FENS Federation of European Neuroscience Societies

9th FENS FORUM OF NEUROSCIENCE

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Milan | Italy

European Dana Alliance for the Brain (EDAB)
in collaboration with the
International Neuroethics Society

William Safire Seminar on Neuroethics

Sunday 6 July, 18.45 - 20.45

Basic research on the human brain. How far can we go? How far should we go?

SUMMARY
Basic research in humans involving invasive procedures and methods that might modify brain function could rapidly advance our knowledge of the brain and reduce the need for work on non-human primates. Recording from individual neurons deep in the brain, for example, is very unlikely ever to be achieved with non-invasive techniques. The potential benefits to science are great, but there are risks, and such fundamental research usually provides no direct benefit to the person. Can it be justified?

Programme: There will be short talks followed by discussion

Chair – Barbara Sahakian, University of Cambridge

Speakers:

- Josef Parvizi, Stanford University - Intracranial EEG and Electrical Brain Stimulation
- Petra Huppi, University of Geneva - MR Imaging for understanding developmental brain disorders- a translational approach
- Itzhak Fried, Brain Research Institute, UCLA – Single Neuron Recordings in Neurosurgical Patients
- Vince Walsh, University College London - Cognitive Enhancements and Human Brain Stimulation: When does scientific laziness become fraud?

ABSTRACT
Much can be learned by direct intervention in the human brain, but if it is not essential for clinical benefit, is it justified? This session considers the value and ethics surrounding basic neuroscience research on humans.

In theory, much of the electrophysiological study done in animals could be done on humans. Since Wilder Penfield's time, researchers have recorded from and stimulated the human cortex with surface electrodes, examining effects on movement, perception, language and thought. The volunteers are usually due to have surgery for severe epilepsy. But the extent and duration of recording and stimulating often exceed what is needed to identify the focus.

Field potentials and single-neuron activity can be recorded during implantation of deep-brain stimulating electrodes, or in addition to surface mapping. There is speculation about using injected

viral vectors carrying optogenetic constructs and implanting light pipes to be able to switch particular classes of neurons on or off with light. While the ultimate objectives are therapeutic, the preliminary work is likely to have little direct clinical value.

TMS and direct current stimulation are widely used to study brain organisation. They are not strictly invasive but can modify brain function.

Such research might eventually inspire new ways to treat disorders but is driven by curiosity to find out how the human brain functions. The ethical problems of intrusive basic brain research are very different from those involved in conventional clinical trials, where the direct objective is to test the toxicity or efficacy of a new treatment, and the control group receives the best current therapy. It could be argued that the relationship between clinicians, patients, scientists and volunteers is not a sound basis for dispassionate consent. Clearly such research presents complex ethical dilemmas.