

Nuffield Council on Bioethics
Novel neurotechnologies:
intervening in the brain

Response from Christian Medical Fellowship

The Christian Medical Fellowship (CMF) was founded in 1949 and is an interdenominational organisation with over 4,000 British doctor members in all branches of medicine. A registered charity, it is linked to about 70 similar national bodies in other countries throughout the world.

CMF exists to unite Christian doctors to pursue the highest ethical standards in Christian and professional life and to increase faith in Christ and acceptance of his ethical teaching.

CMF welcomes the opportunity to contribute to the debate on novel neurotechnologies through this consultation. We submitted a detailed response in June 2011 to the Nuffield consultation on emerging technologies, available on our website: <http://www.cmf.org.uk/publicpolicy/submissions/?id=136>

This response concentrates on the general questions set by the consultation, with a few additional comments offered on the three remaining sections. The general points that we raise are applicable to all three technologies in question, and specifically to the latter two questions for each technology. So although we do not provide detailed responses within each section, the issues are covered at the outset and should be applied accordingly.

We have concentrated on the general questions because the technologies under discussion are still at an early stage of research development and therapeutic use, therefore it is necessary and important to fully consider some of the broader, general ethical issues at stake here, and not simply narrow the debate down to the specific applications of these present and predicted technologies.

General questions

1. Have you ever used a technology that intervenes in the brain, and with what consequences? Please describe your experience.
2. If you have not used a technology that intervenes in the brain before, would you do so if you were ill? Why / why not?
3. Would you use a technology that intervenes in the brain for non-medical purposes, such as gaming or improving your cognitive skills? Why / why not?
4. What are the most important ethical challenges raised by novel neurotechnologies that intervene in the brain?
5. In what ways, if at all, should the development and use of these technologies be promoted, restricted and/or regulated? Please explain your reasons.

Q1-3 As an organisational response, these questions are not applicable.

Q4. The ethical challenges raised by novel neurotechnologies

The appropriate use of all technology requires that it upholds the inherent worth, value and dignity of all humans, which ultimately stems from their creation in the Image of God. The primary challenge we face as a society is to query constantly the impact that technological, in this case, neurotechnological, progress might have on the inherent value, equality and nature of all human life and the broader impact it will have on the wellbeing of our wider communities.

While we affirm and welcome the many benefits that neurotechnologies will undoubtedly bring to us as individuals and to our wider society, our primary concern with their use is whether they will undermine the equality and value of all humans, and whether they will value and uphold the common good. It is not usually technologies per se which dehumanise, but the inappropriate use of particular technologies that can have destructive consequences for others.

Advocates often concentrate on the perceived benefits for some individuals, which may be to the potential detriment of society as a whole. The pitfalls, long-term potential harms and the ethical and social concerns commonly generate far fewer headlines than the benefits. Hence our concern that society must consider how novel technologies will benefit the common good and whether they may in fact lead to a less human and/or less equal society.

The predicted benefits from neurotechnological progress are certainly headline-grabbing and appear compelling. However those claims that are unlikely to be fulfilled and are over-hyped must be distinguished from those that are realistic. Many of these predictions are speculative and may well not come to fruition, so it is important not to overhype potential developments. There is a danger of both ignorance and indifference to both the realities of the claims made, as well as the wider consequences of neurotechnological developments for society.

Neurotechnologies commonly promise great benefits for humanity but whether these goals are, or will be, actually achieved is debatable.

Following are some of the practical and ethical principles that we believe must be taken into account.

Distinguishing between treatment and enhancement

A major concern with novel technologies is the pattern that they frequently follow. Initially aimed at the sick, they then move out to the needy well and finally to anyone who is looking for a competitive advantage.

Classifying applications as either 'enhancement' or 'treatment' can be problematic, particularly when a treatment for one person may be an enhancement for another. It can be unclear whether therapies whose primary purpose is curing diseases, but which have a secondary potential of improving performance, should be classed as enhancements or treatment. Moreover, it can take very little to move philosophically and practically from one to the other.

Even when we can distinguish treatment and enhancement, the question remains as to whether we should use technology just to prevent disease and restore health, or

whether its use can be permitted deliberately to enhance individuals? For example, if tremors could be eliminated, then why not for surgeons doing microsurgery? And then why should autonomy not permit its use for other purposes, for the personal benefit of individuals prepared to take risks for the perceived benefits offered? We have seen this progression with the increasing popularity of cosmetic surgery, despite the significant physical and psychological harms involved.

Those who advocate the deliberate enhancement of individuals (beyond restoring lost or damaged capabilities) justify this on grounds of personal autonomy. However if an enhancement, such as a mood-altering neural stimulation or neural implant, interferes or alters our deliberative process, then it is an open question whether or not we are truly acting freely while under the influence of the enhancement.

Moreover, rights-based arguments generally ignore the context and history of the individual making decisions, paying little attention to social factors constraining choice. Once technologies are adopted they can give rise to pressure to conform to new standards or 'norms'. This can be observed in the increasing use of pharmacological products by students and professors for important intellectual challenges, and by athletes to enhance performance. Others could then be under pressure from peers, employers, competitors, national security or others to accept a particular enhancement. In particular, military personnel are likely to be put under pressure to use invasive neurotechnological products to improve their operation and effectiveness.

If increasing numbers use enhancement 'aids', those who do not take them (for choice or medical reasons) will be disadvantaged - advantages gained by enhanced persons also imply a relative disadvantage for the unenhanced, whether in sports, employment opportunities, academic performance, or any other area. ie. fairness is another value to consider in the debate. For example, a job candidate with a neural implant that enables better data retention and faster information processing would consistently beat out unenhanced candidates. Or a person with enhanced human hearing or sight could circumvent existing privacy protections and expectations by easily and undetectably eavesdropping or spying on others.

This concern will depend on the technology in question, particularly whether it is relatively expensive or not, which ultimately will involve an examination of the biotechnology in question.

So whilst personal autonomy is an important right it is not the only right to consider and indeed can also be trumped by other rights or by harmful consequences (also see our comments below on regulation, Q5).

Continuing advances in neurotechnologies will undoubtedly surpass the capabilities of our natural body. When we consider possible developments, maintaining the enhancement-therapy distinction is imperative for several reasons:

- It would otherwise leave us in the position that all forms of human enhancement would be morally permissible since the things we count as therapy are permissible already. There would be few moral limits.
- The term draws attention to the important difference between making someone 'well' and making someone 'better than well'.
- It is necessary for regulation. Even now, in cases where the line between the

two is murky, regulatory agencies are generally able to make the distinction in practice.

Whilst there are some difficulties in precisely defining 'human enhancement', just because there may well not be a clear dividing line does not mean there is no difference.

Priorities in biotechnology policy

In an environment today with limited resources, decisions are constantly being made about priorities for funding and research. The allocation of limited resources for developing biotechnologies that will be used for enhancement purposes for only a few is of concern in a world where half are still hungry and need clean water.

Clearly the investment in, and financing of, new biotechnologies is a major influence on their development. All major funding is found in the most developed nations, which is where the impact will therefore be first, and sometimes only, felt. Neurotechnologies are expensive to develop so require non-government funding, raising concerns with access and priorities. They are particularly biased, in terms of need and availability, to the needs of the rich. Some of the main drivers for the development of new neurotechnologies are funding by Western research institutions, the military and, to a limited extent, demand from sport. Much funding is from a few significant sources (such as the Gates foundation, the US Defence Advance Research Projects Agency (DARPA) or other military funding, and a few wealthier research institutions) which will have different priorities to those of Government and, often, the common good. Military spending in particular is a major driving influence. The focus for research therefore tends to be towards Western markets.

Clearly we do not have unlimited resources in the world, thus stewardship of limited resources is an ethical issue that should not be dismissed when so many are in poverty. Compounding unequal access to resources are concerns about justice, community, sharing, solidarity and interconnectedness, which should all be central to ethical behaviour in a humane society.

Cost-benefit analyses may be overlooked, when large investments are poured into high profile technologies that will ultimately only benefit a minority of people because of their cost and/or limited application (brain implants being an example). Research funds can often be diverted to media-friendly and headline-grabbing research, rather than simple, low key but effective solutions that would primarily be useful for developing countries. We believe that this is a particular concern with neurotechnologies.

A New Technology Divide?

A potential consequence of the allocation of limited funding and research is the exacerbation of a divide between the 'have's' and 'have-nots'.

Several writers have warned of a widening gap, or a 'technological divide', between the impoverished developing world and the 'wealthy fortresses' of North America and Europe (e.g. Greenfield 2003, The Ministry of Defence 2007¹⁶, McKibben 2003). Inequalities will be exacerbated within countries too, between those who can afford neurotechnologies and those who cannot.

Current forms of trade, finance and patent systems already ensure that control of

most technologies remains with the rich. This, combined with Western society's libertarian attitudes, emphasis on autonomy and influence of the scientific community, will weaken restrictions and regulations for the developed world with these newer kinds of technologies, thereby reinforcing current inequalities:

'Breakthroughs in... medicine may improve health. However, it is more likely that there will be a widening gap between those people with sufficient means and access to these developments through their inherent advantages of wealth, education and market reform, and those who have not. Many of the latter will continue to be concentrated in regions which are least integrated within the globalized economy, where human security risks, poverty and technical backwardness are greatest.' (The Development, Concepts and Doctrine Centre (DCDC). 2007. 'The DCDC Global Strategic Trends Programme 2007-2036', The Ministry of Defence.)

Physical risks and safety concerns

As the consultation paper notes, given the complexity and fragility of the human body and nervous system and how little we still know about how our brains and other biological systems work, concern about physical risks and safety need to be paramount. The body is a complex yet integrated whole, thus in order for some capacities to develop, others may be lost. This suggests that interventions should be undertaken with great caution.

The effect on human nature and value

It is important to be aware of the philosophy behind some vocal advocates of some of these new neurotechnologies and their use.

Once technologies are directed towards making humans 'better than well', assuming the body is manipulable according to individual preferences, then real ethical concerns arise, primarily the challenge to human nature. Whilst some advocates can see no reason to remain fully human if we can evolve into, or create, creatures 'better' than ourselves, the deepest fear that most people express about new technologies and enhancement is that they will cause us in some way to lose our humanity – the essential quality that has always underpinned our sense of who we are and where we are going. Fukuyama has described this as 'Factor X' and defines it as what is left *'...when we strip all of a person's contingent and accidental characteristics away... there remains some essential human quality underneath that is worthy of a certain minimal level of respect – call it Factor X'*. (Fukuyama, F. 2001. *Our Posthuman Future: Consequences of the Biotechnology Revolution*)

Once human value and rights depend on acquiring some particular level of enhanced biological, genetic or cognitive capacity we create a hierarchical ordering of society.

The cost of rejecting the equal status of all human persons would be high to existing and future vulnerable humans, especially those who possess less than the full complement of capabilities too often used to define humanness, (for example, embryos, the newborns, the terminally sick, those in PVS, the physically and mentally disabled etc) who could be excluded from the 'community' under such a value system. Unrestricted individualism and liberalism, tied into new technologies, would thus directly impinge upon the liberties and rights of the vulnerable.

The fundamental question we are therefore faced with is to assess each technological advance and application with the question: **'what will these advances**

do to our sense of “being human” and to the equal value of all humans?’

Q5. Promotion and Regulation of neurotechnologies

Pro-enhancement advocates have argued against regulating enhancements on the grounds that it would infringe on our fundamental ability to choose how we want to live our own lives (eg. Harris, J. 2007. *Enhancing Evolution: The Ethical Case for Making Better People*. Oxford: Princeton University Press p73.).

Personal liberty/autonomy is now valued in society above all else and has undoubtedly played a significant part in the emerging and acceptance of many applications of new biotechnologies. Advocates of human enhancement depend upon a presumption of individual autonomy within society.

Despite appeals to complete autonomy the reality is that we do not have unfettered freedom in the areas of life that we often think we do. The Universal Declaration of Human Rights is clear that the exercising rights and freedoms should be subject to limitation: *‘In the exercise of his rights and freedoms, everyone shall be subject only to such limitations as are determined by law solely for the purpose of securing due recognition and respect for the rights and freedoms of others and of meeting the just requirements of morality, public order and the general welfare in a democratic society.’* (Art 29 (2)). It is rare to find any human activity that has absolutely no impact on other persons, either directly or indirectly, such that our own freedom or autonomy is the only value at stake. Moreover, restrictions do not necessarily curtail freedom. For example, by imposing laws on traffic, we can actually increase our freedom, or by driving forward on only one side of the road we can be (more) assured that we will not be a victim of a head-on collision, which makes driving faster a more sensible proposition. Rights must be balanced with restrictions in a fair and just society. All laws restrict personal freedom to some extent but do it for the common good.

Also, if these new neurotechnologies remain unregulated, they may themselves hinder personal autonomy as well as harm others (for example through challenges to privacy and civil liberties – see our comments below on BCIs).

Greater democratic accountability is undoubtedly required, not once a technology is in use but before.

We therefore believe that there is an urgent need for regulation. As well as controlling the use of new technologies to protect individuals and work for the common good, regulation also serves to send a clear message to users and providers of neurotechnologies of both their benefits and dis-benefits.

Clearly it is challenging to regulate emerging technologies that develop and change before laws can catch up with them and that can often be accessed from the unregulated internet, or developed in countries with little or no regulation. Our interconnected world sets significant challenges to effective regulation. Nevertheless, as a society we still try to solve social ills and regulate as far as possible even if we cannot completely prevent re-occurrence. (For example, we cannot stop any given crime from ever occurring again, yet we still have laws against such acts).

Moreover, the need for regulation (including to prevent enhancement in certain disciplines) is already widely accepted in principle. Sports, for instance, would change dramatically if enhanced persons are permitted to compete to the clear

disadvantage to unenhanced athletes, smashing their previous records

Practically, sometimes the problems generated by emerging technologies can be regulated easily under existing ethical policies. But because new neurotechnology often allows us to perform activities in new ways, situations are arising in which we do not have adequate policies in place to guide us. We need to formulate and justify new policies (laws, rules, and customs) for acting in these new kinds of situations.

Whilst there will be some overall regulation required, to ensure benefits outweigh costs, there will also be a need to regulate individual technologies. Secondary questions as to whether regulation should be via a single framework or individually will mostly be determined according to the neurotechnology itself, but will generally be a mix of the two.

There should certainly be a multi-disciplinary and multi-level responsibility, to include scientists and researchers, research institutions, funders, government bodies, national governments and international regulators. This could be enabled by establishing better collaborations among ethicists, scientists, social scientists, and technologists, as well as government and policy bodies. The chain of accountability should be made clearer at all levels, but must include the funders. National governments should be encouraged to cooperate with international regulations.

1) Brain computer interfaces (BCIs)

Questions

6. Have you used a BCI, and if so, with what consequences? Please describe your experience.
7. If you have not used a BCI before, under what circumstances would you do so?
8. What are your expectations and concerns for BCIs?
9. Are there any particular ethical or social issues associated with BCIs?
10. What would robust and effective regulation of research in this area look like? Is more or less regulation needed? Please justify your response.

Along with the obvious safety concerns such as infection and nerve damage, BCI's also generate concerns with civil liberties and privacy, including ownership of data, access to data, recording conversations, surveillance, monitoring devices that will enable the surreptitious collection of human subject data, chips and sophisticated databases, including genetic databases.

Ironically, all would serve to restrict individual autonomy. Personal autonomy would be reduced to the extent that individuals would have less control over what people knew about them, which would make individuals more vulnerable to government and employer control.

As noted above, safety and expensive may appear to be prohibitive to widespread use but lessons must be learnt from the use of cosmetic surgery and the widespread belief in the overpowering veto of personal autonomy: cosmetic surgery illustrates how public acceptance of an invasive procedure has grown in popularity despite

significant safety concerns, and has moved from providing corrective treatment to use and acceptance for personal enhancement ie. to increase (perceived) attractiveness.

2) Neurostimulation

Questions

11. Have you used neurostimulation and if so, with what consequences? Please describe your experience.
12. If you have not used neurostimulation before, under what circumstances would you do so?
13. Under what circumstances do you think it might be acceptable to use neurostimulation in non-medical context (that is to say, not for the treatment of a disease or disability)?
14. Are there any particular ethical or social issues associated with neurostimulation?
15. What would robust and effective regulation of research in this area look like? Is more or less regulation needed? Please justify your response.

Neurostimulation offers real potential for controlling moods, not only in those clinically depressed but also in people who would like a recreational kick. However, enhancing or depressing the memory can have unintended effects. Memories are complex. Memory is important for regret, remorse, pain and guilt. Forgetful memory can protect from distress and may therefore be harmful if enhanced. Memory is also at the heart of the person, what it is to be 'me'. We play with memory at our peril.

With regard to neurostimulation, claims that are unlikely to be fulfilled must be distinguished from those that are realistic. Many of these predictions are simply speculative, and may well not come to fruition, so it is important not to overhype potential developments. There is a real danger of hype, and in fact the normal brain can do substantially more than most make it achieve.

3) Neural stem cell therapy

Questions

16. Under what circumstances would you use neural stem cell therapy?
17. What do you think of the risks and benefits of neural stem cell therapy?
18. Are there any particular ethical or social issues associated with neural stem cell therapy?
19. How do you feel about neural stem cell therapy being used for non-medical purposes one day, for example for human enhancement?
20. What would robust and effective regulation of research in this area look like? Is more or less regulation needed? Please justify your response.

The consultation paper states that: *'In this consultation, we are not looking for views about stem cells as such, but for views on procedures that involve the injection of stem cells into the brain.'* However it is impossible to ignore the ethical issues surrounding the source of stem cells. A procedure that involves the destruction of human life, whether embryonic and/or fetal, cannot be ethically acceptable, even if the ends are (arguably) beneficial.

Stem cells have been recognised for well over a decade as having huge potential in the treatment of diseases where there is tissue or cell loss – such as diabetes, Parkinson's disease, spinal injury and heart disease.

However, from the outset, the use of hESCs has been fraught with controversy because the harvesting of embryonic stem cells involves the destruction of existing embryos. Moreover, despite claims from some British scientists that they are essential for research, there are other ethical and effective sources of stem cells, which we support and encourage for research and therapeutic use. Many scientists have argued that stem cells derived from ethical sources (adult stem cells, umbilical stem cells and induced pluripotent stem (iPS) cells) are safer than embryonic stem cells and have greater therapeutic potential. iPS cells, which appear to have all the characteristics of embryonic stem cells, can now be produced by stimulating ordinary body cells to revert to an earlier developmental stage without having to destroy embryos.

Both adult stem cells and umbilical stem cells are already used in treatment for a wide variety of conditions. By contrast the first clinical trials using embryonic stem cells have only just recently begun.

Since stem cell research began, ethical stem cell research has opened more and more doors to actual therapies whilst unethical research using embryos is foundering.

The underlying principle for neuro stem cell use should be that good research is ethical research and the end of saving and improving life should not be used to justify unethical means.

Concluding comments

The challenge we are faced with, as individuals, organisations, researchers, regulators and society, is to assess each technological advance and application of the new neurotechnologies with this central question: 'what will these advances do to our sense of 'being human' and to the equal value of all humans?'

Our challenge is to proceed, but with caution, wisdom and more knowledge, not being too easily blinded by technology and its utopian (sometimes over-hyped) promises of better health and greater happiness, but ensuring we ask for the setting of limits and regulation in order to protect all humans and our humanity and dignity. Neurotechnologies should be used to meet human needs and should be our servant, not our master.