

Guest Editorial

Yet Another Emerging Technology: Old and New Questions Posed by Synthetic Biology

TUIJA TAKALA and MATTI HÄYRY

Every time there is a new bioscientific breakthrough, the bioethics community is expected to respond. Every now and then, the innovations are of such magnitude that they seem to challenge not only our ethical frameworks, but also our outlook on life itself. The emergence of genetic engineering, the cloning of Dolly, nanotechnologies, and now, synthetic biology, have all forced us to re-evaluate many of our firmly held ethical convictions.

This special section looks at the ethical and philosophical challenges posed by synthetic biology in the continuum of many other such challenges. It opens with Matti Häyry's overview of the various ethical responses to emerging technologies during the past few decades. In his contribution, Häyry outlines bioethicists' reactions to the emerging technologies as well as the regulatory responses that the advances have evoked. He then moves on to look at the philosophical and ethical issues raised by synthetic biology in particular, and discusses matters such as the permissibility of creating life, the role of hope and fear in technology assessments, and the connotations of the mechanistic view of life that synthetic biology seems to endorse.

Patrick Heavey's article walks the reader through the fields where it is hoped that synthetic biology will make the most significant advances: agriculture, medicine, and fuel production. Before proceeding to discuss the challenges that the many unknowns of synthetic biology pose to consequentialist ethics, he considers the effects that synthetic biology could have on the advancement of science. Theoretically, Heavey's main point is that because of all the uncertainties regarding the outcomes, consequentialism, as a moral theory, cannot help one to decide whether synthetic biology as a whole is an ethical or an unethical project.

In his contribution, Søren Holm argues that some of the threats associated with synthetic biology and other emerging technologies could be overstated. He talks about bioterrorism in particular. He itemizes the basic structure and usages of "bioterrorist arguments" and shows how, on closer inspection, some of the premises and inferences are not quite as solid as they seem from the outset. This does not mean that bioterrorism should not be taken seriously, just that there are other issues that might be overlooked if one allows the rhetorical force of bioterrorism arguments cloud one's view of the field.

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Tuija Takala provides arguments for doubting that the wildest synthetic biology Utopia, increased well-being for all, will ever become a reality. While remaining cautiously positive about the long-term consequences of synthetic biology, she holds that it is likely that something will do wrong before it goes right. In the short term, she sees that the positive effects of synthetic biology come in two forms. First, by challenging some core ethical assumptions, synthetic biology could deepen ethical understanding; and second, by promising hope of sustainable growth, it could, indirectly, benefit humanity by boosting world economy.

Gardar Árnason's contribution discusses the regulation of synthetic biology and the role and place of philosophical ethicists in that debate. From the beginning, the synthetic biology community has been self-regulating, but, inevitably, philosophers are also contributing to the debates. Árnason identifies three main roles that a philosophical ethicist tends to take: the embedded ethicist, the ethicist member of a committee, and the ethicist in public discourse. He sees the role of an embedded ethicist as being the most problematic, and maintains that philosophical ethicists' most important contributions lie in clarifying the ethical concepts used, and analyzing and evaluating the arguments employed.

Patrick Heavey's second contribution to this section introduces the reader to the Catholic church's position on synthetic biology. Heavey summarizes the document produced by the Catholic Bishops' Conferences of the European Community concerning the field, and discusses it in relation to mainstream ethical views. In the analysis, it transpires that these are not very far removed. While concentrating on the standpoint of the Catholic church, Heavey opens the dialogue toward religious ethics more generally by making reference to the stances of other religions.

The section closes with Timothy Murphy's article "Sex Before the State." Murphy's article discusses the prevailing assumption of gendered parental identity, and provides a number of reasons as to why the current paradigm of female mothers and male fathers should be forfeited. Although synthetic biology is not the only reason why gendered parenthood is becoming unfitting in more and more cases, the prospect of synthetic gametes is changing the way we see parenthood. Murphy's article is an example of the sort of redefinitions and reassessments that synthetic biology invites one to make and, one hopes that this will help us further understand what really is of value.



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