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Personalized Medicine Journal in 2019: Reflecting on the Development of the Upcoming Role of Personalized Medicine in the Therapies

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In recent decades, there has been an increase in the incidence of cancer in the affected communities. However, the growth of therapeutic strategies has been very slow. Conventional diagnosis and subsequent treatment in medical centers originated from pathological based examinations, symptoms, and medications.

Regarding to the personalized medicine, individuals possess nuanced and unique features in terms of molecular, physiological, environmental exposure and behavioral aspects, an intervention for their illness can be provided on the basis of these nuanced and unique features. The emergence of emerging technologies such as DNA sequencing, proteomics, imaging procedures, and wireless health monitoring devices have shown inter-personal variations in disease processes.

Recently Omics projects have increased for achieving prediction of disease risk and early intervention for a better outcome by high-throughput genomic. Omics refers to a field investigations in genomics, transcriptomics, epigenomics, proteomics, and metabolomics as well as immunology, where provide a number of markers for various approaches of targeting disease, and will have opportunity to provide therapy for improving disease outcome.

These markers are biochemical, epigenetic, genetic, imaging, metabolic and proteomic. Using more than one marker in a single sample generally increases the sensitivity and ability to detect cancer, and helps in early diagnosis. Today, new ideas for cancer research are based on molecular markers, where various markers such as diagnostic, prognostic and therapeutic markers are being studied in preclinical and clinical trials. Nevertheless, the pathological diagnosis of the disease is fully considered to be a gold standard method [1-3].

Together with genetic changes in tumors, a variety of inherited genetic changes implicated in drug metabolism will also affect response therapies, where may be capable of increasing the toxicity of the drug. This approach has led to the development of therapeutic strategies, as it is called "pharmacogenomics" science, for identifying an individual's response to a particular therapy based on their individual genetic data [4]. The purpose of personalized medicine is to apply the correct therapy (e.g., drugs) at the appropriate dose, with the least toxic or non-toxicity, where this strategy should be appropriate for a particular person at the right time. The personal health hope is that day-to-day treatment will rely on each person's genetic variation in cancer. As a matter of fact, there should be a future-oriented attitude in the medical therapy, because it should make time to think that genetic tests be capable of helping in deciding which therapeutic strategy is likely to be highly effective, to prevent the patient from receiving ineffective drugs. At present, a combination of methods, including surgery, chemo, radiotherapy (RTx) and immunotherapy may be favorable therapeutic strategy. Regarding to the personalized medicine approach, Advances in understanding the genetic alterations linked to malignancies will have provided opportunity for making the right therapeutic decision. Although DNA is the same in different cells, genes encoded in one organ behave differently from other genes in the cells. Indeed, various kinds of tumor cells exhibit an aberrant gene expression pattern; therefore, gene expression technologies can provide the opportunity to assess the expression levels of many genes at the same time for obtaining a cancer-related gene expression as compared with normal specimens.

It is worth noting that this is quite against the traditional medicine, where treatment is considered based on the family history of the patient, the social conditions, the environment and lifestyle. In addition to genetic information, proteomic data can also be used in personal medicine. In the human protein project, the properties of the proteins expressed in a healthy person can be appeared in comparison with the protein expression pattern found in cancer tissues. By identifying all 21,000 known human genomes, the human proteome project creates a map of human body proteins that serves as a source for discovering biological processes and molecular functions, thus promoting disease diagnosis and therapeutic strategies. Many favorable immunotherapeutic proteins (e.g., drugs) have been previously confirmed by the Food and Drug Administration (FDA). In the early stages, the tests accepted by the FDA for diagnosis of cancer were all protein-based (e.g., immunohistochemistry).

The main pathways for cancer progression (e.g., the kinase receptor pathway, Hedgehog pathway, m-Tor pathway, Wnt signaling pathway, PI3K signalling, MAP kinase pathway, Notch, EGFR pathway, tyrosine kinase pathway, and apoptosis), and their reactions (signal transduction) are implicated in protein interactions [3, 5]. Metabolomics as a new concept can be beneficial in personal medicine. In this regard, low-molecular-weight target, or metabolites in cells and biological devices can be considered. In fact, the metabolom is considered to be an approach for the measuring output of biological pathways. Nevertheless, there are challenges in this basin, as are few specialist in terms of metabolomic, and one of these challenges is the lack of educational facilities to provide this specialty. In the age of the genome, precision medicine may bring many gains for preventive and therapeutic approaches in patients through a combination of genetic data with other molecular markers [6].

It is not clear to anyone that modern methods should be applied to achieve a privileged position. In this context, it is important to recognize the threats and risks of human populations based on new approaches, where personalized medicine approaches are regarded targeted therapy.

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