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Safety, ethical and security issues in synthetic biology: a first survey among European researchers in synthetic biology

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Abstract:

Synthetic biology (SB) is an emerging branch of scientific and engineering development. In Europe this new interdisciplinary research field has gained momentum, resulting in over a dozen European research projects funded by the EC-FP6-NEST programme and as reflected in the recently held international conference SB 3.0 in Zurich. While progress is being made in Europe regarding the natural science and technological development in SB, until now, ethical, safety and security aspects have not yet been researched in as systematic way that would allow for conclusive assessments. At the same time,

concerns about potential risks are being raised and there are first signs of a public debate. Given former experience in the societal aspects of various biotechnologies, a foresighted technology assessment is necessary for SB, which is based on in-depth and well-presented analyses not yet available. In order to start filling this gap we conducted a series of interviews with key scientists in Europe between June and October 2007 (as part of our NEST project SYNBIOSAFE). This fact-finding exercise included questions regarding definition of SB (what makes SB different from conventional biotechnology); ethical issues (e.g. creation of artificial living systems, interaction between “natural” and synthetic life forms, similarity of ethical issues compared to earlier technology debates); safety issues (e.g. unintended potential negative effects for health, agriculture or the environment, robustness of the biosafety framework for potential future environmental releases, contribution to improve current biosafety problems); security issues (e.g. awareness of major biosecurity events and guidelines of relevance to SB); regulation (e.g. how should SB be regulated); and perception (how will SB be perceived by the public and non-scientific stakeholders). A first glance at the results of our survey suggests that (1) European SB scientists rarely see fundamentally new ethical issues involved, (2) that a well founded scientific risk assessment is lacking to assess safety implications, (3) that the biosecurity awareness is rather limited, (4) that there is a need for international regulations in contrast to self regulation, and (5) that most of the time a proactive communication strategy with the public is endorsed. These results are discussed to further stimulate a community discussion in Europe and to contribute to an agenda setting for future safety, ethical and security activities in SB.

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