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ASSIGNMENT: DISCUSS IN DETAILS THE ASPECT OF MEDICAL BIOTECHNOLOGY

 Answer:

Medical Biotechnology is the use of living cells and cell materials to research and produce pharmaceutical and diagnostic products that help treat and prevent human diseases. Human insulin, first product of biotechnology was release for sale in 1982.

Medicine is by means of technology techniques so much in diagnosing and treating dissimilar diseases. In medicine, modern biotechnology finds applications in areas such as pharmaceutical drugs discovery and production, pharmacogenomics and genetic testing or (genetic screening). DNA microarray chip – some can do as many as a million blood tests at once.

Pharmacogenomics is the study of how an individual’s genetic inheritance affects the body’s response to drugs. The term ‘pharmacogenomics’s comes from the words ‘pharmacology’ (the science of drugs) and ‘genomics’ (the study of genes and their functions) and is thus the intersection of pharmaceuticals and genetics. The purpose of pharmacogenomics is to develop rational means to optimize drug therapy, with respect to the patients’ genotype, to ensure maximum efficacy with minimal adverse effect. Such approaches promise the advent of ‘’personalized medicine’’; in which drugs and drug combination are optimized for each individual’s unique genetic makeup.

Computer-generated image of insulin hexamers highlighting the threefold symmetry, the zinc ions holding it together, and the histidine residues involved in zinc binding.

### Aspects of biotechnology include:

### RED BIOTECHNOLOGY:

Red Biotechnology (Biopharma) brings together all those Biotechnology uses connected to medicine and veterinary products. Red Biotechnology includes producing vaccines and antibiotics, developing new drugs, molecular diagnostics techniques, regenerative therapies and the development of genetic engineering to cure diseases through genetic manipulation.

* **WHITE BIOTECHNOLOGY:**

White Biotechnology relates to industrial Biotech. White Biotechnology pays special attention to designing low resource-consuming processes and products, making them more energy efficient and less polluting than traditional ones. An example of white Biotech is the use of microorganisms in chemical production, the design and production of new plastics/textiles and the development of new sustainable energy sources such as bio-fuels.

* **YELLOW BIOTECHNOLOGY:**

Yellow Biotechnology, has been used to refer to the use of Biotechnology in food production, for example in making wine, cheese, and beer by fermentation. (A favorite Biotech color in the LSC office!)

* **GREY BIOTECHNOLOGY:**

Grey Biotechnology refers to environmental applications, and is focused on the maintenance of biodiversity and the removal of pollutants/contaminants using microorganisms and plants to isolate and dispose of different substances such as heavy metals and hydrocarbons.

A great example of this is the Carlow based [SME MicroGen Biotech](http://www.microgenbiotech.com/) which is helping to clean industrially polluted land in China.

* **GREEN BIOTECHNOLOGY:**

Green Biotechnology is focused on agriculture. Green Biotechnological approaches and applications include creating new plant varieties of agricultural interest, producing biofertilizers and biopesticides. This area of Biotech is based exclusively on transgenics (genetic modification) i.e. they have an extra gene or genes inserted into their DNA. The extra gene may come from the same species or from a different species.

One of the interesting developments is plant varieties are able to act as bio-factories and produce substances of medical, biomedical or industrial interest in quantities easy to be isolated and purified for example [tobacco plants modified to grow Ebola vaccine](https://edition.cnn.com/2014/10/03/health/ebola-tobacco-plant/index.html).

* **BLUE BIOTECHNOLOGY:**

Blue Biotechnology is based on the exploitation of marine resources to create products and applications of industrial interest. Taking into account that the sea presents the greatest biodiversity, there is potentially a huge range of sectors to benefit from the use of this kind of Biotechnology. One example is the use of wound dressings coated with Chitosan (Chitosan is a sugar that is typically derived from shrimp and crab shells).