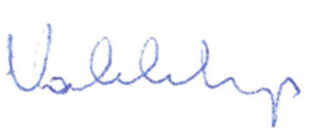
Submission of information on additional trends and issues that were identified and prioritized by the multidisciplinary AHTEG for information gathering

Part I. Endorsement of submission

Name of Country/Organization: Central Committee on Biological Safety (ZKBS), Germany

Name of CBD National Focal point/Head of Organization endorsing: Prof. Dr. Dr. Thomas Vahlenkamp

Signature of the CBD National Focal Point/ Head of Organization:

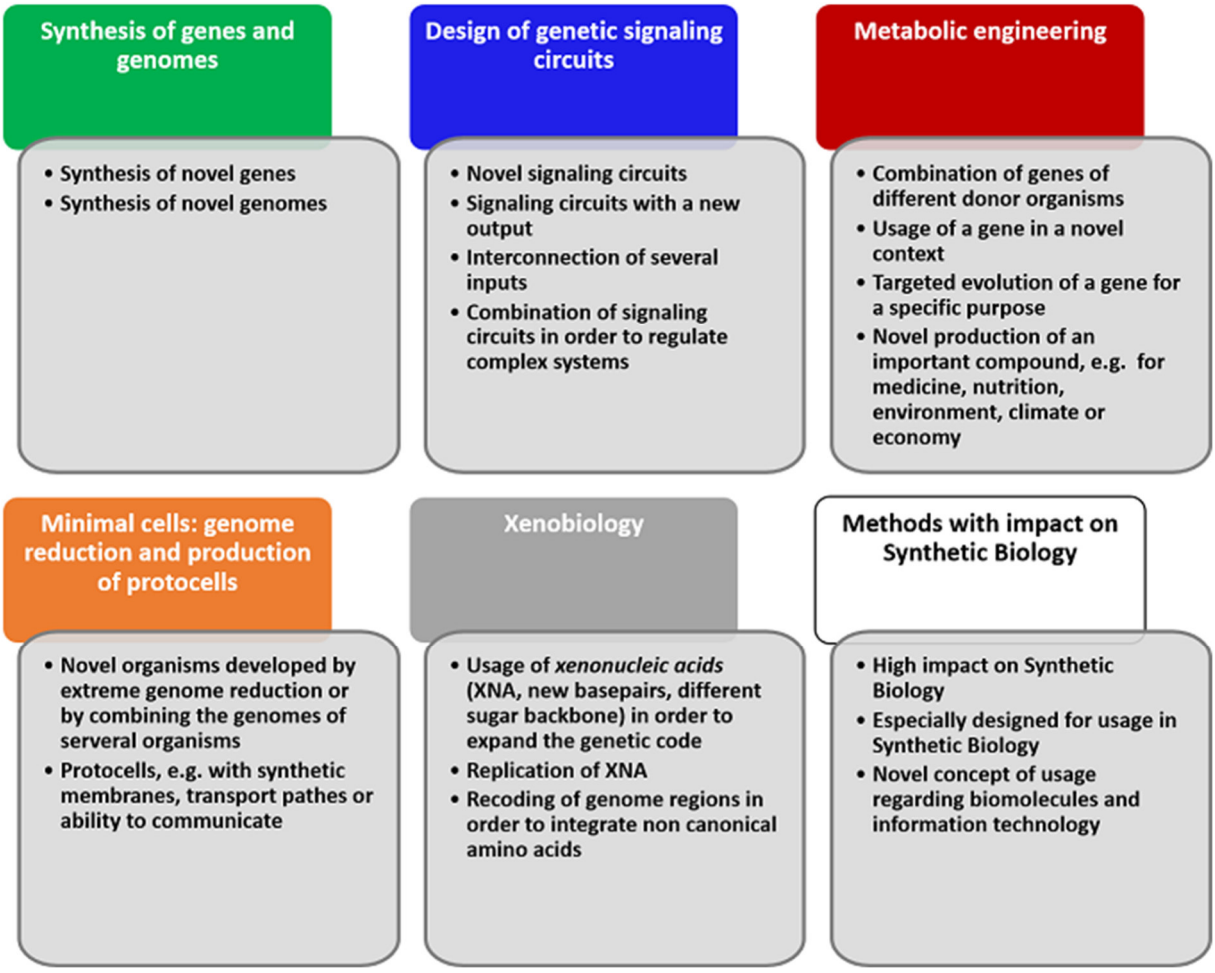


Date: 24.11.2023

Part II. Submission of information

The German Federal Ministry of Food and Agriculture (BMEL) has commissioned the Central Committee on Biological Safety (ZKBS) to monitor developments in Synthetic Biology in order to expertly scrutinize current scientific developments in different fields of research in the natural sciences and medicine to identify regulatory gaps and risk assessment challenges. The ZKBS, being a voluntary expert panel responsible for evaluating genetically modified organisms (GMOs) with regard to potential risks posed to humans, animals, plants, and the environment, would like to submit its view about the present state of research in the field of Synthetic Biology.

Starting in 2009, ZKBS reports on the worldwide development of Synthetic Biology on the basis of original publications published in peer reviewed journals. ZKBS distinguishes between six different areas identifying genuine Synthetic Biology approaches, as depicted below.



While screening published articles utilizing e.g. „Synthetic Biology“ as a keyword, our results constantly reveal that a very large number of the emerging publications turn out to be genuine gene technology approaches rather than archetypical Synthetic Biology.

Those publications which definitely fall into at least one of our defined areas of Synthetic Biology have been cited in three monitoring reports (https://www.zkbs-online.de/ZKBS/EN/SyntheticBiology/overview/overview_node.html) and are further annually posted on the ZKBS' webpage since 2018 (https://www.zkbs-online.de/ZKBS/EN/SyntheticBiology/Current_developments/Current_developments_node.html#doc15526292bodyText1).
On this website, the content of selected publications is briefly summarized and each chapter bears a direct link to the underlying research article.

In summary, at the present state of knowledge, the ZKBS concludes that the current, published approaches in Synthetic Biology are already regulated by existing legal specifications on gene technology, at least in the European Union and its member states, such as European Directives 2009/41/EC on contained use activities with genetically engineered microorganisms and 2001/18/EC on deliberate release and placing on the market of genetically engineered organisms or the German Genetic Engineering Act ("Gentechnikgesetz", GenTG). Similar to the German and European regulations, the ZKBS considers that organisms created with the help of research approaches grouped under the term "Synthetic Biology" will be considered living modified organisms (LMOs) and therefore fall under the definition of an LMO as defined in the Cartagena Protocol (CP) on Biosafety. The CP already contains regulations on LMOs, such as requirements for handling, transport, and identification as well as provisions for the risk assessment of LMOs (annex III).

The ZKBS would like to strengthen its fundamental validation that new genomic techniques (NGTs) are not a matter of Synthetic Biology. NGTs, e.g. Crispr/CAS, zinc finger or TALEN nucleases, oligonucleotide directed mutagenesis, etc., simply use biotechnological tools that do not necessarily create LMOs and certainly would not qualify as Synthetic Biology.

The subfield of synthetic cell research, for example the research on bacterial cell division systems, takes place *in vitro*, that means outside of living systems, and therefore is not encompassed by the GenTG. These studies, however, to date include no recognizable specific hazard potential, since these systems involve no organisms capable of life. Finally, the construction of pure synthetic cells built up out of separate constituents (so called bottom-up synthetic biology approach) did not yet lead to synthetic cells which are able to replicate, and consequently are also not capable of life. In case that synthetic cells able to replicate will be constructed, the current risk assessment methodology would not be applicable because comparators to determine substantial equivalence do not exist.

In summary, we must state that our appraisal of the term “Synthetic Biology” differs from your examples as listed in the bullet points no. 1 – 12 in Annex I of your letter. Especially no. 1, 3, and 8 cannot be judged as Synthetic Biology approaches, in fact it is gene technology, and the remaining items are rather universal terms of broad and general fields of gene- and biotechnology which, of course, may have impact to the environment, but are already covered by the abovementioned regulations.