"Synthetic Biology - a threat or an opportunity?"

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BIOS

CSynBI
Centre for Synthetic Biology and Innovation

LSE Sociology

- Development of synbio occurring in socio-political context, esp in Europe, where perception is one of pervasive lack of trust - In science - In experts - In politicians and regulators
- Especially in areas that touch everyday lives and health (GMO, BSE, MMR…).
- Hence policy makers believe they act in a climate of anxiety, high concerns about risk and insecurity, and hence the need for precaution
- Questions of risks and risk assessment and communication are notoriously hard to discuss and deliberate rationally.
- Esp, when located in a media culture veering between hype/expectation/fear/scandal
- BUT view of public as ignorant, irrational, mistrustful of science, swayed by media stories etc. not confirmed by social science research
- More complex picture emerges of public not as ant-science or mistrustful per se, but able to make distinctions between scientists, journalists, political arguments etc.
- Yet with particular concerns where they see science and its presentation shaped solely by commercial interests.

- Two ‘emerging technologies’ of nano and synbio have been accompanied by obligatory involvement of social science ‘upstream’, no doubt linked to perception that distrust will undermine opportunities.
- Dozens of reports on these issues
  - E.g. see the list at:
  - http://royalsociety.org/synthetic-biology-resource/
- LSEs view, underpinning its involvement in the Imperial-LSE Centre for Synthetic Biology and Innovation (CSynBI) is that this can’t merely be window dressing, or ‘public persuasion’ of acceptability masked as public engagement,
- It has possibilities for genuine experimentation and advance in democracy around technological development, as scientists obliged to enter into public dialogue and communication about opportunities and threats presented by their work.
- FOUR well known key areas of concern in dialogue around synthetic biology.

1. BIOSAFETY

- Accidental release, unanticipated consequences etc, esp given the capacity of living entities to evolve and mutate.
- debated most prominently at Asilomar in 1975
- Leading to current regime - combinations of self-regulation, classification and legal regulation of labs, inspection regimes etc
- Which works rather well!

2. BIOSECURITY

- Deliberate use of synbio organisms in offensive actions
- Major concern in the US, problem of garage biology and easy of access and use, but less so in Europe, and offensive capacities of weaponised biological organisms exaggerated.
- Nonetheless, dual use problem – beneficial and harmful hard to disentangle, notably because problematic developments often arise from the best of intentions and the laws of unintended or unanticipated consequences.
- Currently largely addressed in biopreparedness strategies:
- (see F. Lentzos and N. Rose (2009) Governing insecurity: contingency planning, protection, resilience, *Economy and Society,* 38 (2): 230 - 254

3. COMMERCIALISATION

- Intellectual property, public value versus biovalue.
- Real problem in GMO
- But novel frameworks of open source being proposed by synbio community itself
- To protect the commons in basic elements, but allow property rights in applications, ie facilitating innovation without 'enclosing' commons.
  - See Drew Endy's Open Biotechnology and the BioBrick Public Agreement
  - http://bbf.openwetware.org/BPA.html

4. LIFE ITSELF

- Creating organisms evolution forgot, playing God (which God?) etc..
- Current developments in synbio are far from able to create life ab initio
- More like hijacking living processes and turning them to new ends, which is what humans have been doing for millennia.
- But legitimacy of manipulating living organisms – and limits – remains a crucial question
- Emergence of an engineering conception of life – and hints of an 'age of biological control' (Wilmut) where limits on what we can do to ourselves and other living creatures are not set by nature but by ourselves – so how?

How to promote democratic dialogue & public engagement

- Yes, public debate, though not just opinion surveys – scientists IN PUBLIC
- Key characteristic of synbio and nano is uncertainty but these issues CAN be debated in public
- Upstream engagement beyond ELSI - -engineering socio-technical systems
  - (NB Example of biofuels for what happens if this is NOT modelled)
- Building socio-ethical capacities into next generation of synbiologists – many of whom wish to be entrepreneurs for the public good
- Synbio for public value, not just biovalue
- Mitigate demands for hype and rapid translation (which can lead to problems, e.g. extreme case of Prof Hwang in Korea)
- Develop multi-strategy regulatory frameworks – self regulation, quasi-governmental (a la Warnock and HFEA), legal, governance networks etc. to create stable milieu.
- UK has very good models for this, but NB challenges of internationalisation and harmonisation