Nuffield Council on Bioethics

Emerging biotechnologies

CONSULTATION RESPONSE
from the
CHRISTIAN MEDICAL FELLOWSHIP (CMF)

June 2011

Introduction

We applaud the Nuffield council for generating some much needed public discussion of the impact of emerging biotechnologies, and we welcome the opportunity to contribute to the debate through this consultation.

We believe the most important questions to be asking about any emerging biotechnology is *'how will this benefit the common good*?' and, perhaps even more importantly, '*will this emerging technology lead to a less human or humane society*?' These central questions will be highlighted further in our response.

Firstly, however, we want to affirm the benefits that emerging technologies will bring to us as individuals and to our wider society.

Humans are technologists by nature and vocation and wise stewardship of our created world requires some form of technology, whether it be using sharpened sticks to plough fields or in developing the latest vaccines. We believe that God has endowed humans with creative gifts and inclinations and given us the mandate to steward his created order using all the earth's abundant resources. Thus we believe that technology is a moral obligation, implicit in the created order, which is for the benefit of humankind.

The idea that science should be used for the benefit of humans was influenced by the vision mapped out in the seventeenth century by Francis Bacon. Scientific knowledge should be sought, said Bacon, not "*for superiority [over] others, or for profit, or fame, or power…but for the benefit and use of life*". Part of this obligation is to reach out and heal the sick and to embrace technology as aids to prevent or correct illness and restore health and fitness.

Appropriate use of 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 is the need to query constantly the impact biotechnological 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.

Consequently, our deepest concern is with the <u>use</u> of new biotechnologies and 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 has destructive consequences for others. However, advocates can tend to concentrate on the perceived benefits for some individuals, to the potential detriment of society as a

whole. Hence our concern that society must consider how emerging biotechnologies will benefit the common good and whether they will they lead to a less human and less equal society.

1 How would you define an 'emerging technology' and an 'emerging biotechnology'? How have these terms been used by others?

The focus of this consultation, and our particular interest in it, are primarily the ethical and safety issues generated by predicted developments in some (but by no means all) biotechnologies. Therefore we specify here the technologies that are predicted to bring about major changes to human health, life and our nature rather than attempt to widen or restrict this debate with definitions.

The biotechnologies we consider the ones to 'watch' are:

Genetic technologies
Assisted reproductive technologies
Information technology
Cognitive science
Neuroscience
Synthetic biology
Nanotechnology.

These have sometimes been referred to as the GRIN[1] or NBIC[2] technologies, which may be a useful acronym to use but illustrates our concern that definitions can exclude some developments or technologies (for example, these both exclude synthetic biology).

We generally prefer to use the term 'human enhancement' technologies, as this incorporates only the technologies that are predicted to enable human enhancement. Human enhancement can be defined as: "…*the directed use of biotechnological power to alter…not disease processes but the 'normal' workings of the human body and psyche, to augment or improve their capacities and performances*."[3] These are technologies that aim to make us 'better than well'.

2 Do you think that there are there features that are essential or common to emerging biotechnologies? (If so, please indicate what you think these are.)

Since the beginning of history, man has had a desire for self-improvement, whether through using tools, education, work or adhering to religious or ethical codes. Each of us seeks to become a 'better human' in a variety of ways' say Miller & Wilsdon.[4] Man has dreamt of transforming himself to overcome our all-too-human limitations. Descartes foresaw humans becoming masters and owners of nature, believing that a time would come when science and medicine would allow men to become wiser and

[1] **G**enetics, **R**obotics, **I**nformation technology and **N**anotechnology. *Radical Evolution*, Joel Garreau, Doubleday, 2005.
[2] I.e. nanoscience, biotechnology, IT and cognitive science. *Converging Technologies for Improving Human Performance*, a 2002 report issued by the National Science Foundation and United States Department of Commerce.
[3] *Beyond Therapy: Biotechnology and the Pursuit of Happiness.* A Report of the President's Council on Bioethics.2003: 13.
[4] Miller, P. & J. Wilsdon (eds.) 2006. *Better Humans? The Politics of Human Enhancement and Life Extension*. London: Demos. p14.

more capable than ever before, spared from many diseases of body and mind and "*perhaps also even from the debility of age*."[5]

Yet there is a limit to achieving human improvement through low-tech means, such as education, philosophical contemplation, standard medical care or stimulants like caffeine. What is new now is the opportunity to use emerging biotechnologies to address some of the more fundamental problems of the human condition, so we would no longer have to accept our bodies the way we find them, nor accept humanity the way we find it.

To illustrate, before the advent of new reproductive technologies, expectations regarding a child's sex or deafness were outside the control of parents. But now, whilst the *desire to* have children of certain types (particularly a certain sex) is not new, the *availability* of biotechnological possibilities makes such choices a realistic possibility.

A common concern with these new technologies is the same pattern that they frequently follow. Initially aimed at the sick, they then move out to the needy well and finally out to anyone who's looking for an advantage. Biotechnologies commonly promise great benefits for humanity—such as increased productivity and creativity, longer lives, stronger bodies and minds and more. (Whether these goals are, or will be, actually achieved is debatable). Predicted advances in biotechnology are likely to be used for far more than just disease prevention and for making us well. These technologies could also be used to make us 'better than well'.[6]

There are a number of other features common to emerging biotechnologies that we are concerned about. All will be developed in more depth in later questions. Briefly, biotechnologies that are novel often:

- have their roots in a mechanical view of life augmented by a mathematical cybernetic view of mind/brain;
- view that natural is inferior to technological;
- are supported by a belief in the overpowering veto of personal autonomy;
- desire to lose any sense of human moral superiority when looking at human enhancement;
- Are biased in terms of need and availability to the needs of the rich;
- are expensive to develop so require non-government funding, raising concerns with access and priorities, and
- require global regulation, which is difficult to achieve in our massively interconnected world.

3 What currently emerging biotechnologies do you consider have the most important implications ethically, socially and legally?

Nanotechnology/nanomedicine
Genetic engineering
Pharmaceutical developments
Cognitive science/neuroscience
Cybernetic developments/ /robotics
Synthetic biology

[5] Descartes, R. 1637. *Discourse on the Method of Rightly Conducting one's Reason and Seeking Truth in the Sciences.*
[6] Miller, P. & J. Wilsdon (eds.) 2006. *Better Humans? The Politics of Human Enhancement and Life Extension*. London: Demos.

Assisted Reproductive technologies
Information technology

4 Are there examples where social, cultural and geographical factors have influenced the development of emerging biotechnologies (either in the past or currently)?

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. 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, developing drugs for enhanced concentration, blood replacements to aid deeper diving, night-vision goggles, antidotes for superbugs etc.

However we also note that limits to the development of certain new biotechnologies may be forced by health care rationing.

5 Are there examples where social, cultural and geographical factors have influenced public acceptance or rejection of emerging biotechnologies?

Certain social and philosophical developments have strongly influenced the public acceptance of biotechnologies. Clearly these are not the only influences but they are particularly significant.

The role of science and technology

As noted in our introduction, Bacon exerted a significant Christian influence on the initial development of science and technology. He emphasised the social use of scientific knowledge, but this then came under the influence of the radical utilitarianism of the 18th century and then the emphasis on fulfilment and individual autonomy of the early 19th century. Its outworking is seen in modern technological medicine, characterised by personal liberty (autonomy) and the view that suffering is pointless and the human body manipulable.

As a result, people now look to science, in this case new biotechnologies, (instead of religion) to manipulate bodies, help extend lives or even escape mortality completely.

The role of autonomy

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 the new biotechnologies. Advocates of human enhancement depend upon a presumption of individual autonomy within society, so long as this does not impinge upon the liberty of others, but with the burden of proof on those curtailing it.[7]

[7] Harris, J. 2007. *Enhancing Evolution: The Ethical Case for Making Better People*. Oxford: Princeton University Press. p73.

However many take the autonomy argument further, arguing, for example, that reproductive rights includes not just what is possible for 'natural' procreation but also changes that would directly benefit future generations or avoid harm to them.[8] James Watson similarly advocates fundamental hereditary changes to humans: "*No one really has the guts to say it, but if we could make better humans by knowing how to add genes, why shouldn't we?"*[9]

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.[10] Note our comments on this at Q14 below.

The role of consumerism

Autonomy, sometimes also termed as 'progressive libertarianism' has been matched by an increase in materialism in society, in the 'cult of the well' (suffering is pointless) and in consumerism. This is potent and demanding mix:

Consumerism says 'I want it!'
Libertarianism says 'Why not?'
Science and technology says 'Here's how!'

Thus many argue that we have no right to prevent people from using technologies if they want to, if they are available and if they appear to harm no one else.

Cosmetic surgery provides an illustration of public acceptance of a procedure that has grown in popularity despite significant safety concerns and has moved from providing corrective treatment to its use in enhancement i.e. to increase (perceived) attractiveness.

At the same time however we note the negative perception and portrayal of genetically modified crops and the consequent loss of public confidence in science and technology (see later comments on this), which has hindered public acceptance of GM technologies. In this case, the media had a significant role in the public rejection of GM.

6 Are there examples where internationalisation or globalisation of research, markets and regulation have influenced the development of emerging biotechnologies?

The human genome project, the 1000 genome project and other ongoing multiple genome projects.

7 How have political traditions (such as liberal democracy) and political conditions (e.g. war) influenced the emergence of biotechnologies?

See our comments above in Q5.
Regarding political conditions, the military are frequently the drivers behind investment in certain emerging biotechnologies. In particular, the US Defence Advance Research Projects Agency (DARPA) is renowned for investing in new technologies to improve and enhance military and defensive capabilities. For example, one of their funded research projects is the improvement of the strength

[8] Ibid. p77.
[9] Cited in Garreau, J. 2005. *Radical Evolution.* New York: Doubleday, p115.
[10] Harris, op cit.

and endurance of soldiers through tuning and manipulating their metabolism to the level of Olympic athletes through genetic modification.[11] The use of pharmaceutical products for military pilots – to prolong wakefulness and concentration - has also been reported.

8 Are there ethical or policy issues that are common to most or many emerging biotechnologies? Are there ethical or policy issues that are specific to emerging biotechnologies? Which of these, if any, are the most important?

There are certainly ethical concerns that are common to most emerging biotechnologies, which we detail in Q11. Common *policy* issues are detailed at Q14 below. We suggest that a generic ethical question that should be asked of all emerging biotechnologies is not only 'What *is* this biotechnology used for?' but also 'What *should* it be used for?' Should we use biotechnology just to prevent disease and restore health or should we use some of the new possibilities opening up to deliberately enhance ourselves and our children? This is one of the central ethical issues common to emerging biotechnologies.

We simply note here a list of what we perceive to be the common policy and ethical issues to consider for new biotechnologies, and will expand in more detail on these later, Q11 and Q14.

Common to all biotechnologies:

- Novel hazards, practical safety concerns and potential side effects.
- Technology policy, particularly priorities of resource allocation and funding
- The technology divide and unequal access to these (often expensive) technologies
- Regulation complexities and challenges, in a global, internet-dominated age
- Public transparency in research and use, or lack of (eg labelling of food containing manufactured nanoparticles or nanotechnology)
- Purpose of use, particularly treatment or enhancement

Specific to some biotechnologies:

- Disadvantages and limits to autonomy and freedom for both the 'enhanced' and the 'unenhanced'
- The philosophy behind some advocates of some biotechnologies and their use, particularly the transhumanist agenda.
- Tendencies to over-hype predicted benefits that are in reality unrealistic

9 Do you think that some social and ethical themes are commonly overlooked in discussions about emerging biotechnologies? If so, what are they?

[11] Garreau, J. 2005. *Radical Evolution.* New York: Doubleday, p32-33.

There is a common danger that the *dis*-benefits of some of these biotechnologies are overlooked and/or ignored in favour of only perceived and predicted benefits.

Some of the main drivers for the development of new biotechnologies are funding by Western research institutions, the military and, to a certain extent, demand from sport. The focus for research therefore tends to be towards Western markets. To illustrate this problem, of 1,233 new drugs on the global market in 1975 - 1997, only 13 were applicable to the tropical conditions causing the most infectious disease deaths.

Much of the anti-aging research is funded by rich late-middle-age individuals and foundations funded and controlled by them. They have a strong desire to fund a personally relevant issue. This could cause a bias in the time and seriousness given to this issue.

Cost-benefit analyses can 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.

10 What evidence is there that ethical, social and policy issues have affected decisions in (i) setting research priorities, (ii) setting priorities for technological development, and (iii) deploying emerging biotechnologies, in either the public or private sector?

11 What ethical principles should be taken into account when considering emerging biotechnologies? Are any of these specific to emerging biotechnologies? Which are the most important?

We consider this to be one of most important questions in this consultation on emerging biotechnologies, therefore we set out in detail the practical and ethical principles that we believe must be taken into account. Along with the ethical principles, we deliberately include some practical and policy concerns as we consider these to be of great importance and there is little opportunity to comment on them clearly elsewhere.

Ethical Considerations

The Role of Autonomy and Individualism

Some exercises of autonomy can be destructive of human well-being, both in the life of the chooser and in the lives of others affected by his/her choices. The Universal Declaration of Human Rights states that exercising rights and freedoms should be subject to limitation.[12] We concur and fully support this.

Whilst many advocates of new biotechnologies build their case on autonomy and unrestricted liberty (see Q5), in fact the emerging of these new technologies, if

[12] Art 29 (2) "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." .

unregulated, could hinder personal autonomy and harm others (note our response at Q14).

Firstly, civil liberties and privacy will be challenged by several new technologies, such as surveillance, monitoring devices that will enable the surreptitious collection of human subject data, chips and sophisticated databases, including genetic databases. 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. Ironically, all would serve to restrict individual autonomy.

Secondly, if an enhancement, such as a mood-altering drug 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.

Thirdly, 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. If increasing numbers use enhancement 'aids', those who do not take them (for choice or medical reasons) could be disadvantaged. Or use of 'mind pills' to enhance concentration and memory could curtail the freedom of others to choose NOT to use them. Others could be under pressure from peers, employers, competitors, national security or others to accept a particular enhancement. For example, military personnel may be put under pressure to use pharmaceutical products to improve wakefulness and concentration.

Fourthly, *un*-enhancements will seem to be morally permissible as well, if individual autonomy is the most important value to consider in debates. For example, we note the case of deaf parents who specifically want a deaf baby in selecting embryos for *in vitro* fertilization. This can easily be defended if autonomy becomes the driver for permitting enhancements.

Lastly, genetic modification of the germline would certainly restrict the liberties of future generations, creating irreversible changes *without their consent*.

So whilst 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.

Distinguishing between treatment and enhancement

Classifying applications as either 'enhancement' or 'treatment' can be problematic, particularly when a treatment for one 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 if we can distinguish, the question remains as to whether we should use technology just to prevent disease and restore health, or whether it can be used to deliberately enhance ourselves and our children? To cite two examples*:* prosthetic limbs have improved to such a degree that they are already enabling greater than normal strength and capabilities to those that use them, sparking a debate on whether athletes with those artificial limbs may participate in the Olympics; at least 60

golf pros have had laser surgery to reshape their corneas and after Tiger Woods underwent this in 1999 he was quoted as saying that after surgery the hole looked bigger to him.

It is predicted (although by no means guaranteed) that continuing advances in robotics and bio-nanotechnology to give us cybernetic body parts, from bionic arms to artificial noses and ears, that surpass the capabilities of our natural body. We might soon be able to communicate and access those capabilities without having to carry any external device, thus raising our productivity, efficiency, response time, and other desirable measures—in short, enabling us to even better survive our world.. 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.[13]

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 a few, is of concern in a world where half are still hungry and need clean water.

For example, whilst nanotechnology will certainly bring public health benefits, will new technologies such as nano-biomedicine benefit developing countries? Will it provide cures for cancer or vaccines for major diseases afflicting less developed countries such as hepatitis and TB? As noted above, of 1,233 drugs on the global market in 1975 - 1997, only 13 were applicable to the tropical conditions causing the most infectious disease deaths.

The cost of developing some of the cybernetic developments cited above, and then their use in individual treatments, will necessarily limit funding and treatment for other needs and communities.

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.

[13] For example, the use of Ritalin for ADHD is often ambiguous and yet regulatory agencies, despite their faults, still manage to make and generally enforce the distinction between permitting it for therapy and not for enhancement.

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'. "*Human enhancement may create a wide moral chasm between the haves and have-nots. In such a case, resolving issues of rights and responsibilities will take on considerable importance to avoid significant social and economic disruptive effects*." [14]

The emergence of an enhanced 'elite' on top of an already unequal society is a worrying possibility and there is little to stop it in society.[15] 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 2007[16]. McKibben 2003).

Even *within* countries unequal access to genetic, cybernetic or cognitive enhancement could reinforce, perhaps exacerbate, existing social inequalities, predominantly for the already vulnerable such as the economically disadvantaged, non-competents, disabled and embryos.

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 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*." [17]

Advantages gained by enhanced persons also imply a relative *disadvantage* for the unenhanced, whether in sports, employment opportunities, academic performance, or any other area. i.e. 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 super-human hearing or sight could circumvent existing privacy protections and expectations by easily and undetectably eavesdropping or spying on others. More students (and professors) using ritalin may attain admission at the best universities, reducing those opportunities for others etc.

Clearly, natural advantages and inequities already exist without moral issues, and we appreciate that new technologies and therapies can also bring benefits to the disadvantaged *over time*, when mass produced and cheaper.[18]

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[14] Allhoff, F., Lin, P., Moor, J. & Weckert, J. 2009. *Ethics of Human Enhancement: 25 Questions & Answers*, US National Science Foundation.

[15] For some advocates it is more than a possibility, but a goal, to create a new 'elite' group of 'posthumans. .

[16] The Development, Concepts and Doctrine Centre (DCDC). 2007. "The DCDC Global Strategic Trends Programme 2007-2036", *The Ministry of Defence.*

[17] Ibid. p58.

[18] For example, mobile phones, radios, cars, antibiotics, vaccines etc.

However there are already so many inequalities in the world that it seems difficult to justify further additions. Moreover if human enhancement technologies develop as predicted, they will afford a tremendous advantage in life; *e.g.*, over others in a competition for resources, so much so that it overstretches the natural range of equality to the point where inequality becomes a more salient issue.

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.

Living Meaningful Lives

If using new technologies makes our personal efforts meaningless, we will not know if anything we achieve is because of us, or because of the particular technology we use. This could serve to undermine personal achievements, experience and even failure.

Kass has warned that although humans want to be happy, reliance should not be on pharmaceuticals that give happy feelings without the relationships, longings and personal achievements that are essential for true human flourishing.[19]

The view that suffering is pointless (noted at Q2 and Q5 above) ignores the fact that suffering is more than just an immediate experience of physical pain. The experience of physical, psychological and emotional pain, deep longing and anxiety can aid our understanding of what and who we are as humans. One cannot gain courage without risk, deep compassion without personal experience of pain or real gain without some sort of sacrifice, discipline or even failure. A concern with the goal of enhancement is that such qualities are not only ignored but are potentially lost.

The Philosophy Driving Enhancement

The more extreme advocates of some of the emerging biotechnologies see them as a means to free themselves and humanity from the physical limitations of the human body. The underlying ideology, which is driving claims for unrestricted development and use of these new biotechnologies, is *transhumanism*. Transhumanists want to transform the human species into something 'posthuman', that is, better than human.

In the words of one transhumanist author: *"Human – the very word is synonymous with suffering and failure…What is the human condition but an affliction?…Let us learn to think beyond the human condition. Not what humanity is but what it could be!"*[20]

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 transhumanists can see no reason to remain 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

[19] President's Council. 2003. *Beyond Therapy: Biotechnology and the Pursuit of Happiness.* A Report of the President's Council on Bioethics. P298-299.
[20] *Designer Evolution,* Press Release, Simon Young,Prometheus Books, New York, 2006

essential quality that has always underpinned our sense of who we are and where we are going.[21]

Furthermore, 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 human-ness, (for example, embryos, the newborns, the terminally sick, those in PVS, the physically and mentally disabled etc) who would be excluded from the 'community' under such a value system. Unrestricted individualism and liberalism would thus directly impinge upon the liberties and rights of the vulnerable.

The need to protect human dignity

Kant played a key role establishing the importance of human dignity, based on man's intrinsic worth and existence as an end in itself, not a means to be used arbitrarily. More recently Fukuyama has defended the importance of human dignity, not just as 'religious dogma', terming it 'Factor X' and defining 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."* [22] In contrast, advocates of the unrestricted use of these technologies, particularly transhumanists, deny any intrinsic worth of humans and reject the equal value of human lives.

However once human value and rights depends on acquiring some particular level of enhanced biological, genetic or cognitive capacity we create a hierarchical ordering of society, as the transhumanist agenda illustrates.

The challenge we are therefore faced with is to assess each technological advance and application with the questions: 'what will these advances do to our sense of 'being human' and to the *equal value of all* humans?'

Practical and Policy Considerations

Risk and safety concerns

"*The safety question may be the greatest impediment to the industry, which is why many respondents thought that the only route to non-medical use was via the demonstration of safety and efficacy in a medical condition."* [23] .

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 suggests that interventions should be undertaken with great caution.

The body is a complex yet integrated whole, thus in order for some capacities to develop, others may be lost, or enhancement may lead to unintended outcomes. The safety (specifically medical) risks of using 'smart drugs' that alter cognitive function, along with unintended side effects, especially when used by adolescents with developing brains and nervous systems, have been raised by the OFT and others. Safety is also a concern with implants requiring surgery, which create a high risk of infection and nerve damage.

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[21] Fukyuama, F. 2001. Our Posthuman Future: Consequences of the Biotechnology Revolution.
[22] Ibid.p149.
[23] Office of Science and Technology (OFT). July 2005. *Drugs Futures 2025? Perspective of the Pharmaceutical industry.* P26.

There are also concerns with the use of nanotechnology, particularly the potential toxicity of nanomedicine. The toxicity and inflammatory properties of ultrafine particles increase as the mean particle size becomes smaller. Some nanoscale structures may disrupt, in unexpected ways, life systems at the sub-cellular level. They may interfere with DNA and mitochondria for example. There is growing evidence that nanoparticles interfere in protein expression and gene expression.

Their high mobility also means that some nanoparticles can potentially pass through physiological barriers such as the blood-brain, lungs, stomach, skins retinal and placental barriers. It is likely that free nanoparticles can pass through the food chain in unexpected ways. A variety of nanomaterials have the capacity to cause tissue and cellular damage by causing oxidative stress.

There is a need for greater transparency and accountability, and the freedom and availability of information, thus putting an onus on providers to supply information sufficient to allow users to make informed choices.

Regulation

See our more detailed comments at Q14 below. In general, it is right and beneficial for the public to be informed about and engaged with new developments at the earliest possible stage. Unfortunately, many industries are going ahead with the production and marketing of nano-products without adequate information or safety precautions, for example, in the use of nanoscale TiO2 sun-block creams. We consider that current regulations and risk assessments are inadequate and some are outdated, and there is an absence of standards in the field that needs addressing.

Privacy, surveillance

Consideration should be given to how new biotechnologies will challenge the existing laws governing privacy, surveillance and health information? For example, the development of a medical wearable device for home telemonitoring of patients with chronic diseases will be able to measure blood oxygen saturation, pulse rate, breath rate etc but will also download to a PC through wireless bluetooth technology.

12 Who should bear responsibility for decision making at each stage of the development of an emerging biotechnology? Is there a clear chain of accountability if a risk of adverse effects is realised?

We first need to distinguish between science that seeks to know, and technology that seeks to use. The current view tends to state that once we know we can't stop use, but nuclear moratoria show that that does not have to be the case.

There should be a multi-disciplinary and multi-level responsibility. This should 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.

13 What roles have 'risk' and 'precaution' played in policy decisions concerning emerging biotechnologies?

Nanotechnology
The European Commission issued a 'Communication on the Precautionary Principle' (2000); accepted by Council of Ministers' Nice Decision (2000).

In March 2004 the Health and Consumer Protection Directorate General of the European Commission issued 'Nanotechnologies: A Preliminary Risk Analysis'.

The question is, despite these useful but limited EU directives, are scientists and industry adhering to precautionary principles, to transparency? There is, so far, little evidence of precaution reflected in, for example, transparency in labelling, research priorities and conflicts of interest.

We consider that activities that present an uncertain potential for significant harm should be prohibited, unless the advocate of the activity shows that it presents *no appreciable risk of harm.*

14 To what extent is it possible or desirable to regulate emerging biotechnologies via a single framework as opposed to individually or in small clusters?

We answer this question more generally, as we wish to set out clearly the urgent need for regulation per se.

Secondary questions as to whether regulation should be via a single framework or individually will mostly be determined according to the technology itself, but will generally be a mix of the two. Whilst there will be some overall regulation required, to ensure benefits outweigh costs, there will also be a need to regulate individual technologies. (For example, those in charge of a sport must set the rules to allow or forbid enhancements so that, in swimming for instance, some aquadynamic swimsuits are allowed and some are not).

Sometimes the problems generated by emerging technologies can be regulated easily under existing ethical policies. But because new technology 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.

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 (see Q11 above). 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. However, it is important to note that 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.

Of course, it is particularly 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. 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, we accept the need for regulation already. Sports, for instance, would change dramatically if enhanced persons are permitted to compete to the clear disadvantage to unenhanced athletes, smashing their previous records.

Importantly, regulation serves to sends a clear message to users and providers of technologies and both benefits and *dis*benefits of particular technologies.

15 What role should public opinion play in the development of policy around emerging biotechnologies?

The public have a right to know as citizens and stakeholders about the development and use of biotechnologies. They should be engaged through use of consultations, through increasing communication and understanding of technologies and their implications (including hazards and risks not just benefits). Greater democratic accountability is undoubtedly required, not once a technology is in use but before.

Whilst public consultations are important in ascertaining and engaging public interest and input, they should not be used to override basic ethical, moral and safely issues, nor indeed national regulatory requirements.

16 What public engagement activities are, or are not, particularly valuable with respect to emerging biotechnologies? How should we evaluate public engagement activities?

17 Is there something unique about emerging biotechnologies, relative to other complex areas of government policy making, that requires special kinds of public engagement outside the normal democratic channels?

Concluding comments

The predicted benefits from technological progress are certainly headline grabbing and appear compelling. However those claims that are unlikely to be fulfilled must be distinguished from those that are realistic. Many of these predictions are simply predictive, and may well not come to fruition, so it is important not to *overhype* predicted developments.

The pitfalls, potential harms and the ethical and social concerns generate far fewer headlines than the benefits. There is a danger of both ignorance and indifference to both the realities of the claims made, as well as the wider consequences of biotechnological developments to society. The *range* of possible applications of new technologies admittedly compounds difficulties in predicting where the greatest risks lie. In some cases, the applications can be many and varied. For example, lasers can be used for surgery, in cancer diagnosis, or to guide bombs to their targets.

Ultimately however, it is not technologies per se which dehumanise, but the dehumanising *use* of particular technologies that can have destructive consequences for others. It is human choice as to whether technology is used to heal or destroy. And while we may not have accurate foresight, we can and should have forethought.

Our challenge is to proceed, but with caution, wisdom and more knowledge, not being too easily blinded by technology and its utopian promises of better health and greater happiness but ensuring we ask for the setting of **limits and regulation in**

order to protect both humans and our humanity and dignity. Technologies should be used to meet human needs. Biotechnology should be our servant, not our master.

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About CMF:

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.

The 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.