

DESCRIPTION FOR GENERAL PUBLIC

Main goal of this project is to deepen the knowledge about biological mechanisms that lead to the emergence of consciousness. Very complex nature of brain activity connected with consciousness prevented scientists from proving beyond doubt how the brain creates conscious experiences. Researchers are convinced that no single brain structure or one type of neuronal activity does not solely give rise to consciousness. Therefore, new paradigms are being constructed that are meant to give new insights into this matter. The project is a part of collective effort through introducing novel methods of analysing biological signals related to conscious processing, transferred from research devoted to development of brain-computer interfaces.

The primary experimental tool used in the project to record brain activity will be electroencephalography (EEG), that allows for observing electrical activity of the cortex. This method is sensitive to rapid changes in electrical signal, while remaining relatively cheap and easier to use than other popular methods of imaging brain activity (e.g. magnetic resonance or computer tomography). Data will be collected from different experimental conditions where the level of consciousness of participants will change (e.g. fully awake or in deep sleep). After appropriate analysis, it is expected that it will be possible to extract such measures and characteristics of electrical activity of the brain, that will allow to assess the level of consciousness in individuals with high accuracy.

Identification of stable and reliable neural correlates of consciousness will not only broaden scientific knowledge about the relation between biological mechanisms and psychological processes that appear as their consequence, but might also bring some practical value in the future. Availability of an automatic system for classification of consciousness level could be used e.g. to support diagnostic process of people with disorders of consciousness (e.g. vegetative state or minimally conscious state). Creation of new methods for scientific study of correlates of consciousness and handling them to the research community will allow for further improvement of research methods in cognitive neuroscience that give us insight into relation between the brain and the mind.