Global Science Research Journals

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Perspective | Open Access

Global Journal of Molecular Evolution and

ISSN: Vol. 8 (1), pp. 1, February,2022


# Systematic collaboration of genomic surveillance studies

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**Received:** 01-Feb-2022, Manuscript no: GJMEG-22-64868, **Editor assigned:** 04-Feb-2022, PreQC no: GJMEG-22-64868 (PQ), **Reviewed:** 18-Feb-2022, QC no GJMEG-22-64868, **Revised:** 24-Feb-2022, Manuscript no: GJMEG-22-64868 (R), **Published:** 04-Mar-2022, DOI: 10.15651/GJMEG.22.08.003

## ABOUT THE STUDY

Genomics is an interdisciplinary field of biology that focuses on the structure, function, evolution, mapping and editing of the genome. The genome is the complete set of DNA from an organism, including all its genes and their hierarchical three-dimensional structure. In contrast to genetics, which refers to the study of individual genes and their role in heredity, genomics is the collective characterization and quantification of all genes in an organism, their interrelationships and their effects on the organism. Genes can direct the production of proteins with the help of enzymes and messenger substances. Next, proteins make up the structure of the body, such as organs and tissues they control chemical reactions and transmit signals between cells. Genomics also includes genome sequencing and analysis by assembling and analyzing the function and structure of the entire genome using high-throughput DNA sequencing and bioinformatics. Advances in genomics have revolutionized discovery-based research and systems biology, facilitating the understanding of the most complex biological systems such as the brain.

### Early Sequencing Efforts

Nucleic acid sequences were early after Rosalind Franklin confirmed the helical structure of DNA, James D. Watson and Francis Crick published the structure of DNA in 1953 and Fred Sanger published the amino acid sequence of insulin in 1955. It became the main goal of molecular biologist. In 1964, Robert W. Holley published the Rib nucleotide sequence of alanine-transferred RNA, the first nucleic acid sequence ever determined. As an extension of this study, Marshall Warrenberg and Philip Leder were able to unravel the triplet nature of the genetic code and sequence 54 of the 64 codons in an experiment. In 1972, Walter Fires and his team at the Institute for Molecular Biology, Ghent University (Ghent, Belgium) first sequenced the gene that encodes the coat protein of Bacteriophage MS2. The Fires group has expanded its research into MS2 coated proteins to bacteriophage MS2RNA.The MS2RNA genome encodes determine the complete nucleotide sequence of only four genes in 3569 base pairs, encoding Simian virus 40 in 1976 and 1978, respectively.

The Human Genome Project is an ambitious research effort aimed at deciphering the chemical makeup of the entire human genetic code that is the genome. The primary work of the project is to develop three research tools that will allow scientists to identify genes involved in both rare and common diseases. Another project priority is to examine the ethical, legal and social implications of new genetic technologies and to educate the public about these issues.

Although it has been in existence for less than 6 years, the Human Genome Project already has produced results that are permeating basic biological research and clinical medicine. For example, researchers have successfully mapped the mouse genome and work is well under way to develop a genetic map of the rat, a useful model for studying complex disorders such as hypertension, diabetes, and alcoholism. The Human Genome Project is an international research project whose primary mission is to decipher the chemical sequence of the complete human genetic material that is the entire genome, identify all 50,000 to 100,000 genes contained within the genome and provide research tools to analyze all this genetic information.

This ambitious project provides scientists with a powerful new approach for the isolation and analysis of genetic material one in DNA to understand the origin of the disease and develop new strategies for its prevention and treatment. It is based on the fact that it can be done. Almost all human illnesses, except physical damage, are associated with changes in the structure and function of DNA that is mutations. These disorders include approximately 4,000 hereditary "Men Dorian" disorders resulting from mutations in a single gene. Complex and common illnesses that result from genetic alterations in multiple genes and disorders caused by DNA mutations acquired throughout a person's life and it leads many types of cancers.