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Photo: Einar Nilsen

Gigantic research projects in the USA and EU are set to probe deeper into the mysteries of the brain. Brain research is an investment for the future.

Brains to comprehend

Now is the time to achieve a level of research and development not seen since the height of the Space Race.

With these words, President Barack Obama introduced the BRAIN Initiative in his State of the Union Address on 12 February this year (1). In this context, BRAIN is an acronym for «Brain Research through Advancing Innovative Neurotechnologies». As usual, the Americans are speaking in capital letters, and the ambitious goal of this project is to «revolutionise brain research» through mapping, understanding and simulating the more than 100 billion neurons of the human brain in functional detail (2).

We already know a great deal about basic brain functions seen in a macro perspective, as well as about the behaviour of single neurons and groups of neurons. Large research projects such as The Human Connectome Project are now mapping the neuron connections in the brain in detail (3). How these connections interact dynamically in the major, governing processes of the brain remains less known, however. This will require, among other things, an ability to simultaneously monitor and simulate millions of neural pathways. To do so will require computer capacity of an order of magnitude that existing technology cannot provide. The BRAIN Initiative is therefore also a technological programme.

The initiative can in many ways be compared to the human genome project. Both projects are challenging, multidisciplinary bio-research projects, in which the long-term benefits far outweigh the short-term ones. A key difference, however, is that whereas the genome project had a clear objective from the start, the BRAIN project has a less clearly defined goal. The project is not concerned with a specific disease, but seeks to map and understand large parts of the normal as well as the pathophysiological processes in the brain. The idea is that such knowledge will provide new understanding and new treatment strategies for many of the most common brain diseases. Insight into the normal function of the brain will also enhance our understanding of the interaction between people and technology, so-called man-machine relationships. It can be used in areas such as improved control of artificial limbs, development of more intelligent computer systems and control of external robots by the power of thought.

For the initial year, a total of USD 100 million in government funding was granted to the project. In comparison, the genome project received USD 28 million for its initial year. Private investors have also granted substantial sums and entered into long-term commitments. For example, the Allen Institute will devote USD 60 million in annual grants, the Salk Institute will grant USD 28 million annually and the Kavli Foundation USD 4 million annually for the next ten years (2).

In Europe a similar project, The Human Brain Project, was awarded the status as one of the EU's flagship projects this spring (4). The University of Oslo and the Norwegian University of Life Sciences are two of a total of 87 European research institutions involved (5). The EU will devote EUR 100 million per year to the project over the next ten years. This project also aims to increase our fundamental knowledge about the brain. In addition, the project will study health, disease and treatment, and create new technology and new jobs in innovation and research (5).

«It doesn't take great brains to comprehend that it's important to figure out how the brain works. I'll remember that, also during our budget discussions.» So Prime Minister Jens Stoltenberg said at the opening of the Norwegian Brain Centre at the Norwegian University of Science and Technology on 28 February 2012 (6). In the state budget for 2013, the government followed up by granting an earmarked NOK 12.5 million to these research groups (7). This notwithstanding, figures from the revised state budget show a total reduction of NOK 100 million in the national research budget for 2013 (8). At the same time, Norway is ranked as number 17 on a European innovation index, behind the EU countries Sweden, Denmark, Germany and Finland (9). Each dollar invested by the US authorities in the genome project yielded 140 dollars in return (1). This is a much better rate of return than the Norwegian oil fund can document. Research is an investment for the future. It does not take great brains to comprehend this much.

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