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Case Study on In-Vitro Meat WP5 Policy Report, March/April 2015

Summary of findings and policy considerations

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¹ This policy report is based in Epinet's WP5 case study on in-vitro meat. The partners have shared their notes and reflections on three years of research in order to produce a shared summary of key findings along with policy recommendations. As the rapporteur, I extend my gratitude for excellent scholarship, brilliant insights and good working spirit.

Aims and Objectives

The in-vitro meat (IVM) research field remains small with perhaps 50 or so scientists active globally. These scientists are in the Netherlands, the US, the UK, Sweden, Israel and Norway, with some interest expressed in Denmark and by a group of bioreactor engineers in Portugal. The main groups involved in supporting this innovation domain are: *New Harvest*, a US based pro-IVM campaign group that raises funds through donations for small scale research work, discusses IVM in the media and organises conference panels; the *In-Vitro Meat Consortium*, established by Dutch and Norwegian scientists in 2008 as a networking device with presence at conferences, although, now with limited activity; the US animal rights group *People for the Ethical Treatment of Animals* (PETA). The most high profile laboratories are those of Mark Post at Maastricht University and the New York based private company Modern Meadow, both of which have become relatively financially secure research sites over the last three years.

The aim of the Epinet case study was to explore and interact with these epistemic communities / networks that have been developing, implementing, supporting and promoting IVM technologies. The study team consisted of expertise in sociotechnical evaluations, systems and uncertainty analysis, ethics and media studies. The team identified early on a small set of policy considerations around the issues of **public funding** and **the social shaping of IVM**. The question of whether or not IVM research should be publicly funded has had to be viewed in relation to how IVM technologies are represented, understood, shaped and reshaped and, accordingly, what sort of IVM activities should be funded. When the case study commenced in 2012, government policy makers had only twice chosen to fund IVM laboratory work, i.e., a section of the Dutch government interested in environmental issues and protein (2005-2009; 2010-2014), and NASA (~2000). In addition to that, the European Science Foundation (ESF) funded a two day blue skies conference in Gothenburg, Sept. 2011. Other funders include *PETA*, *New Harvest*, and private donators.

Research questions that shaped the course of the case study:

- Who is involved in IVM, why and how did they become active?
- How do they interact as an epistemic network?
- What role do politically engaged activist groups play in shaping the emergent biotechnology?
- How do IVM protagonists establish a shared imaginary of its future large-scale application, its use and its users?
- How is this imaginary materialised and what actions, both in terms of product design and discursive promotion, are undertaken that expand the epistemic network?
- How do the scientists, positioned as insiders or outsiders of mainstream biomedical tissue engineering, frame their work and capacity in the area?
- How do imagined future regulatory hurdles shape IVM work?

The policy considerations presented here have served throughout the case study as a common point of reference in dialogue across the network of IVM research and evaluation. As it stands, basic research into IVM is focussed upon cell-culturing techniques, but if the technology is to flourish it will have to scale-up and recreate the laboratory work of cell-culturing on an industrial mass scale. While a scaling of that nature is not yet a foreseeable future, the case study was developed to reflect upon the early stage technology-readiness of what remains an emergent science in search of funding, in search of users, in search of identity.

Policy considerations and recommendations

Our central policy considerations are presented here as discussion points, directed at **scientific and innovation policy advisory bodies** to the European Science Foundation (ESF), DG-Research and other relevant EC Directorates and national research funds in matters of agriculture and food policy, biotechnology, food security the environment and sustainable industries.

(1) How is IVM conceived of and the research contextualised? Supporting pathways from laboratory cell-culturing into food development.

Explanation/findings: We observe inconsistencies in the definition of IVM as an innovation object, and in the framing of its place and purpose in the world. It is unclear what this particular innovation is for. If it is a solution to something, then it is unclear what exactly the problem is. We observe arguments that seemingly justify the eventual IVM innovation, that it will target environmental problems linked to meat production and over consumption. However, these arguments find their way into contradictory narratives when they are presented, for example, in conjunction with ideas about new niche markets and in related developments that are likely to reinforce not solve current problems linked to overproduction. In other words, the low priority given to the IVM research field by public funding organisations and in innovation policy development is explained, in part at least, by 'unconvincing' sociotechnical imaginaries presented by the IVM research community and its supporters. Policy-makers will need to know what IVM is and the problems it is targeting before they can talk about developing an innovation policy.

Recommendation : An innovation policy regarding IVM research and development towards food production, needs to reach clarity on the 'problem/solution' definitions and framing of IVM and of IVM research elements.

(2) How does IVM research attract attention and what kind of attention does it get?

Explanation/findings: We observe that the IVM network has underestimated the importance of the fact that meat is not just 'animal muscle tissue' but an entity that attracts attention for a whole range of reasons other than possible ecological, ethical and industrial advantages. For example, we observed through focus group research that IVM is largely perceived as artificial and the artificiality of food products is typically seen in a negative light. This reaction indicates to us unease with IVM as a product or an ingredient in products that will be found in the marketplace in the future. However, as regards the media attention IVM has received, we observe mixed narratives of curiosity, awe and rejection, and also that so-called 'promotional publics' can be invoked by a big media event such as the cultured burger launch in 2013.² The outcome of this media event suggests to us a way to think productively about the mix of public engagement with PR and advertising as integral to the making of technoscience (here IVM), while the dominant tendency is perhaps to dismiss PR and advertising as superficial and cynical, biased and irresponsible.

Policy consideration (general for innovation policy): To what extent should policy-makers take on board PR and marketing – occurring 'upstream' in research and innovation – as constructive elements of public engagement and deliberation?

2 Kate O'Riordan, Aristeia Fotopoulou and Neil Stephens (under review). 'The first bite: imaginaries of food, publics and the laboratory grown burger.' *Public Understanding of Science*.

(3) The social acceptance hurdles in transforming IVM technologies into food development, possibly large-scale industrial production

*Explanation/findings: We observe that the IVM network has underestimated the wide range of cultural and social meanings attached to meat, its production and consumption, leaving it an open question: **What 'is' IVM?** For example, they have been unprepared for the so-called 'yuck' factor and how to make sense of it. They have not been prepared for its persistence despite the work done to move beyond it, or to expect persistent social rejection on the basis of the artificiality of IVM, although, this is in accordance with past experiences of artificial foods innovations. It is also of some concern how an impressive technical ability finds itself here in search of purpose, of social support, acceptance and justification. In that respect, IVM is like a toy in want of a convincing social argument. It remains a rather vague idea of a product, however, a product looking for a market which risks being open to all arguments (good or bad) in favour of IVM developments, i.e., if it is enough to justify monetary investment. Policy-makers will need to know if they are looking at developing innovation policy or marketing strategies. Although the two are now inextricably linked in the H2020 programme, the latter (developing marketing strategies) may be at odds with the social and common-good logic we expect from innovation policy.*

Recommendation: An innovation policy regarding IVM research and development towards food production, needs to reach clarity on the reasons for why IVM products are socially and culturally contentious, and on the extent to which marketing logics are allowed to dictate the justifications to move forward.

(4) The implementation hurdles in transforming IVM technologies into food development, possibly large-scale industrial production

Explanation/findings: We observe that the IVM network has underestimated the structural and systemic challenges that would have to be met if IVM were to be scaled up to industrial level. In particular, the network has not appreciated the enormous challenge it would pose to attempt an integration of mass-scale IVM production into the existing agri-food system. In spite of some appealing arguments about reduced energy consumption, land use and climate gas emissions, IVM still risks being perceived as impracticable and unappealing from the point of view of production and marketing. However, should IVM products be allowed in principle, a host of policy and regulatory issues will need thorough consideration: Industrial, labour and market regulations (production planning, land use, employment issues, IPR issues, competition, etc.); Production oversight (hygiene standards, nutrition standards, donor categories, wellbeing of cell donors, etc.); Consumer protection (categorising, labelling, product safety, warnings/endorsements, etc.). With all that taken together, the question still remains if we want IVM products in the world.

Policy consideration (general for innovation policy): Which technology assessment methodologies can come together to adequately clarify what is at stake in deeply uncertain early stage technologies and to identify how to constructively move them forward?

With respect to IVM specifically: We recommend bringing together a range of technology assessment methodologies who, in coming together, can map and adequately characterise the challenges of integrating IVM into the agri-food system.