

This response was submitted to the consultation held by the Nuffield Council on Bioethics on Emerging biotechnologies between April 2011 and June 2011. The views expressed are solely those of the respondent(s) and not those of the Council.

Response of the Bioethics Group of the Church in Wales to the Consultation Paper on Emerging Biotechnologies of the Nuffield Council on Bioethics

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

An 'emerging technology' is a new development or innovation in any aspect of science and technology.

An 'emerging biotechnology' is a new biological development which manipulates, develops or enhances life (human, animal or plant) in some way. Such technologies include genetic engineering, synthetic biology, the development of anti-ageing drugs, stem cell treatments, body implants and prosthetics, regenerative medicine.

2. Do you think that there are features that are essential or common to emerging biotechnologies?

Largely emerging biotechnologies focus on scientific or medical advancement, usually aiming to benefit human-kind. The development of these technologies is usually driven by the commercial impact they may have. There needs to be a clear focus and goal for the development of these technologies, without constricting research and development.

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

The genetic modification of crops to make them resistant to specific environmental or ecological conditions is an evolving industry. The use of genetically modified crops for human consumption is still treated with considerable scepticism. There are undoubted benefits to the use of genetically modified crops as yields can be increased substantially. From a legal perspective the genetic modification of crops or breeding crops that so that they consistently display a particular characteristic raises the question of the patenting of life. Increasingly, patents are being sought for crops that have been modified in some way. This imposes considerable restrictions on farmers who cannot produce their own seeds, an issue that has considerable financial implications, particularly for farmers in the poorer regions of the world.

The use of stem cells and the issues surrounding human cloning and embryology. We are particularly concerned about the possibility of selecting embryos for particular characteristics such as sex or eye-colour, legislation therefore needs to remain tight as far as embryology is concerned. The developments in stem cell research are exciting and have the potential to lead to the effective treatment of a number of diseases. However, there is a risk that patent law may be used in relation to this technology. We would consider the patenting of human cells to be ethically reprehensible as they are not new inventions but derived from existing human material.

Human enhancement technologies are developing which could allow human beings to control emotions and memory. There is also research into the development of anti-ageing drugs and the use of regenerative medicines to prolong life. All of these raise ethical issues around how far we go in interfering with nature.

Developments in Nanotechnology are creating new nanomaterials, nanomedicines, electronics. These can be beneficial to human-kind, however there may be environmental, health and safety issues that have yet to be realised. There are ethical concerns surrounding the use of these technologies for the development of warfare, particularly where there are potential dual uses of medicines as weapons for example.

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

A number of factors have contributed to the development of fertility treatments, including the fact that an increasing number of women are waiting until later in life to start a family. Preimplantation genetic diagnosis is now widely accepted as a way of screening for genetically inherited diseases and is used as a method of selecting embryos that are healthy. The existence of these technologies clearly have a wide number of uses and applications. However, there is likely to be increasing social pressure to extend its use to include the selection of other characteristics such as sex or eye-colour.

The genetic modification of crops has certainly been influenced by geographical factors, as this technology is being used to combat environmental conditions and increase food yields.

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

In recent years the genetic modification of crops has been the cause of considerable public debate, particularly surrounding the safety of these crops for human consumption. These technologies are more acceptable in some areas of the world, but are continue to be treated with scepticism in Europe.

The recent trend for patenting seeds is concerning as it forces farmers to buy seeds every year, this is issue an issue that particularly affects the poorer regions of the world.

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

The development of genetically modified crops has been influenced by globalisation and concerns over the need to provide adequate food supplies for all. However, the use of GM crops will not solve the world's food provision problems.

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

It is difficult to separate cause and effect. The liberal democracies, such as Europe and the USA have certainly been the main sources of development. They are, however, the "richer" parts of the world where funds are more freely available to cover the enormous cost of

innovative research. This extends both to private (commercial) research and state funded research, which has tended to focus on bio-warfare applications.

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?

The main ethical issue across the field of biotechnology is the potential for dual use, both to help human kind and as a weapon. It is the need to allow research to progress balanced against the risk it will be misused which poses the greatest potential problem.

The increasing trend in the patenting of life, including seeds, animals developed for research purposes and stem cells raise considerable ethical issues. Patents are being sought more and more widely and is likely to affect all emerging biotechnologies on one form or another. There are considerable ethical concerns with regard to the patenting of life in this way, particularly when, for example, stem cells are derived from an existing organism and are therefore not a new invention, but part of God's creation.

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

The difficulty with emerging biotechnologies is that they do not usually become public knowledge until a patent is applied for, or until the research has produced significant results which are reported in the international or national press. There is therefore very little time any significant ethical debate.

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?

Central to the ethical debate on emerging biotechnologies is the relationship between humanity and nature. In considering these ethical issues it is possible to use scripture to inform theological discussion, however within the Anglican tradition we also tend to balance this with reason and experience.

The implication of the patenting of genes associated with animal life, such as the OncoMouse, is that human genes may also be patented, as has already been seen with the sequencing of the Human Genome. These sequences relate specifically to a particular animal or human being. The patenting of particular human gene sequences implies that at least part of human life can be owned. There are also implications for the potential patenting of specific stem cells. It has widely been accepted that one cannot own another human being, slavery is for the most part condemned. This therefore raises the question of whether something as personal as human cells, human DNA, or any part of it, can be owned.

The early embryo represents our need to protect the vulnerable; life is not a thing or a commodity. Careful ethical consideration of the ways in which embryos are used in research and development of therapeutic treatments is therefore necessary

The creation of 'saviour siblings', although with good intent may also be considered to be a 'slippery slope' to the creation of 'designer' babies, where embryos are selected for certain characteristics such as eye or hair colour. This would be an undesirable use of the technology available and would be open to significant abuse.

Currently genetic modification of crops is widespread and becoming more and more so. There are considerable ethical issues surrounding patent law and the potential consequences of these laws. There are clearly difficulties in determining whether the process of the genetic manipulation of crops goes against or fulfils God's purpose for humanity as stewards of creation. the creation of seeds resistant to insects and climate conditions, seemingly benefit humankind in widening food production. However, it is also clear that the restrictions that patenting places on the use of such crops leads to the abuse of farmers who are tied into purchasing seed every year rather than being able to cultivate their own seed. Unfortunately the patenting of these seeds leads to the exploitation of those most in need. This particularly affects farmers in the developing world who are already facing economic crisis. It also raises the question of whether life, or any part of it, given its potentially unique status in the universe, be open to commercial exploitation? This is true of the breeding of animals for particular characteristics, it also gives rise to the question of power that comes from the difference between simply owning a cow and owning the rights to the genetic sequence which gives rise to all cows.

The development and patenting of the OncoMouse has created a number of ethical issues. The mouse was developed with a view to provide more effective treatment for cancer sufferers in the long-term. This can be considered to conform to the image of God, using our God given creativity to benefit humankind. The difficulty arises once the technology was patented. Until that point it would be possible to use the technology to produce mice with a variety of conditions for use in research. However, once patented any further mice would have to be created under license which would restrict its use. Consequently this leads to the commercial exploitation of life.

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?

Responsibility rests first with the scientists themselves. As individuals they have personal responsibility for their actions. We would suggest that ethics should play a greater part in the education of scientists. Secondly, it rests with those funding the work. Here is where the problems often begin. Commercial interests are usually dominant in companies and the military have a great influence in government funded work. Finally, it is the nature of science to make public most results. When "the genie is out of the bottle" the use to which a technology is put is often beyond the control of anyone.

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

These elements seem only to be applied to the potential “dual use” technologies. Then the motives have to be questioned as to whether it is for the benefit of humankind or to gain military or political advantage.

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?

Where there is common ground between emerging biotechnologies it may be possible to regulate them within a single framework. However, this may be too restrictive and it may be necessary to consider each case individually.

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

The problem is that like most research, these technologies are outside the knowledge of the public at large who only find out about developments often years after they have happened.

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

It is important that the public are properly informed about emerging biotechnologies. It is therefore necessary to engage in a variety of ways and through a variety of media.

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?

No

The Bio Ethics Group of The Church in Wales
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