



ECHOES OF SYNTHETIC BIOLOGY IN VEDIC LITERATURE AND INDIAN PHILOSOPHY: ANCIENT IMAGINATION, MODERN INNOVATION

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ABSTRACT

The field of synthetic biology is expanding quickly, fusing biological systems and engineering concepts to create new life forms or rewire already-existing ones. Although synthetic biology is regarded as a contemporary field, its theoretical underpinnings are similar to ancient Indian philosophical and protoscientific concepts. This article compares the inventiveness of the ancient world with contemporary invention by examining how Indian philosophical frameworks and Vedic literature conceived life as modular, programmable, and morally guided.

KEYWORDS : synthetic biology, vedic, philosophic, ancient, Indian

INTRODUCTION

In order to create new biological systems with specific functions, the interdisciplinary field of synthetic biology (SynBio) combines molecular biology, bioengineering, and computational design. It aims to create genetic circuits, standardise biological components, and create organisms for use in environmental remediation, agriculture, and medicine. These contemporary ideas of designable biology are similar to how life and creation were conceptualised in ancient Indian philosophy, especially in the Vedic texts and later metaphysical schools of thought.

Vedic and Philosophical Conceptions of Programmable Life

The Panchamahabhutas (the five elements of earth, water, fire, air, and space) and the subtle laws known as tattvas govern the universe and all living things, according to Vedic texts. Literature suggests that this modular strategy parallels the building-block concept in synthetic biology, where biological components such as DNA, proteins, and metabolic modules are systematically assembled to construct functional systems. In a manner akin to modern synthetic biology's pursuit of constructing life with intent, Indian philosophical traditions such as S khya and Ny ya depict life as emerging from systematic combinations of primordial substances, directed by an underlying intelligence.

Proto-biotechnology In Ancient India

Early bioengineering methods were developed in ancient India, such as selective plant and animal breeding, fermentation for medicinal tonics, and early smallpox prevention methods akin to vaccination. The idea of repurposing organisms for human use is reflected in these. Foreshadowing attempts to create synthetic life, Jeewanu experiments in the 20th century, motivated by Vedic cosmology, created particles that resembled protocells.

Ethical And Philosophical Reflections

Indian philosophy has parallels to the ethical issues of synthetic biology, such as biosafety, biosecurity, and the ethics of creating new life forms. Responsible innovation is guided by dharma (righteous behaviour) and ahimsa (non-violence), which prioritise ecological harmony and harm minimisation. Discussions of karma (actions and consequences) in Upanishadic philosophy are similar to current bioethical discussions about the long-term effects of genetically modified organisms.

CONCLUSION

Synthetic biology may appear as a purely modern scientific enterprise, yet its philosophical roots trace back to ancient Indian thought, where life was seen as a constructible, ethically governed system. Revisiting these ideas enriches the cultural foundations of synthetic biology and encourages responsible future innovation bridging science and philosophy.

Author Summary

This mini-manuscript examines the relationship between contemporary synthetic biology and ancient Indian philosophy. This article illustrates how early Indian concepts envisioned life as modular, programmable, and ethically governed, drawing on Vedic literature and related metaphysical schools. These concepts are similar to those of synthetic biology today, where researchers create genetic circuits and artificial life forms under the direction of engineering principles and moral considerations. This study stimulates a conversation between cultural heritage, biotechnology, and future bioethical frameworks by bridging the gap between ancient wisdom and modern science. It highlights that modern innovations are frequently rooted in humanity's long-standing quest to understand and shape life responsibly.

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