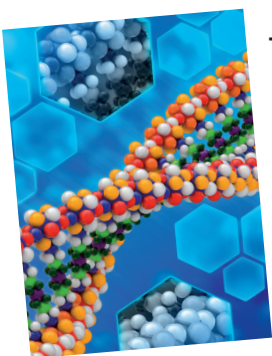


Synthetic biology



The field of Synthetic Biology (SynBio) is full of exciting possibilities, from adapting crops to thrive in barren lands to growing new organs to save the lives of transplant recipients.

And yet all unexplored scientific territories may pose potential risks, which is why the Scientific Committees have scientific Opinions on SynBio from definition to potential risks to public health and to determining the type of risk-related research that needs to be done in this field.

→ WHAT IS SYN BIO?

SynBio, as defined in Opinion I, is 'the application of science, technology and engineering to facilitate and accelerate the design, manufacture and/or modification of genetic materials in living organisms.' In other words, SynBio uses faster and easier methods for producing genetically modified organisms (GMOs) by adding or removing genes from an organism, or assembling modular genetic

elements and creating one from scratch. The principal purpose of defining SynBio is to assist the identification of processes or products that might require a substantial change from current risk assessment and safety procedures.

→ WHAT ARE THE APPLICATIONS OF SYN BIO?

SynBio aims to design biological systems that do not exist in nature, or to re-design existing principles to better understand or improve life processes. There are SynBio applications already in use, such as yeasts that produce insulin or the malaria drug, artemisinin.

SynBio is still a young field, having emerged at the dawn of the 21st century, and applications for the pharmaceutical, chemical, agricultural, and energy sectors are growing.

→ ARE THE HAZARDS AND RISKS RELATED TO SYN BIO ACTIVITIES WELL EVALUATED?

The scope of the Opinions is for the foreseeable future (10 years) and currently, the existing methods of risk assessment for GMOs and chemicals are applicable; however, new SynBio developments may require adapting existing methods for risk and safety assessment.

→ ARE THERE ISSUES SPECIFIC TO SYN BIO THAT COULD EMERGE?

Challenges in assessing SynBio risks are foreseeable and include the integration of modified cells into/with living organisms; future developments of autonomous modified cells; use of non-standard biochemical systems in living cells; increased speed of modifications by new technologies and an evolving 'Do-it-Yourself Biology' among the citizen science community. However, these can be managed by combinations of strict safety approaches including SynBio safety locks, like genetic firewalls and genetic kill switches to ensure biosafety risks.

This fact sheet is based on the following opinions of the independent Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR), on Health and Environmental Risks (SCHER), and on Consumer Safety (SCCS): 'Opinion on Synthetic Biology I - Definition' and "Opinion on Synthetic Biology II - Risk assessment methodologies and safety aspects". **June, 2015**

These opinions are available at:
https://ec.europa.eu/health/scientific_committees/emerging/opinions_en