Project. The incredibly complex code of the human genome was essentially cracked during that 10-year span, and it had an enormous impact on enhancing human health, technological development, science education and the global economy. Similar outcomes are a very likely result of Mr. Obama's brain mapping initiative."

Asked about the huge cost of the project, here is President Obama's reply: "Every dollar we invested to map the human genome returned \$140 to our economy — every dollar," he said. "Today our scientists are mapping the human brain to unlock the answers to diseases like Alzheimer's and Parkinson's. They're developing drugs to regenerate damaged organs, devising new materials to make batteries 10 times more powerful. Now is not the time to gut these job-creating investments in science and innovation."

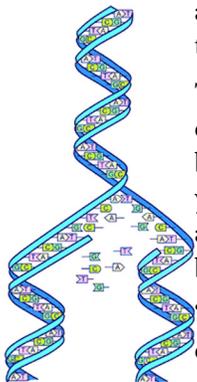
Has human brain mapping been beneficial for people with Parkinson's in the past? Absolutely! Deep Brain Stimulation (DBS) already uses brain mapping technology. There are currently four possible target sites in the brain that can be selected for placement of the stimulating electrodes used in DBS: the internal segment of the globus pallidus (GPi), the subthalamic nucleus (STN), the pedunculopontine nucleus (PPN), and a subdivision of the thalamus referred to as Vim (ventro-intermediate nucleus). These structures are small clusters of nerve cells that play critical roles in the control of movement. How do we know these are the best areas to place the electrodes? Brain mapping studies discovered where the areas are that cause tremor, rigidity (muscle stiffness), bradykinesia (slow movement), gait problems, and dyskinesia, among others. It follows that more extensive and accurate brain mapping may increase our surgical options as well as lead to a cure.

The initiative, if successful, could provide a lift for the economy. "The Human Genome Project was on the order of about \$300 million a year for a decade," said George M. Church, a Harvard University molecular biologist who helped create that project and said he was helping to plan the Brain Activity Map project. "If you look at the total spending in neuroscience and nanoscience that might be relative to this today, we are already spending more than that. We probably won't spend less money, but we will probably get a lot more bang for the buck."

"We are only beginning to realize and appreciate the extent neurological disorders have dramatic impact on afflicted individuals and their families" Professor Otto adds. "So, to the extent that this project address-



*A depiction of a map of the human brain*





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es the underlying neurobiological causes of brain disorders and their treatment, it will have enormous impact on the health of our nation. A second and really quite important reason to support this project is non-scientific, but rather economic. The best estimates suggest that the \$3.8 billion invested in the Human Genome project in the 1990s had a net economic impact exceeding \$800 billion, including the creation of jobs and development of technology. So from several important perspectives, this project deserves the strongest possible support. There really is no downside.”

For those of us affected by Parkinson’s Disease, that statement is especially true.