**Lecture 7**

**Synthetic biology**

Biology is the study of living beings, and it mainly deals with its functions. Biological and chemical systems have overlaps as they both comprise chemicals.

 During the early part of 20th century, chemists started to design and produce new chemical substances and consequently a new field of synthetic chemistry was established.

 Similarly, synthetic biology involves designing and creating new [biological substances](https://www.sciencedirect.com/topics/medicine-and-dentistry/biological-substances), such as new genes, proteins, new organs, or even a whole organism.

 Therefore, the field of synthetic biology is in many ways an extension of synthetic chemistry.

 It involves engineering a living system comprised of known chemicals that would be alternates for existing living things but easier to understand. Therefore, they can be used to test unanswered questions of the complexity of living systems.

 The ultimate in synthetic biology is to create a living organism from nonliving chemicals, which can be directed to behave in a specific manner to provide answers to questions that we cannot get from existing life forms. .

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**Working definition of ( Synthetic Biology ) is the design of construction of DNA-encoded parts, devices ,and organisms, and their applications for useful purposes.**

**Synthetic biology will transform how we grow food, what eat, and where we source materials and medicine.**

**Synthetic biology can modify or create organisms to help address challenge in medicine , agriculture , manufactory and the environment.**

**Synthetic biology is a multidisciplinary field of technology , that involves engineering the genetic materials of organisms, such as viruses , bacteria ,yeast , plant , animals , - to have new characteristics.**

**Synthetic biology is essentially the application of engineering principles to biology . It involves the design and construction of biological systems and devices ,as well as re-design of existing , natural biological systems, usually based on DNA-encoded componentry and their appreciation for useful purposes. Component include DNA , RNA , and protein ( commonly enzymes )**

**Synthetic biology is a nature – based design rather than being a branch of biology , like ecology,or medical biology.**

**It is much more a way of working, explains. And synthetic biology has similarities with industrial design.**

 **Engineer’s design a new car by improving all sorts of individual components ( engine , wheels , body works ) and combining them into better cars, and in synthetic biology we combine of protein , DNA , microorganisms and cells into new application.**

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