

# **Importance and applications of molecular biology to medical sciences**

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- 1. Diagnosis of infectious diseases**
- 2. Production of proteins and hormones**
- 3. Gene cloning**
- 4. Gene therapy**
- 5. Production of recombinant vaccines**
- 6. DNA fingerprinting**

# 1. Diagnosis of infectious diseases

Molecular biology is widely used for diagnosis of infectious diseases including:

- Bacterial
- Viral
- Mycotic
- Parasitic

## **2. Production of proteins and hormones**

Through molecular biology, human proteins can be produced in abundance for therapeutic purposes e.g. insulin and growth hormone

### 3. Gene cloning

Gene cloning is the technique whereby multiple copies of a plasmid or other cloning vehicles are produced by inserting the plasmid into a suitable host capable of producing multiple copies and growing in a bulk culture. The bacterium *Escherichia coli* is often used as the host organism for this purpose

## 4. Gene therapy

Gene therapy is the name given to methods that aim to cure an inherited disease by providing the patient with a correct copy of the defective gene.

Gene therapy is a therapeutic technique in which a functioning gene is inserted into a cell to correct a metabolic abnormality or to introduce a new function. Gene therapy is a promising approach to the treatment of cancer and other genetic diseases in human and animals.

## 5. Production of recombinant vaccines

- Recombinant DNA technology offers a rational approach to the understanding of the molecular basis of a number of diseases e.g. sickle cell disease, cystic fibrosis etc.
- Proteins for vaccines (e.g. hepatitis B) and for diagnostic tests (e.g. AIDS Test) can be obtained. It is used to diagnose existing diseases and predict the risk of developing a given disease.

## 6. DNA fingerprinting

- DNA fingerprinting, also called DNA profiling is a DNA identification technique that is based on similarity investigation of two nucleotide sequences. This is a molecular biology method that has application in Agriculture and the medical sciences.
- The use of DNA fingerprinting technique is now regarded as a milestone in diagnosis and surgical pathology .