SUMMARY OF HUMAN GENOME PROJECT

Ashutosh Dash

Department of Bioinformatics, Buxi Jagabandhu Bidyadhar Autonomous College,Bhubaneswar, Odisha, India

WHAT IS HGP?

HGP was an international collaborative scientific project who's main aim was to identify and map all the genes present in human genome.

INTRODUCTION

No two individuals are similar, except monozygotic twins, as they differ in their genetic make-up, which is due to the difference in nucleotide sequence of their DNA s. Therefore scientists always wanted to map human genome.

GOALS

1) Determine the sequence and the number of all the base pairs in the human genome
2) Identify all the genes present in human genome
3) Determine the function of all the genes
4) Identify the genes that causes genetic disorders
5) Store the information in databases
6) Improve the tool for data analysis
7) Store information in public databases
8) Addressing and Resolving ethical, legal and social issues related to this project

METHODOLOGY

1)Sequence Annotation: sequencing the whole genome and later assigning the different regions with functions
2)Whole DNA was isolated from cell and broken into fragments
3)Fragments were inserted into BAC and YAC
4)Cloning was done inside the bacteria and yeast
5)Fragments were sequenced as annotated DNA sequence
6)Sequence were aligned with the help of computers
7)Sequences were annotated and assigned to different chromosomes
8)Physical maps of the genome were created using microsatellites and restriction endonuclease recognition sites.

SALIENT FEATURES OF HUMAN GENOME

1) Human genome has 3.1647 billion nucleotide base pairs
2) The average gene size is 3000bp. The largest gene is Dystrophy on X-chromosome, it has 2.4M bp.
3) Human genome consists of 25000 genes
4) Chromosome 1 has 2968 genes(max.), while Y-chromosome has 231(min.).
5) Function of 50% of discovered genes is unknown.
6) Less than 2% of the genome represents structural genes that code for protein.
7) 99.9% of the nucleotide bases are exactly similar in all human beings
8) Presence of Single Nucleotide Polymorphism(SNPs)
9) Presence of large number of mini/ micro-satellites
10) Presence of Junk DNA

APPLICATION AND FUTURE CHALLENGES

1) More than 1200 genes are responsible for various disorders, cancer and many more.
2) Improving the health care
3) Study of interaction between various genes and proteins
4) Promoted the development of new biotechnology companies
5) Improving the use of fossil-based resources

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REFERENCE

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