

**SHORT COMMUNICATION****MOLECULAR DIAGNOSIS: A GAME CHANGER**<sup>1</sup>Shahzad Ali Jiskani, <sup>2</sup>Rizwan Ali Talpur<sup>1</sup>Department of Pathology, Indus Medical College Tando Muhammad Khan<sup>2</sup>Department of Physiology, Isra University, Hyderabad**Corresponding Author:****Shahzad Ali Jiskani,**

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We are trying to understand the ways in which diseases evolve in a person with ground breaking advances in molecular biology. Moreover, it also gives us an indication of the patient's disease resistance, immunity, and unique treatment. Hospitals, reference labs, and blood banks are commonly used for molecular diagnostics. Polymerase chain reaction (PCR), blotting techniques, fluorescent in situ hybridization (FISH), microarray, and, among others, mass spectrometry are the main technologies involved. These tests

Successful care rendered by a healthcare professional to the patient relies on specific 'diagnosis' and 'treatment' of the ailment. For decades, first-line laboratory diagnostic applications such as Gram staining, staining of haematoxylin and eosin, full blood count, and other biochemical tests have been available. They have essential limitations, however. The area of diagnostics has been dynamically transformed by molecular diagnostics. It is a branch which provides a collection of techniques in the genetic code (genome) and protein expressed by the genes (proteome) to analyse biological markers. Its function in human diseases is commonly associated with the identification of mutations and pathogens. In laboratory medicine, the continuous availability of new methods and new applications has helped to make molecular diagnostics the fastest growing field.

are commonly used in clinical applications, including infectious diseases, screening for genetic diseases, pharmacogenomics, oncology and typing of human leukocyte antigen. <sup>(1)</sup>

The most widely used process in major laboratories is PCR. It has revolutionised scientific study and medicine in the region. There are now approximately more than twelve updated forms of PCR with major advantages over each other. It plays a growing role in infectious

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diseases such as tuberculosis, HIV, hepatitis, and so on. While conventional laboratory tests can be used to diagnose infectious agents, PCR remains an excellent option as it is a quicker, more responsive and more accurate process. Similarly, in the area of histopathology, understanding the biology of lymphomas and leukaemia has also gained significance. Translocations are now being detected by rT-PCR in aggressive tumours such as sarcomas. In forensic sciences, genetics, and paternity testing, DNA profiling is also used.<sup>(2)</sup>

In contrast to the traditional method of karyotype analysis, the FISH technique has expanded the cytogenetics field, being faster and more precise. The identification of molecular markers and translocations in different cancers, including leukaemia, breast carcinoma, prostate cancer, cholangiocarcinoma, and melanoma, has become a critical tool in oncology. Literature, however, shows that developing countries have restricted use of FISH due to a lack of knowledge or unavailability of the process.<sup>(3)</sup> Microarray is another upcoming tool that, due to its cost and because it also requires professional hands to operate, is not yet routinely used in diagnostics. Yet, as accurate and responsive as other molecular diagnostic facilities, it claims to be. Molecular methods are also used in agricultural and industrial applications, in addition to the medical field. Moreover, gene therapy research is continuing and in the limelight. It is estimated that about 19,000 to 20,000 protein coding genes are found in the human genome.<sup>(4)</sup> In this age of personalised medicine, it is anticipated that a number of molecular methods will soon identify the entire human genome. The progress and new discoveries in the field of molecular biology have led to a paradigm change from standard

diagnostic tests to the advancement of a variety of different diseases in diagnosis and treatment.

## CONCLUSION

Therefore, we conclude that knowledge of molecular biology and diagnostics for any medical practitioner has become important. Medical students can also acquire knowledge of molecular diagnostics in this age of modern medicine. In addition, in the medical education, emphasis should be on including molecular diagnostics.

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