BIOINFORMATICS: AN EMERGING FIELD OF RESEARCH

AKRAM M.*

Department of Eastern Medicine and Surgery, Faculty of Medical and Health Sciences, The University of Poonch, Rawalakot, Pakistan.
*Corresponding Author: Email- makram_0451@hotmail.com

Abstract- Bioinformatics derives knowledge from computer analysis of molecular data. Bioinformatics develops technique for the analysis, retrieval and storage of data. Information technology, molecular biology and computer science are included in bioinformatics. Bioinformatics is management of information for molecular biology and has many practical applications. In present paper, genomic application, gene therapy and genes have been discussed.

Keywords- Gene, clinical application of PCR, information technology, DNA isolation, bioinformatics, human genome project, polymerase chain reaction, database searching tools in bioinformatics

Introduction

Gene is a structural building block of the inheritance passed on from mother and father to offspring. Genes contain information for production of proteins. Gene rehabilitation is the relevance of genetic engineering. Gene therapy is the new practice by means of the genes for the management and avoidance of disease [1]. The target candidate for gene therapy is so called solitary gene disorder caused by mutation in a single gene. The normal gene is entered to alter an unusual gene. In gene transfer, unusual gene is repaired. Human genome is the overall DNA in any human being. DNA possesses genes responsible for the pattern of protein. Four chemical known as bases such as cytocine, guanine, thymine and adenine are found in DNA. These bases are important in formation of codon that are subsequently help in protein formation. These bases are tremendously vital. Sequence of DNA show link between all individuals through similarities [2]. The underlying principle of this study is to review the literature on bioinformatics.

Methods

A review of the literature published in peer reviewed journal. Literature was searched by using different terms used in bioinformatics.

Human Genome Project

This was a 13 years scheme, U.S. Department of energy co-ordinated this program National Institutes of Health actively participated in this project. In this project information of about 20,000 to 25,000 genes were documented. The number of chemical base pairs was three billion. Data of this project was stored in the directory. Apparatus quality was enhanced for analysis of data. Access of private division to this technology was made possible. Social, legal and ethical aspects of this technology were properly addressed. It is matter-of-fact that 99.9 % identity is found in all human beings. Very small portion of human genome possesses genes responsible for protein synthesis [3].

Polymerase Chain Reaction (PCR)

PCR is commonly used in medicine. In bioinformatics, PCR is used to conclude the connection between the different organizations [4]. PCR is involved in recognition of primordial individual remnants in archaeology. In criminology, a minute model of blood, tissue cells or hair root is used to know person. PCR is recommended for generation of large amounts of the DNA of attention from specimen. PCR may be modified to bring into play with RNA provided that RNA is first transformed to DNA. PCR is a technique through which a minute quantity of target DNA (the template) is selectively enlarged to produce enough to carry out an analysis. This sequence may be from micro-organism causing disease in human being that will help in recognizing the micro-organism. Sequence analysis may help in discovering the variation in genes such as mutations causing genetic disease.

Clinical Applications of PCR

Mutation discovery.

Fertilized embryo is investigated to diagnose hereditary ailment before implantation.

Detection of viral and bacterial sequences in tissues [5].

Mutations

Mutations in genetic materials are sometimes not detectable due to the degeneracy such as CUA, CUC and CUU codes for leucine. Thus, a change in genetic material affects the third nucleotide can have no effect of translated protein [6].

Gene and Allele

A gene is a sequence of DNA that can be translated into a protein. A version of gene is called an allele [7]. A gene contains two alleles. Blue or brown color of eye is due to allele of a single gene.

Genetics

It is the science that deals with the fundamental causes of the resemblance and differences. Genetics is the discipline of inheritance and dissimilarity among individuals. It is adequate to present the philosophy of inheritance that may be supportive in understanding community medicine [7].

DNA Isolation

It is a everyday development that is applicable in molecular or forensic analysis.

There are some steps to export a DNA.

First of all, cell is opened or ruptured and DNA is explored. Separation of lipid film is done with the use of detergents. Protease is added to remove protein. Alcohol is used for precipitation of DNA [8].

Tools Used in Bioinformatics for Searching Database

FASTA (Fast alignment).

BLAST (Basic local alignment tool).

Smith and waterman algorithm.

Steps in Searching Database

First of all the identify query regarding DNA/ protein sequence. Secondly, tools for searching sequences are selected such as BLAST or FASTA depending upon the need. At the end, search the database of protein or DNA using tools such as FASTA or BLAST [9].

Discussion

Application of bioinformatics is gene therapy. In near future, gene therapy will be used to manage hemophilia, sickle cell anemia, cystic fibrosis and cancer [10,11]. But, it should be remembered that immune system may attack cells treated by gene therapy. In viral methods of gene therapy, virus can infect the treated person with gene therapy. Bioinformatics is also involved in cloning genes. A clone is precise duplicate of cell. Gene cloning is the creation of numerous precise copies of a piece of a molecule DNA [12]. Genome mapping is an additional purpose of bioinformatics. Genome mapping is a procedure by which the different genes positioned on chromosomes or determined and the virtual hereditary space with recognized genes is calculated. In the beginning of bioinformatics evaluation, only the genes were used as indices, but nowadays DNA markers of various types are being used [13].

Conclusion

Bioinformatics is the learning of natural science, computer science and in sequence technology. There are a lot of applications including cloning of genes, management of diseases by genes and genetic engineering.

Ethics Statement

This is a review article and there is no need of approval from ethical committee

Conflict of Interest: There is no conflict of interest

Disclosure Statement

None of the authors have a financial or proprietary interest in the subject matter or materials discussed in the manuscript, including, but not limited to, employment, consultancies, stock ownership, honoraria, and paid expert testimony.

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