

Synthetic Biology - the next phase of biotechnology and genetic engineering

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Synthetic biology is an emerging field of science and technology. Depending on the way it is defined, synthetic biology is still mostly a matter of basic research, or it is already influencing the markets, societies, and the environment. This presentation aims to give an overview of synthetic biology and its societal implications from the point of view of technology assessment, based on findings from a recent assessment report (Sauter et al., 2015). It will briefly discuss the definition of synthetic biology, present some case studies to highlight the actual and potential significance of the field in the context of the notion of a bioeconomy, and point to possible ways forward for the field as a whole.

While the notion of synthetic biology is more than 100 years old, the field actually emerged in the early 2000s in the US and in Europe. It has been the subject of increasing interest with regard to public and private funding activities and ethical and artistic reflection, whereas public awareness of and discourse about the field are still rather poorly developed. Today the very definition of synthetic biology is still disputed, but a number of applications exist on the market – and a much greater number of visions and ideas for future applications is being discussed among experts from fields such as biotechnology, physics, bioinformatics, but also art and the DIY and start up community.

From the point of view of technology assessment, synthetic biology in the narrow sense – mainly comprising future developments towards artificial biological systems – can be distinguished from synthetic biology in the broader sense – comprising techniques of genetic modification that are mostly application oriented and increasingly based on digital information. Focusing on synthetic biology in the broader sense, the presentation will highlight the state of play in various fields of application, especially in energy production. To exemplify the potential societal implications of synthetic biology it will introduce two case studies: one on the (future) role of digital information in biology, and one on the (current) role of public discourse on the development of novel kinds of oil from algae. The insights from these case studies will lead to new questions about possible ways forward for synthetic biology as a field and about the role the social sciences can play in shaping it.

References:

Sauter, A., Albrecht, S., van Doren, D., König, H., Reiß, Th., Trojok, R. (2015): Synthetische Biologie – die nächste Stufe der Bio- und Gentechnologie. Endbericht zum TA-Projekt. Berlin: Büro für Technikfolgen-Abschätzung beim Deutschen Bundestag