PERSPECTIVE

Recent advances in synthetic biology, biosafety and biosecurity problems

Eiden Bell

Bell E. Recent advances in synthetic biology, biosafety and biosecurity problems. J Biomol Biochem. 2022;6(1):01.

ABSTRACT

Synthetic biology is a new multidisciplinary field of study that applies engineering concepts to biological studies. Recent applications of synthetic biology have broadened methodologies and instruments for traditional biological study, with the objective of modifying existing biological systems or creating new ones. First, we'll take a look at the evolution and growth of synthetic biology over the last decade. Although synthetic biology has made significant contributions to basic life science research, human health, environmental protection, and even economic growth, potential biosafety, biosecurity, and ethical risks have emerged in recent years as technology has become less expensive, more mature, and accessible.

INTRODUCTION

The quick evaluation of the hazards connected with the potential exploitation or abuse of this technology in numerous sectors, and we explore issues from three perspectives: biosafety, biosecurity threats, and ethics. Finally, technical, ethical, and regulatory measures have been developed or discussed in recent years to address challenges posed by synthetic biology's rapid progress, including laboratory-level precautionary measures for biosafety and biosecurity (such as genetic safeguards and firewalls), ethical codes of conduct for biological scientists, and regulations or oversight rules from personal, national, and international perspectives. There is a quick description of these initiatives. For decades, biological researchers have wished for rational design and cell engineering. The first stage was the development of recombinant-DNA technologies in the 1970s, which allowed scientists to not only engineer cells and produce novel biological activities for the first time, but also to speed up the clarification of cell physiological and biochemical features. Key tools for cell engineering, including as genome sequencing and synthesis, have become less costly and more accessible to researchers all around the world in the last ten years. Synthetic biology, a new science that applies engineering concepts as guides for biological study, has evolved as a result of these technological achievements to either change existing biological systems or build new ones. Significant progress has been achieved in two areas of synthetic biology research since its inception. Synthetic biology offers an interesting possibility to efficiently create biomaterials or biofuels utilising designed microorganisms, often employing readily available and low-cost ingredients to produce a wider range of useful chemical compounds. High-tech textiles have been created using engineered bacteria that thrive on cornstarch. Microalgae that produce oil using just sunshine, carbon dioxide, and water are also a possible alternative to fossil fuels. The efficiency of photosynthetic complexes (chloroplasts) is critical for increasing microalgae oil content. A synthetic chloroplast genome and the Chlamydomonas reinhardtii chloroplast genome have both been successfully inserted into yeast cells, allowing for quick manipulation or development of chloroplasts for increased photosynthetic efficiency. Synthetic biology, as previously said, brings up new possibilities for changing or generating biological entities. Nonetheless, synthetic biology is confronted with the "dual-use problem" of technologies, which states that technology can be employed for good or bad. Although the likelihood of synthetic biology misuse cannot be totally eliminated, risks may be reduced by being fully aware of the dangers and implementing appropriate ethical and regulatory procedures. We'll look at the concerns from three different angles: biosafety, biosecurity, and ethics. It is currently claimed that inadequate work has been done in the synthetic biology sector to detect or analyses relevant biosafety issues. A comparative approach is a typical strategy for assessing risks; however, due to the complexity of synthetic biology, risk assessment based on a comparison is problematic. Traditional genetic modification methods often involve manipulating known genes in a donor organism; hence, a suitable comparator is simple to come by. Synthetic biology designs and techniques, on the other hand, are frequently more complicated, including the synthesis of a new pathway involving many genes or a gene with uncertain function. Furthermore, xenobiology is a field of synthetic biology that deals with the production of life using noncanonical base pairs or amino acids.

Managing Editor, Journal of Biomolecules and Biochemistry , Berkshire, UK

Correspondence: Eiden Bell, Managing Editor, Journal of Biomolecules and Biochemistry, Berkshire, UK, E-mail biochemistry@scholarlymed.com

Received: 20-Jan-2022, Manuscript No. PULJBB-22-4414; Editor assigned: 22-Jan-2022, PreQC No. PULJBB-22-4414(PQ); Reviewed:15-Feb-2022, QC No. PULJBB-22-4414 (Q); Revised:28-Feb-2022, Manuscript No. PULJBB-22-4414 (R); Published:10-Mar-2022; DOI: 10.37532/puljbb.22.6(1).01