



## EDITORIAL

### **Molecular Genetics and Molecular Diagnostic Research in Saudi Arabia**

Throughout the World, including Saudi Arabia, advances in molecular biology research have substantially improved the knowledge of many branches of medicine, such as molecular pathology, genomics, and molecular diagnostics. These advances are being translated into therapy, known as personalised medicine, precision medicine, companion diagnostics, point-of-care testing and targeted therapy. Targeted therapy directed at specific genetic alterations is already helping clinicians and oncologists manage certain types of cancers and other heritable disorders. For these purposes, diagnostics laboratories play an essential role by providing the test results, which are crucial for developing the treatment strategy.

Molecular diagnostic tests enhance the use of therapeutic products in a more precise manner to treat many diseases. Molecular testing using genetic material is the most accurate diagnosis for personal medicine and helps the clinician prescribe the correct medication. Today, many cancers are treated successfully because they are detected early. Some of that detection is due to the numerous tumor markers detected in molecular laboratories.

The healthcare system has developed enormously in the Kingdom of Saudi Arabia over the past 10 to 20. Medical laboratory services in the Kingdom, essential to the healthcare facility, are ready to provide citizens and non-citizens with reliable laboratory data. However, such hospitals' molecular and genetic testing laboratories are still at the initial stages. Recently, a few CAP (College of American Pathologists)-approved molecular pathology laboratories have been launched in some hospitals, and they are providing genetic testing in the Kingdom. Laboratory services aim to provide tests such as clinical exome sequencing, BRCA gene testing for breast cancer, infectious diseases screening, in vitro fertilisation, and preimplantation genetic diagnosis.

A PubMed search combining Molecular Diagnostic and Saudi Arabia terminology gave 4,454 hits, 4181 hits, and 2985 hits for 1976 to 2023, 2013 to 2023 and 2018 to 2023, respectively. This indicates that molecular areas have proliferated in the Kingdom in the past five years. This is because of new-new inventions in molecular technologies. This technology transfer helps the Kingdom be self-reliant for patient testing; for example, there was no need to depend on outside laboratories during the COVID-19 pandemic to diagnose this deadly disease.

The grant funding provided in the last 10-15 years by the Saudi government under various schemes such National Science Technology and Innovation Plan (NSTIP) or the MAARIFAH programs helped many university departments in the Kingdom to establish facilities in the areas of DNA sequencing, microarray studies, gene expression studies, tissue culture experiments and other DNA and RNA-based research by acquiring sophisticated instruments like Next-generation DNA sequencing machines etc.; this strategy is leading the way in many Universities and institutions to contribute to the 2030 Vision's success by employing research and transfer the scientific knowledge to establish the diagnostics tests and develop commercial kits. This will support the knowledge-based economy transformation and create new employment opportunities for the Kingdom's younger generation. Few institutes and training centres also provide specialised medical training courses and outstanding workshops that enhance practical skills in molecular diagnostics. A four-year program for Medical Laboratory Sciences also started in some universities in the Kingdom; such programs can produce the technical staff for these diagnostics laboratories.

The development and use of newer genetic tests at the molecular level will have substantial economic benefits for the Kingdom. Developing molecular diagnostic technology will help Saudi Arabia and other Gulf Cooperation Council (GCC) countries and the Middle East region. This prevents sending human samples (such as blood and tissues) for genetic testing to laboratories abroad and saves money, thus boosting the local economy and creating private companies. This molecular diagnostics knowledge also helps in the success of clinical trials being conducted in Saudi Arabia.

By documenting these advances in the Scientific direction of the Kingdom, the "Journal of the Umm-Al-Qura University for Medical Sciences" (JUQUMS) like to seek more contributions in the areas of molecular sciences, such as molecular pathology, molecular diagnostics, cancer genomics, infectious diseases, cardiovascular diseases and Next-generation DNA sequencing technologies. The manuscripts on these topics are invited from researchers from all geographical areas. JUQUMS aims to get indexing in PubMed and Web of Science by publishing high-impact manuscripts with your cooperation.

**Associate Editor**

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