SYNTHETIC BIOLOGY- THE CURE OR THE PROBLEM?

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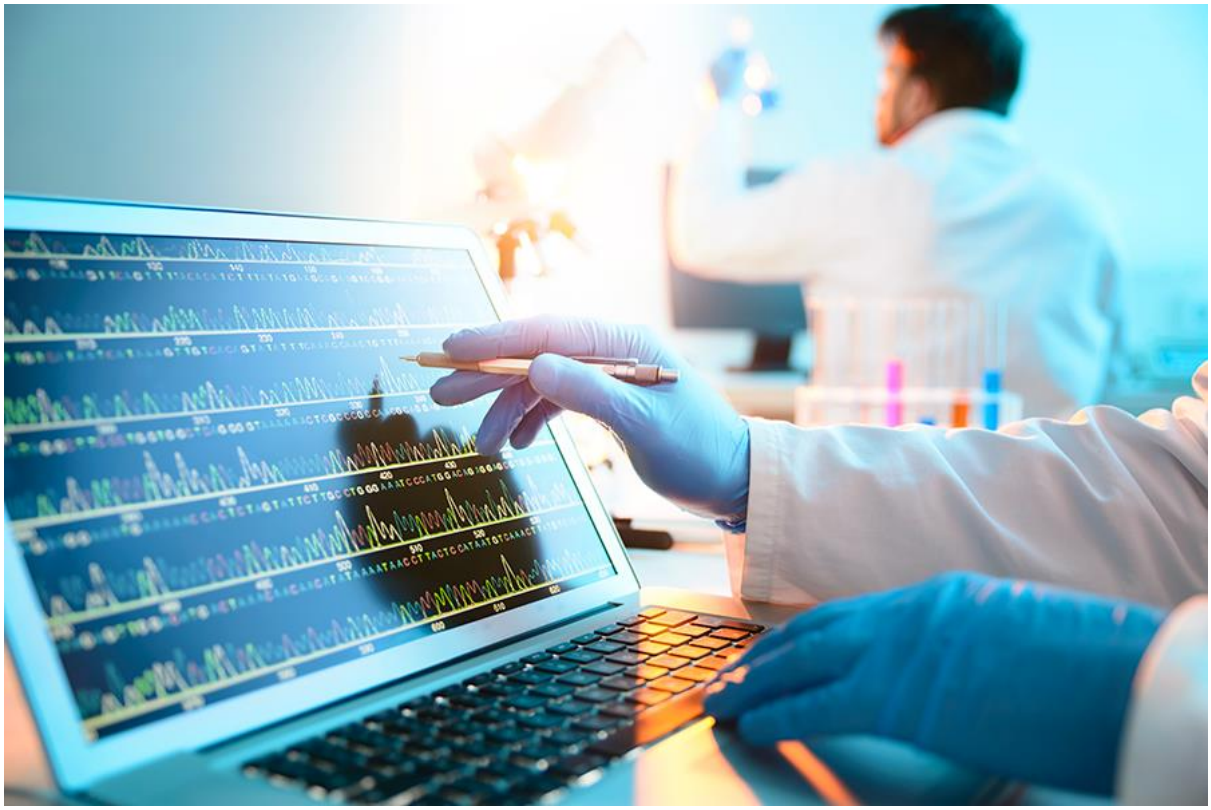

DNA sequencing in genetic engineering

WHAT IS SYNTHETIC BIOLOGY

With advances in technology and rapidly falling costs of DNA sequencing and synthesis, scientists begun to create entirely new sequences of DNA, allowing them to develop organisms with novel functions such as producing fuels or pharmaceuticals.

This latest advance termed 'synthetic biology', a field which share feature with modern technology and builds on traditional molecular biology tehcnique to control, design, characterisation and construction of biological parts, devices and system.

Besides, synthetic biology is focused on developing more rapid and simple methods in produce genetically modifed organisms (GMOs).

BENEFIT VS RISKS

Synthetic biology area being listed in World Economic Forum to be most likely give "major impact" toward world economy. Synthetic biology presents a dilemma as it may propose solution of the greatest challenges facing the environment but also poses a high risk for natural ecosystem.

Several synthetic biology applications aims to respont to agriculture sectors. Hence, synthetic biology in agriculture sectors could contribute to reduce pests, growth in small scale farmers, and increase yield.

Applications in bioremidiation also benefit biodiversity by using synthetically engineered microbes to degrade more persistent chemicals substances.

Synthetic biology can be used to synthesise products that are currently extracted from plants animal and the ability of synthetic biology to restore genetic diversity and even extinct species has been widely reported.

Despite its intended benefits, misuse of these technologies and a failure to account for unintended consequences could have significant negative impacts on both human and environmental health.

Synthetically engineered microbes could have adverse effect in the environment due to their potential to transfer their genetic material to other microorganisms which could become invasive.

Besides, these organisms could have toxic effect on other organisms such as soil microbes, insects, plant and animals. They also may become invasive on native species and destroying the habitat or disrupting the habitat.

In line with precautionary principle under Convention on Biological Diversity (CBD), efforts are underway to develop an adequate scientific basis for assessment of such activities.

In Malaysia, Department of Biosafety, Ministry of Environment and Water is the one that responsible in protect, controlling and review all the activities and application regardless Genetically Modified Organisms (GMOs), such as synthetic biology regulated under Biosafety Act 2007.

Any release (e.g. commercial use, planting, field trial and disposal) or research work in contained facility involving GMOs are subjected to National Biosafety Board approval.