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General Topics in the Field of Personalized Cancer Therapy

Lu DY[1*], Lu TR[1], Xu B[2], Ding J[2] and Yarla NS[3]

[1]*Shanghai University, Shanghai 200444, China*

[2]*Shanghai Institute of Materia Medica, Chinese Academy of Sciences, Shanghai 201203, China*

[3]*GITAM University, AP, India*

[*]**Corresponding author:** Lu DY, Shanghai University, Shanghai 200444, China, Tel: +86 21 66163545; Fax: +821 66132177; E-mail: ludayong@shu.edu.cn

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Abstract

Personalized medicine is a new frontier in modern medicine. Personalized cancer therapy (PCT) has been developing over 60 years. But, PCT remains to be improved. Central dogma is waiting for uncovering. This perspective addresses this matter briefly.

Keywords: Personalized cancer therapy; Individualized cancer therapy; Drug sensitivity testing; Cancer biomarker; Pharmacogenomics; Antimetastatic therapy; Drug combination; Assistant chemotherapy

Introduction

PCT is imperfect now due to unsatisfactory clinical outcomes and higher costs in some of the strategies. There are several key factors for these unsatisfactory therapeutic benefits. My early reviews gave a panorama of currently applied PCT strategies, especially the drawback of every PCT (individualized cancer chemotherapy, ICC) strategies-drug sensitivity testing (DST), cancer biomarkers, bioinformatics, pharmacogenetics (PG), antimetastatic therapy, drug combination, assistant chemotherapy, cost-effective [1-7]. It serves as a platform or vehicle for discussion and promotion of these ICC strategies.

Which Strategy is More Powerful?

DST and PG are the mainstream of current PCT/ICT) [8,9]. By analyzing different available PCT/ICT strategies, we suggest is that no unilateral type of ICC strategies work now. Our argument is based on current clinical practice. DST [10,11] or PG [12-14] is unsatisfactory individually. Patients' survival has improved very little in spite of utilization of DST [10,11]. Many factors, such as increasing drug number in the DST, development of active and specific anticancer or antimetastatic drugs [15-18], may ameliorate this condition. However, this is not enough in clinics.

Sequencing cancer genomes has gradually increased our capability to pinpoint to tumor biomarkers. Detection of human or cancer genetic, transcript, protein or glycoprotein molecular and bioinformatics need less and less moneys in future. The cancer biomarker or bioinformatics detection-based ICT strategy will also improve with technical innovations in the future [9].

A recent genomic study of >3,000 tumors across 26 cancer types has been underway. Only 1/4 of these tumors contain known cancer genes [8]. It means that most tumors are caused by undefined cancer genes. Thus there is a great potential for further investigations of cancer biomarkers.

Now PCT/ICT can be mainly divided into DST, PG and cancer biomarker detection. In future, new disciplines such as individualized antimetastatic chemotherapy and individualized assistant chemotherapy may soon come into reality. The greatest drawbacks of present individualized cancer chemotherapy are designed to target primary tumors rather than metastatic lesions [15-18], inconvenience, high costs [19,20] and lack of effective antimetastatic drugs [21,22]. Individualized antimetastatic chemotherapy might be the key of future strategy.

In the past, we can see that each ICT/PCT strategy is to narrow to provide information of both tumor characters (pathology) and pharmacology (drug sensitivity). These two patterns of biomedical information are not overlapped. Thus, we are sure that future trend is to introduce integrated ones of PCT/ICT that will provide the information of two.

A lot of hospitals never try of any ICC strategies. In future, ICC strategies should be improved and perfected for survival benefits or even cure of late stage of cancer patients. The more we try different types of ICT strategies in the clinics, the more satisfactory outcome we may obtain. We wish more cancer clinicians notice and apply these strategies because ICC strategies are best ways to treat and cure cancer patients.

The ultimate goal is to markedly decrease death from cancer. To guide therapeutics, ICT/PCT strategies seem to be one of best options for cancer treatment. No matter which type of ICC strategies is used in clinics, it ought to be effective and in reasonable cost. According to this rule, new ICT/PCT strategies might be innovated. In the past 10 years, the focus of ICT/PCT strategies has been transformed from drug sensitivity test into pharmacogenomics. In the next decade, we hypothesize that ICT/PCT strategies will be transformed from DST [10,11] to PG [12-14] to cancer biomarker-oriented therapy or individualized antimetastatic therapy [15-18] and finally combine patho-pharmacology information of all. New era of ICT/PCT is coming, are we ready for that [23,24] ?.

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