

Development Editor Note: Biomolecular Therapeutics

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The use of biological materials or biological reaction modifiers in the diagnosis and treatment of diseases is discussed by Biomolecular Therapeutics, thus reversing the ageing phase. In four areas: structural biology; drug discovery, production and delivery; pharmacology and pharmacogenomics; and oncogenic signalling, Molecular Therapeutics is a highly integrated basic science and translational part. Molecular medicine is a wide field in which physical, chemical, biological, bioinformatics, and medical techniques are used to explain molecular structures and mechanisms, to identify and to establish molecular interventions to correct fundamental molecular and genetic disease errors.

Instead of the preceding philosophical and empirical emphasis on patients and their tissues, the molecular medicine perspective emphasises cellular and molecular phenomena and therapies. Molecular diagnostics is a group of methods used to examine genome and proteome biological markers and how their cells express their genes as proteins, applying molecular biology to medical tests. The approach is used to diagnose and control illness, classify risk, and assess which treatments may be most appropriate for individual patients. Molecular diagnostics provides the possibility of personalised medicine by examining the specifics of the patient and their illness. Infectious disease, oncology, human leucocyte antigen typing, coagulation, and pharmacogenomics (the genetic prediction of which medicines would function best) are among the medical specialties where these studies are useful. They have a lot in common with clinical chemistry.

In the late twentieth century, the molecular biology field expanded, as did its clinical application. Yuet Wai Kan proposed a prenatal genetic test for Thalassemia in 1980, which did not rely on DNA sequencing then in its infancy, but on restriction enzymes that cut DNA where unique short sequences were known, producing different DNA strand lengths depending on which allele the foetus possessed. The term was used in the 1980s in the names of companies such as Molecular Diagnostics Incorporated and Molecular Diagnostics Bethesda Research Laboratories. The discovery of newly discovered genes and new techniques for DNA sequencing contributed to the development of a distinct area of laboratory molecular and genomic medicine during the 1990s.

The commercialization of molecular biology assay instruments has made their use in clinics possible. Medical diagnostics can be taken into the clinic, the office, or the home thanks to miniaturisation into a single handheld unit. Diagnostics can require accreditation or fall under medical device regulations, and clinical laboratories must meet high standards of reliability. Regulations such as the Clinical Laboratory Reform Reforms, Health Care Portability and Transparency Act, Good Laboratory Practice, and Food and Drug Administration specifications in the United States must be complied with by laboratory processes. These processes can be tracked with the aid of laboratory information management systems.

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