Novel neurotechnologies

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Novel neurotechnologies

‘Intervening in the brain’

• Three types of novel technologies:
  – Neurostimulation (DBS, TMS)
  – Brain-computer interfaces
  – Neural stem cells
Neurostimulation

• Deep brain stimulation (DBS)
  – Currently used to treat Parkinson's disease, epilepsy, stroke and severe obsessive compulsive disorders

• Transcranial magnetic stimulation (TMS)
  – Depression, or to enhance cognitive functions such as attention, understanding, perception
  – Interest in non-medical applications such as enhancement of problem-solving and memory
Brain-computer interface
Brain-computer interface

- System for measuring and analysing brain signals and translating them into outputs
- Possible medical uses include helping ‘Locked-in syndrome’ patients communicate
- Non-medical uses of BCIs such as computer games and military applications are also being investigated
Neural stem cells

• Neural stem cells replace cells that are lost in disease or enhance the growth of new neurons
• Stem cell injection is being investigated as a means of treating neurodegenerative conditions such as Alzheimer's disease, Parkinson's disease and Huntington's disease
Terms of reference

• To identify and consider the ethical, legal and social issues that arise from the use of novel neurotechnologies to intervene in the human brain in both clinical practice and non-medical settings

• To explore ethical issues from the communication and representation of neuroscientific research to intervene in the brain in the media and by researchers

• To draft a report and make recommendations for research, policy, governance and public engagement
External consultation

- Open consultation: 70 responses
- Fact finding meetings with:
  - Clinicians
  - Industry
  - Military
  - Investment
  - Patients
  - Regulators
Report overview

- Current understanding and practice
- Ethical framework
- Regulation and Governance
- Non-therapeutic interventions
- Economic drivers of innovation
- Communication

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