

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.

## **Nuffield Council on Bioethics: Emerging biotechnologies - response form 2**

*Please feel free to answer as many or as few questions as you wish. There is no limit to the length of each answer.*

### **Emerging technologies**

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

Emerging technology can be defined as technology that is difficult to be governed by conventional research, innovation and legal systems.

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

Considerable benefit for human health and welfare and potential risks and ignorance on human body, identity and dignity

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

Regenerative medicine, synthetic biology

### **Cultural, international and historical context**

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

In Japan, the geographical feature of which extends from the north to south and has high humidity, many kinds of microbe, and fermented and brewed food have been invented and developed, and fermentation engineering and brewing technology is now on the leading edge in the world. In this context, most researchers tend to regard synthetic biology not as an emerging technology but as a rehash of such traditional disciplines.

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

Because Japanese consumers are so particular about the quality and safety of food, the public seem rather conservative on the development of novel food biotechnologies.

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

Japanese government and public institutes are keen to develop value-added GM rice in order to compete with cheap imported rice and protect domestic rice production industry.

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

Seniority system and high political concern of the aged appear to push technology development for elderly people's health and welfare.

### **Ethical, policy and public engagement issues**

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?

How to make researchers involved in emerging biotechnologies be aware of the importance of ethical consideration and self-regulation and take their responsibility and integrity.

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

Interaction between tangible entities produced in emerging biotechnologies and human senses, especially visual sense and tactile sense. We may need to understand in what sense we discriminate the life from the life-like.

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?

In public sector in Japan, there are almost no apparent decisions in setting research priorities, setting priorities for technological development, and deploying emerging biotechnologies, except for the case of iPS cells. As Prof. Shinya Yamanaka becomes a public figure after the discovery of iPS cells, the government put huge resources into the development of this area. Fame is a critical factor affecting such decisions.

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?

In my opinion, any ethical principle should not be given a priori, but be agreed among the public or experts entrusted by the public.

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?

Question might be not a matter of who but a matter of to what extent. Researchers should be more responsible at earlier stage and industries and medical professions at later stage. The government and the public should also take their own responsibility at all the stage.

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

The government and other social actors need to be aware of potential risks and take to some extent precautionary attitude on the development of emerging biotechnologies. But this never means emerging technologies should be regulated from the early stage, but rather with a continuous external monitoring/evaluation and socially accountable explanation, these technologies should be appropriately guided.

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?

As there are a lot of loopholes and oversights in the development of cross-disciplinary emerging biotechnologies, it may be good to construct a rough but single framework spreading a net over the whole related field. But the regulation via this framework should be carefully designed and flexibly and dynamically modified in order not to disturb future innovation and hinder the involvement of entrepreneurs.

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

Public opinion should be directed to whom the public can trust in the governance of emerging biotechnologies and what kind of needs they wish to satisfy by these technologies in future.

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

Detailed mapping of the diversity of public values on emerging biotechnologies. For this visualization, science illustration/arts can have a great potential to connect with the public. These activities can be evaluated by verbal and non-verbal exchange of the public attendance in the field interacting emerging biotechnologies.

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?

Emerging biotechnologies may bring unique feelings and sentiments to individual humans, artistic expression would become more important issues compared to other complex areas.