

Precision Medicine: Personalising Healthcare

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Precision medicine, also known as personalized or genomic medicine currently holds high regard in medical practice. The Precision Medicine Initiative defines precision medicine as the medical approach to disease treatment and prevention by taking into account individual variations in genes, environment, and lifestyle for each person.¹ Developing targeted medical therapies and interventions based on these individual factors will lead to improving the efficiency of the medicines while reducing their side effects. Thus, precision medicine seeks “the right treatment for the right patient at the right time.”²

This personalised medical approach emphasizes recognising individual heterogeneity in disease susceptibility, progression and response to treatment. It combines data from various fields in biology that cover an extensive analysis of a given molecule such as genomics, proteomics, and metabolomics among other omics fields along with clinical and lifestyle aspects to generate tailor-made healthcare decisions. In contrast with the traditional one-size-fits-all approach, precision medicine recognises that different patients with the same diagnosis may need dissimilar therapies depending on their unique biological profiles.

APPLICATIONS³

Precision Medicine has found wide applications in the treatment and management of a host of diseases including cancer and a few rare diseases and pharmacogenomics.

When it comes to cancer treatment, precision oncology identifies genetic alterations causing cancer growth using genomic profiling and prescribes targeted therapies like tyrosine kinase inhibitors and immunotherapy, based on the specific molecular anomalies in a patient’s tumour that result in excellent disease control

In pharmacogenomics, an individual’s genetic variations are analysed to predict the pharmacogenomics of medication response. This aids healthcare providers in prescribing drugs at the right doses and avoiding side effects.

Genomic sequencing facilitates precise diagnosis in the context of precision medicine for patients with rare genetic disorders while offering opportunities for personalised treatment options.

In the field of preventive medicine, precision medicine holds the promise of early disease detection and prevention. Genetic testing and advanced diagnostic technologies enable the identification of individuals at high risk of developing certain conditions long before symptoms manifest. This allows individuals to make fact-based decisions concerning their lifestyle choices. It will also help them undertake focused screening for early disease detection.

CHALLENGES AND LIMITATIONS⁴

Ethical considerations weigh most when one thinks of precision medicine. Ethical issues involving data privacy, consent and equal access to precision medicine technologies need to be taken into consideration. Safeguarding patient privacy and ensuring the responsible use of genetic information is essential to maintain trust and confidence in precision medicine initiatives.

Cost and accessibility could be key factors that could play a spoilsport in people adopting precision medicine. Limited resources and high costs of genomic sequencing and personalized therapies may prevent a large number of people from accessing precision medicine.

Validation and regulation are also points to be pondered as clinical utility alongside safety can only be ensured through rigorous validation of targeted therapies and

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biomarkers. Precision medicine's regulatory frameworks must adapt to the swiftness in the evolution of the field.

Doctors and other healthcare providers need a comprehensive understanding of molecular genetics, biochemistry, and interpretation of genetic test results to make the right treatment decisions or advice on the prevention of a disease. Furthermore, this information has to reach the patients themselves who are critical participants in decision-making about their healthcare.

In conclusion, Precision medicine has emerged as an innovative approach capable of transforming healthcare by providing patient-specific care that enhances patient outcomes while reducing healthcare expenses. However, challenges are galore regarding technicality, ethics and logistics that warrant collective and multi-level interventions. Making good use of the advancements in genomics and allied areas, precision medicine can revolutionise medical care. Sensitising ourselves and the public about the power of precision medicine is the first step towards the new era of patient-centred

healthcare. Let us carefully tread along this new and emerging terrain of patient care.

END NOTE

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