The nervous system and its pathologies

Understanding the organization and function of the nervous system is one of the most crucial frontiers of knowledge. Brains are the result of a long evolutionary process reaching the pinnacle of complexity with humanization. With more than 100 billion interconnected neurons, research in neuroscience, cognitive science, neurology and psychiatry comprise the most complex field of life sciences.

Understanding the hierarchical assembly of thousands of molecular, cellular and tissue components of the nervous system, as well as their dynamics and their plasticity is essential to decipher the complexity of the functions of the human nervous system including motor control, sensory perception, learning, decision making, language, symbol manipulation, awareness of being and social interactions.

In Europe, the total cost of brain disorders is estimated at €800 billion/year representing a heavier financial burden than cardiovascular diseases and cancer combined. In coming years, as the population ages, these expenses will moreover increase considerably. In addition, a quarter of the population will likely suffer from a brain disorder at one point in their lifetime.

The strengths and Teams in the field

- 740 Teams
- 3,800 Personnel including: Researchers, post-docs, engineers, Technicians, administrative staff and students
- 18 Clinical Investigation Centers
- 5,900 Publications per year
- 120 Million euros of budget (excluding salaries)

Neuroscience research and its translation into diagnostic and therapeutic measures are of highest priority and represent growing challenge for neurological diseases, neurodegenerative diseases, epilepsy, sleep diseases, multiple sclerosis, stroke, brain tumors, migraines but also psychiatric disorders anxiety, depression, addiction, autism, schizophrenia, obsessive compulsive disorders and deficits of sensory organs, visual, hearing or somesthesis impairments.

Beyond its benefits to medicine, research on the nervous system will broaden the scope of many other domains including education, innovation, data processing, robotics, security (road, industrial) systems and the general economy.
Scientific, technological and medical priorities

Promote a multi-scale and interdisciplinary approach by supporting the development of new technologies, particularly in the field of imaging and brain computer interfaces in order to:

- Decipher the mode of organization of the nervous system, the neural code and identifying the rules of interaction of the human brain with the surrounding world;

- Understand the neural basis of major sensory, motor, cognitive, emotional and behavioral functions and their disorders;

- Establish the roles of genetic, epigenetic and environmental factors during the development, the lifetime and the normal aging of the nervous system.

Ensure and facilitate the networking of research facilities (structures) across France and Europe by promoting links between pre-clinical, clinical and industry in order to:

- Understand the mechanisms underlying neurological, psychiatric and sensory organ diseases so as to model them, to identify therapeutic targets and to better characterize disease subtypes by identifying specific biomarkers;

- Understand the different stages of disease progression and identify biomarkers of these stages, particularly of the prodromal phase in order to initiate treatment as early as possible;

- Analyze the risk-benefit ratio of pharmacological and non-pharmacological treatments by studying efficacy and toxicity biomarkers and by examining individual response variations to treatments.

Expert Group

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