



Bio Tech Sectors

Categories of Biotechnology

Biotechnology is applied to bring about advancements in various fields of science and technology. It is a huge field of science and study that has grown very quickly and those working in these fields categorized the sectors/branches into a color-coded classification system.

There are approximately 15 sectors of biotechnology.



Red Biotechnology (Medical):

This color represents the development of medical and biopharmaceutical products which includes medicinal veterinary products.

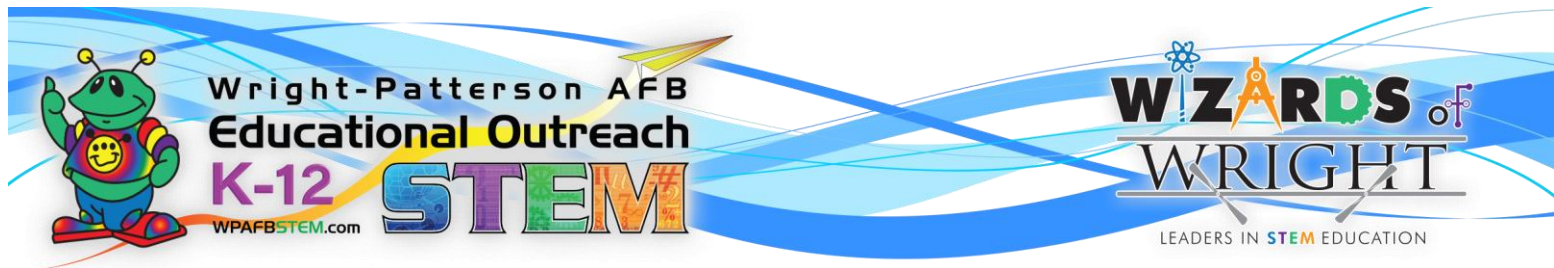
- concerned with human life and health
- improves human health
- uses living cells and cellular materials for the treatment of various diseases
- used to create various medicines, genes, and vaccines
- focuses on the production of pharmaceutical drugs to help prevent and/or cure diseases
- used to create antibiotics for humans



- has become a large factor in clinical research and gene therapy (used to treat HIV/AIDS and cancer tissues and build up healthy cells)
- used in the research and understanding of appropriate dosage for patients
- used in the production of huge insulin levels and nutritional supplements for the treatment of diabetic patients

White Biotechnology (Industrial): This color represents industrial biotechnology.

- most common and widely used biotechnology in the textile, energy, and food industries
- focuses on developing a new procedure that uses natural resources and less energy than traditional ones
- used to improve the efficiency and competence of the manufacturing process while lowering the environmental impact in industrial plants and industries
- used to conserve natural resources
- applies to different kinds of industries such as chemical manufacturing, detergents, paper, textiles, etc.
- uses microorganisms for various industrial sectors such as food, animal feed, biofuels, and biogas
- helps to improve the quality of products but also reduces the harmful industrial byproducts
- used for the lowering of the emission of greenhouse gases
- used to find new techniques to make industrial processes more orderly and cleaner



Green Biotechnology (Environmental and Agricultural): This color of biotechnology deals with agriculture, which includes the development of new plant varieties, biopesticides, and biofertilizers.

- often used to help farmers produce crops more efficiently while also minimizing the usage of chemicals
- used in creating crops that are resistant to pathogenic infestations or herbicides (chemicals used for killing weeds)
- used to remove poisonous and hazardous metals from the environment
- improves crop productivity
- used to create new pest-resistant crops, making other insecticides unnecessary
- used to transmit genetic traits of crops that can endure changing climate conditions while also improving nutritional quality
- bacteria, fungi, and other microorganisms are used to help clean the environment and transform trash
- used to convert plants into biofuels
- focuses mainly on the sustainable production of agricultural crops and improvement through genetic engineering
- focuses on improvements of quantity (yield) and/or quality (shelf-life, flavor, etc.) of food

A famous green biotech product brought to the market was a tomato engineered to withstand the rigors of shipping and have an increased shelf life.

Yellow Biotechnology (Food and Nutrition): This color of biotechnology is related to the technology of food production, e.g., in making cheese, wine, and beer by fermentation.



- focuses on food technology and nutritional science
- overall goal is to make food “better” and to grow food more sustainably

Blue Biotechnology (Marine/Oceans): This color of biotechnology is involved with using marine resources.

- consists of aquaculture, coastal and marine life
- used for research of marine life, particularly sea animals
- marine organisms are used in the production of pharmaceuticals and as food supplements to improve human health
- can be used in pain relievers
- used to increase food supply from freshwater fish and seafood
- used in the development of alternative energy sources

Grey Biotechnology: This color represents the environmental applications of biotechnology. It helps maintain biodiversity and lower pollutants using plants and microorganisms. It is also used as a better waste treatment option (microorganisms, especially bacteria, can ingest the waste products and degrade them at the site of disposal and convert them into harmless byproducts)

Violet Biotechnology: This color deals with the ethical, law, and philosophical aspects of biotechnology.

Dark Biotechnology: This color represents biowarfare. It is associated with bioterrorism or biological weapons that cause diseases and deaths in humans, domestic animals, and crops, using microorganisms, and toxins.

Each color can collaborate and overlap with any of the other colors.