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A Short Notes on the Role of Semi-Synthetic Organisms

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DESCRIPTION

Any unusual or unnatural genetic information incorporated into an organism's genome usually a bacterium such as *Escherichia coli* is generally known as Semi-Synthetic Organism. And this Semi-Synthetic Organism is genetically modified and has beneficial uses to mankind in various fields of study. DNA is a double-stranded complex molecule that codes for every ounce in an organism. F All components and aspects of an organism are formed with the knowledge provided by genetic information, from the smallest proteins to the largest organs and even some observable traits.

Deoxyribonucleic acid is made up of nucleotides each nucleotide contains a nitrogen base, a sugar group, and a phosphate group. There are four main nucleotides, which are present in DNA: Adenine, Guanine, Cytosine, and Thymine. These base pairs are complementary, being of specific shapes that fit each other like lock and key. According to Chargaff's Rule for base pairing: Adenine pairs only with Thymine and Cytosine pairs only with Guanine. Even while only these two base pairings can exist in nature, when scaled up to a complete genome, the combinations encode a plethora of information. As a result, it follows that having more base pairs equals having more information. Genetic information has been stored in a four-letter alphabet that is propagated and retrieved through to the formation of two base pairs ever since least the last common origin of all life on Earth. Synthetic biology's fundamental goal is to create new life forms and functions, and the most general route to this goal is the creation of semi-synthetic organisms whose DNA contains two additional letters that form a third, unnatural base pair. Previous efforts to introduce semi-synthetic organisms resulted in the production of an *Escherichia coli* species. This *Escherichia coli* now places an important role as a model organism and it is even exploited in various industries and plays a crucial role during Clinical trials.

Artificial DNA base pairs will be added to a semi-synthetic organism through genetic modification. A recent breakthrough in the disciplines of genetic engineering and synthetic biology has opened the door to the creation of novel proteins, medicines, and biofuels, among other beneficial things that do not exist in nature. The semi-synthetic organism will be capable to transcribe and translate synthetic nucleotides with the same efficacy as natural A, C, G, and T nucleotides. Proteins containing ncAAs (non-canonical amino acids) will produce using a novel transcription mechanism. The newly generated organism is the initial step in the advancement of this innovative technology. While the organism will build with only two artificial nucleotides, the researchers believe that future semi-synthetic organisms could use a little more artificial base pairs, leading for exponentially more new biological processes to be developed. Synthetic biology is a cutting-edge innovation in life sciences that has received considerable interest from researchers in the past few decades. The potential for sectors like drug development, environmental engineering, pharmacogenomics, and bioengineering appear to be unlimited with the introduction of synthetic nucleotides that can couple with each other and other naturally occurring nucleotide base pairs. Semi-synthetic organisms could be a game-changer for these sectors as they deal with modern-day concerns like climate change and antibiotic resistance.

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CONFLICT OF INTEREST

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