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Personalized or Precision Medicine: Current Vision, Challenges and Future Prospectives

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Abstract

Personalized or precision medicine (PM) is targeting a treatment as individualized and specified as the disease. This advanced approach depends on identifying the genomics, epigenomic, transcriptomics, proteomics and clinical information that drives the breakthroughs and analysis of how a person's unique molecular background affecting on disease/cancer susceptibility, progression and treatment. PM approach is completely extensive of the traditional medical approach (One-Size-Fits-All) to (One-Size-Fits-One), smart, promising and rapidly expanding field of healthcare system towards pro-active treatment, reduced costs and quality of life enhancement.

Keywords: Personalized medicine, Molecular background, Challenges, Future prospective

Introduction

Nowadays, personalized medicine (PM) is a particularly novel and exciting trend in the medicine and healthcare field [1]. It is a concept that has the power to transfer medical interventions by providing effective, targeted therapeutic strategies relies on the genomic, epigenomic and proteomic profiles of an individual [2]. The applications of PM lie not only in smart treatment, but also in prevention and disease susceptibility [3]. Relatedly, due to the interdisciplinary spaces of systems biology and systems medicine, more research efforts should be directed [4]. The revolution of PM has created a golden opportunity for pharmaceutical companies to develop novel molecular-targeted therapeutics, but also remained a challenge for optimized usage, manipulating the existing drugs and combination therapies [5].

PM is a huge field including the application of genetic and biomarkers in early diagnosis and disease progression, In-vitro modeling of disses through cells, experimental animals and clinical trials, bioinformatics and big data analysis of genetic materials and drug screening [6]. To fully realize the potential of PM, pharmaceutical companies and drug decision-makers invest in the development of novel diagnostic techniques to help the patients for a higher resolution,

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optimized and timing therapeutic selection. PM requires coordinated multidisciplinary adjustments to each aspect of the integrated chain, from discovery to development and from industry to lifecycle management [7]. A huge difference between PM and traditional medicine as PM can offer improved medication selection and targeted therapy, reduce side and adverse effects, increase patient response, shift the target of medicine from reaction to prevention and predisposition, improve cost efficiency, and increase patient trust [8].

Multistep strategies involved in PM such genome sequencing, detection the mutations and allelic polymorphism especially in some genes related to diseases, cancers susceptibility, Screening the epigenomics and genetic environmental effects. Understanding the transcriptomics, proteomics secrets related to diseases. Finally, data analysis and integration to know how all these interplays affecting and applicable together in prevention, early diagnosis, disease progression and treatment response are reported [9]. Moreover, scientific economy-based technology between researches centers, universities, national and private sectors and pharmaceutical companies for novel targeted medications [10].

Many debates, limitations and challenges in PM approach such as: (1) Misunderstanding and recognition shortage from the stakeholders and consumers about the benefits of PM. (2) Scientific challenges due to poor understanding of the molecular mechanisms, interactions of certain diseases and shifting research priorities. (3) Economic challenges to save cost and gain benefits. (4) Information security and patency affairs during the investigation and development stages. (5) Finally, there are systematic and policy challenges regarding the link between government research and regulatory agencies [11-20].

Conclusion

PM has the potential to cover the requirements and improve health approaches by decreasing drug development and health care costs. In the future, we will expect that each person will receive his full genomic and proteomic information to record in his own clinical and medical history. These data would allow scientists, physicians, clinicians and drug designer to implement the most effective healthcare system. Hoping when we apply the personalization and precision terms, we have specific and particular associations, hopes and truths to improve human health for more improvement in the quality of life.

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