We are what we eat? Some thoughts on the governance of nutrigenomics and personalised nutrition

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Introduction

This paper considers the problems of governance, as might be faced by a law or policy maker who is asked to consider the regulation of nutrigenomic science and personalised nutrition. This paper does not seek to provide a comprehensive taxonomy of the problems, nor to provide definitive solutions. Rather it seeks to explore nature of the governance questions raised by nutrigenomics and suggest a framework for their analysis.

An interdisciplinary approach to governance

This paper is centred on a vision of interdisciplinary governance, at the core of its development is the sincere belief that neither scientists, ethicists, lawyers, nor any other body of persons—whether skilled in a specific discipline or acting as a concerned, or unconcerned, public—has the exclusive ability to “govern” technology. At this point it is necessary to distinguish between the concept of “ability to govern” from the concept of “power to govern”.

In this context, I regard the “ability to govern” to mean simply the ability to engage with the issues relating to the thing being governed (in this case nutrigenomics and personalised nutrition). In contrast, in order to have the “power

to govern” you must be in some way able to effect the conduct or development of the thing being governed (again in this case nutrigenomics and personalised nutrition). Thus, by use of the term “governance”, and the accompanying verb “to govern”, I am referring to more than regulation through legal instruments, but am also opening up the field of discussion to include, for example, the operation of: ethical codes, financial markets, political systems, religious doctrine, scientific research agendas and pressure groups. This list is not intended to be exhaustive, but is merely demonstrative of those kinds instruments or organisations that might exert some form of “power to govern”. This comes with the obvious caveat that some actors will exert more “power to govern” than others. Equally, the list of those disciplines, professions and groups that might then show an “ability to govern” under this definition is also vast.

This construction of governance, in terms of those who have “ability to govern” and those who exert a “power to govern,” may seem to complicate what might otherwise be a simpler discussion of the legal issues associated with a particular topic (such as the development of a new technology). However, when viewed from the position of a law or policy maker these questions become interesting. Prior to defining a law or policy, the decision maker must decide with whom (if anyone) they must consult, and how that consultation will take place. As part of this process, the law or policy maker must (either implicitly or explicitly) assess the level of “ability” and “power” to govern possessed by themselves and others. Thus we arrive at the understanding that the law or policy maker to which we are referring, need not be a member of a government, but could be operating within one of the other groups that might exercise some “power to govern”.

It seems there is a Hierarchy of Governance. Some law or policy makers and some forms of governance—that is

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some forms of exercising a “power to govern”—are more effective, or more enforceable than others. The situation becomes still more complicated when viewed from a global perspective. Essentially, the true practice of governance in the field of new technology is about a balance of competing interests and values. Consider for instance the impact of the following on the conduct and/or development of biomedical research: The Hippocratic Oath [1]; The Nuremberg Code;¹ The Declaration of Helsinki [2] and the Statement on the Principled Conduct of Genetics Research.²

These documents and standards are not laws, they have not been enacted by government nor are they enforced directly by an apparatus of the state, and yet they can be seen to exert some “governance power” over biomedical research (specifically that involving research on humans). The effect or impact of an individual governance document is hard to measure. Whilst it is clear that some documents and standards are more influential than others, the intention of this paper is not to quantify governance, rather to explore it. Nevertheless, to varying degrees the tenets of the small selection of governance documents listed above exert some governance power over biomedical research. Their impact on an individual research project is affected by a number of variables including: the specific branch of research involved; the country in which the research takes place; the beliefs of those conducting the research; the legal frameworks in place; the constituency to which the particular document or standard applies.

Those governance documents that emanate from government are generally stronger, in terms of their governance power, than those that emanate from another source. These might take the form of statutes, statutory instruments and court cases. In the alternative, they might take the form of less formal measures such as departmental policy, budget controls or codes of practice. Nevertheless, they might be considered to be of a higher order, in terms of a hierarchy of governance, than the first group of documents. Examples, drawn from the UK might include: The Human Tissue Act 2004 [3] and The Human Fertilisation Act 1990 [4].

These two statutes place limits on the use of certain human materials for research and create committees to monitor, licence and regulate those areas of research that involve the relevant material. Failure to comply with the terms of these statutes, may carry a specific penalty, including the possibility of sanction under the criminal law.

¹ (1949) Trials of war criminals before the nuremberg military tribunals under control council law no. 10, vol 2. US Government Printing Office, Washington, pp 181–182, available online at: <http://www.nihtraining.com/ohsr/site/guidelines/nuremberg.html>.

² (1998) Human Genome Organisation (HuGO) Ethics Committee, statement on the principled conduct of genetics research, available online at: <http://www.gene.ucl.ac.uk/hugo/conduct.htm>.

Thus it would seem that they have a higher governance impact than those documents considered earlier. Yet they remain subject to the same limitations including: the specific branch of research involved; the country in which the research takes place; the beliefs of those conducting the research; the legal frameworks in place; the constituency to which the particular document or standard applies. In this case the “constituency” does not refer to members of a particular group or profession, as it might with the earlier variety of document rather it refers to a specific body of citizens with a particular domain (in this case the UK).

Other positions on the hierarchy might then be occupied by governance documents—including those of a legal nature—issued by regional or global bodies such as the EU; the UN or the WTO (consider the current governance dilemma caused by the EC moratorium on GMO products, currently under consideration by the dispute resolution panels of WTO³). Such supragovernmental organisation might be seen to occupy a position above national governments in any proposed hierarchy of governance, though they are subject limitations in the same way as the other governance documents considered. Those with the smallest amount of *prima facie* power to govern—such as interest groups—can often have a high impact on governance through the publication of policy documents, statements, investigative papers and through other actions that bring those issues they consider important to the forefront of public debate. This can include engaging the help of the media or feeding directly into the governance processes of other occupying a higher position in the proposed hierarchy. Through the hierarchy of governance proposed in this paper, we arrive at an interdisciplinary definition of governance as “the study and practice of legal, philosophical and social issues within a regulatory framework or broad regulatory context”.⁴ The hierarchy is measured in terms of “governance ability”, “governance power” and “governance impact”.

Problems for governance of new technology

One of the major governance problems for the law or policy maker, in addition to concerns about the impact of their governance decision, is what I have termed the

³ Complaints against the EC moratorium by the United States (WT/DS291), Canada (WT/DS292) and Argentina (WT/DS293); for more information see: <http://www.wto.org>; for 3rd party commentary on the case see: (2006) Genewatch, The WTO GMO Dispute: The Interim Report of the Dispute Panel, online at: <http://www.genewatch.org/WTO/WTO%20-%20Interim%20report%20GeneWatch%20short%20note.pdf>.

⁴ The author first presented this definition of governance at a workshop organised as part of the PropEur Project in Cardiff, June 2004. For further information on this project see: <http://www.propeur.bham.ac.uk/>.

“Minerva condition”.⁵ The development of new technologies or advances in science are often described in utopian terms by those who support them, and dystopian (or even apocalyptic) terms by those who oppose them. As Gordijn has observed, “the dominance of utopian dreams and apocalyptic nightmares in the debate on future perspectives of [new technology] holds the risk of unnecessary backlashes. These radical views are the product of one-sided perspectives” [5]. This extract refers specifically to debates surrounding nano-technology, but the tendency to pit utopia against dystopia is common in the framing of debates around new technologies. These visions of the future traditionally demonstrate great promise, or great danger from a new technology. They may be based on science fact, and on published scientific data. In contrast, they may be projections of future developments (truly a vision as opposed to a reality). Many of the key narratives in these proposed futures may be drawn from science fiction or may have become the subject of science fiction. Thus the law or policy maker faced with the need to make a governance decision, is asked to balance utopia(s) against dystopia(s), science fiction against science fact, to decide upon a vision of the future. Perhaps it is sufficient to govern science as it is now? This carries the risk that governance structures may be unsuited to the task of regulating the technology in question, or perhaps a sudden development will require an absolute rethinking or reinvention of governance decisions. Thus there exists a delicate temporal balance within the development of governance, a risk that the governance measures will become outmoded, as new technological and scientific advances are made. These changes might be characterised by a need to respond as a “moral panic” [6] (perhaps due to a prevailing dystopian vision within the law or policy makers’ constituency), or a simple inadequacy of the current governance framework to cope with the new development (the internet is perhaps a good example of a technology that has lead to the development of many new governance provisions to cope with the myriad of possibilities it opens up). In the alternative, it may simply be caused by some form of change of view regarding the technology in question or change in understanding caused by a new development as noted by

Chadwick and Berg, “This is not surprising, as developments in science and technology have a ‘value impact’—they can change the way we look at things and call for new principles to mediate between competing interests.” [7]. Thus in truth the law or policy maker is being asked to govern both science as is, and “science potentia”—that science which may come.

It may be that the constituency of the law or policy maker in question requires a specific bias, they may be interested in propagating a particular utopia or dystopia as part of their governance approach (this may be more likely where the law or policy maker in question has a potentially small amount of “governance power”, such as an group, which seeks to promote a particular view point). It has been suggested such utopian and dystopian visions can be unhelpful, and risk polarising the debate. However, they at least contribute to the governance process of other law or policy makers—perhaps those with a higher level of “governance power”—as they attempt to discern the relevant “science potentia”.

So we arrive at the “Minerva condition: A need to understand both the present reality and future of the knowledge you seek to govern”. In summary, those who are involved in governance are, it seems, asked to be to some extent clairvoyant.

Nutrigenomics, personalised nutrition and the future

A pair of leading nutrigenomic scientists recently observed that: “Nutritional genomics is still in its infancy, but it is predicted to rapidly move to the systems-based ‘holistic’ level by using high throughput technologies and advanced data analysis tools. Transcript, proteome, and metabolite profiling technologies are constantly being improved and are becoming more convenient but in the end require a substantial investment in equipment and specialized personnel. Although the new technologies already generate insights into nutrition-dependent signal transduction mechanisms and gene regulation phenomena, it is obvious that at present, these studies more often generate hypotheses than deliver true answers” [8]. This quotation begins to outline the “Minerva position” as it applies to this branch of science, by demonstrating the embryonic nature of the science and expressing, the uncertain progression of the science. A simple internet search for the expression “personalized nutrition” delivers approximately 6,130,000 responses.⁶ Among the responses are a variety of

⁵ Minerva was the Roman goddess of wisdom (as well as, amongst other thing, to: science, medicine and warfare). Depicted in ‘Minerva’ a marble mosaic by Elihu Vedder, located on the landing of the stairs leading to the Visitors’ Gallery above the Main Reading Room of the Library of Congress in Washington, DC.- she portrayed as a guardian of civilization and promoter of the arts and sciences. In her left hand she is holding a scroll that contains the entire sum of human knowledge, towards the top are listed various items of knowledge, the area to wards the bottom is unclear, and cannot be seen. This is taken to represent the things that man does not know yet. Hence the term “the Minerva condition” to refer to the need to understand the things we do not yet know.

⁶ A simple search using the search engine <http://www.google.com> and searching for the term “personalized nutrition” delivers about 6,130,00; repeating the search with the anglicised spelling “personalised nutrition” delivers about 567,000 sites.

companies, research institutes and other groups offering or developing “personalised nutrition”. Nestlé, for example remain relatively restrained in the utopia they promise, commenting on the benefits of personalisation without being overly specific as to what those benefits might be;⁷ others who are already offering products for sale (including home genetic tests and nutritional samples) paint a more extravagant picture of the promise of nutrigenomics and personalised nutrition.⁸ In contrast, many groups have begun to speak out against personalisation, and to identify potential dystopian scenarios for personalised nutrition—see for example, The Food Ethics Council [9] and Gene-Watch UK.⁹ And thus we see the embryonic stages of the governance process beginning.

Final conclusion

In conclusion, the governance processes relating to a new technology are destined to be complicated, and to require the balancing of competing interests and visions of the future. As the science continues, debate is to be encouraged at all levels and involving the widest constituencies possible in order to ensure the most appropriate development of the science. The most appropriate development, may for some governance bodies be non-development (consider the moratorium on so-called terminator technology or the

restriction on human reproductive cloning). Perhaps—whatever the level of “governance ability”, “governance power” or “governance impact” the process of recognising the “Minerva condition” and navigating a path through (or proposing new) utopian and dystopian visions of the future, is best summarised in a two-part question: Where are we going? And how do we get it right?¹⁰

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⁷ “Growing new areas of research will concentrate on condition-specific probiotics and preventive nutrition. At a personal level, individuals will be able to develop a highly individual nutrition program. This will all imply the development of innovative new products that deliver new benefits to consumers. Nestlé scientists are already leading the next wave of breakthrough research.” http://www.research.nestle.com/innovations_publications/key_innovations/Personalized_nutri.htm.

⁸ “For the first time, you will be able to make targeted lifestyle choices based on information that is specific to you, and you alone, and create a unique health program. Nutrigenomics creates an opportunity for you to take control of your health like never before.” <http://www.onepersonhealth.com/geneticAnalysis/nutritionalGenetics.jsp>.

⁹ <http://www.genewatch.org/>.

¹⁰ This questions was posed to the audience by a member of the local business community at the opening session of University of South Carolina NanoEthics Conference, 2–5 March 2005.