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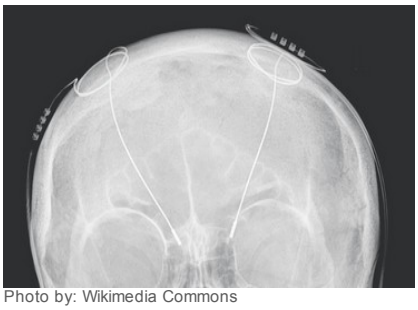

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Experts: Decade to be spent studying neural diseases

By JUDY SIEGEL-ITZKOVICH
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Israelis prominent in European Commission's 10-year Human Brain Project.

Eight Israeli brain researchers at three local universities will be part of an international project – similar in scope to the Human Genome Project of the 1990s – to increase understanding of the human brain and its hundreds of diseases, from Alzheimer's to schizophrenia, so that treatments and cures can eventually be developed.

The European Commission announced at a ceremony in Lausanne on Monday that it had chosen the Human Brain Project (HBP) as one of two Future and Emerging Technologies (FET) Flagship topics.

The project's selection as a FET Flagship is the result of more than three years of preparation and a rigorous evaluation by a large panel of independent, high profile scientists, chosen by the European Commission.

They will meet and discuss their collaborative work every few months.

The project, based at the Ecole Polytechnique Federale de Lausanne (EPFL) in Switzerland, will receive funding of 1.19 billion euros over the next 10 years. It will be headed by an Israeli, Prof. Henry Markram, who joined EPFL a decade ago after graduating from the Weizmann Institute's Feinberg Graduate School.

More than 80 universities and research institutions in Europe and the rest of the world will be involved in HBP, which will begin later in 2013 and continue until 2023.

The local Israeli section of the project is led by Prof. Idan Segev of the Edmond and Lily Safra Center for Brain Sciences (ELSC) at the Hebrew University; Prof. Yadin Dudai of the Weizmann Institute of Science and Dr. Mira Marcus-Kalish of Tel Aviv University. Segev is an expert on brain simulation (from his work on the Blue Brain Project), while Dudai specializes in cognitive functions and social impact and Marcus-Kalish in databasing.

Long a supporter of the idea, President Shimon Peres said that "Israel has put brain research at the heart of its efforts for the coming decade, and our country is already spearheading the global effort towards the betterment of our understanding of mankind. I am confident that the forthcoming discoveries will benefit a wide range of domains, from health to industry, as well as our society as a whole," Peres said.

"The human brain is the most complex and amazing structure in the universe, yet we are very far from understanding it. In a way, we are strangers to ourselves. Unraveling the mysteries of the brain will help us understand our functioning, our choices, and ultimately ourselves. I congratulate the European Commission for its vision in selecting the Human Brain Project as a Flagship Mission for the forthcoming decade," said Peres.

A major part of the program is to collect data on the brain using a variety of advanced research approaches and build models of brain activity through the use of supercomputers even more powerful than those in use today. Segev told The Jerusalem Post before flying to Lausanne on Monday

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“This will enable the attainment of a deeper understanding of the brain and its illnesses, and at the same time make possible development of powerful computer technologies and brain-driven robotics. This is a historic moment,” he said.

Segev explained that new computer hardware has to be developed, as it takes a huge amount of energy to cool it so that brain functions down to individual neurons can be simulated.

“A new generation of computers has to be created that will not have energy problems. The human brain,” he continued, “uses the amount of energy of a 12-watt bulb. But the computers for understanding [the brain] need an incredible amount of energy.”

Neuroscience is producing huge amounts of data based on specific aspects of the healthy and diseased brain in different species and at different ages. But despite these incredible advances, the project’s organizers said, “we still lack a unified understanding of the brain that can span its multiple levels of organization, from genes to cognition and behavior.”

This, they said, will require the development of new types of computing to collect and manage the information, integrate it in computer models and brain simulations, identify patterns and organizational principles and recognize gaps to be filled by new experiments.

Diagnosis of brain diseases is often based on physical symptoms and is possible only in the late stages of disease, when no cure and little treatment are available.

TAU will contribute to the medical informatics area in the HBP.

Marcus-Kalish will focus on developing novel rule-based tools, together with controlling the false discovery rate (FDR), to characterize human brain impairment by neurological disease. The broadest view on all relevant features will be provided, enabling the development of data-based diagnostic tools, as well as tools to predict the success of potential treatments.

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