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Regulation of Lac operon by repressor is referred as negative regulation. Operation of Lac operon is also under the control of positive regulation.

**Human Genome Project** was launched in **1990** to find out the complete DNA sequence of human genome using genetic engineering technique and bioinformatics to isolate and clone the DNA segment for determining DNA sequence.

**Goal of HGP-**

- a) Identify all the genes (20,000 to 25,000) in human DNA.
- b) Determine the sequence of the 3 billion chemical base pairs that make up human DNA.
- c) Store this information in data base.
- d) Improve tools for data analysis.
- e) Transfer related information to other sectors.
- f) To address the legal, ethical and social issues that may arise due to project.

- The project was coordinated by the US Department of Energy and the National Institute of health.
- The method involved the two major approaches- first identifying all the genes that express as RNA called Express sequence tags(EST).The second is the sequencing the all set of genome that contained the all the coding and non-coding sequence called sequence Annotation.

**Salient features of Human Genome:**

- a) The human genome contains 3164.7 million nucleotide bases.
- b) The average gene consists of 3000 bases, but sizes vary greatly, with the largest known human gene being dystrophin at 2.4 million bases.
- c) Less than 2 per cent of the genome codes for proteins.
- d) Repeated sequences make up very large portion of the human genome.
- e) Repetitive sequences are stretches of DNA sequences that are repeated many times, sometimes hundred to thousand times.
- f) Chromosome 1 has most genes (2968), and the Y has the fewest (231).
- g) Scientists have identified about 1.4 million locations where single base DNA differences (SNPs – single nucleotide polymorphism) occur in humans.