Opinion

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Clinical Cancer Therapy, Personalized Chemotherapies

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Abstract

Personalized cancer treatment (PCT) has a long history—dating back to 1950s in US. It is a multidisciplinary approach pioneered with in vitro drug sensitivity testing (DST). PCT are widely investigated within 1970s and popularized since then. Despite widely utility, PCT remains to be diversified and perfected in a new era. Central dogma remains to be found out. This article tries to introduce the different characters of PCT and deliver our vision of PCT in future.

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

Introduction

Personalized medicine for anticancer treatments has a long history—dating back to 1950s in US. Personalized cancer therapy (PCT) is a multidisciplinary approach pioneered with in vitro drug sensitivity testing (DST). PCT, especially DST are popularly investigated within 1970s. Despite popular utility in the clinic, PCT remains to be diversified and perfected via knowledge updating and cost reductions. In our early reviews, currently applied PCT strategies—including DST, cancer biomarkers/bioinformatics, pharmacogenetics (PG), antimetastatic therapy, drug combination, assistant chemotherapy, cost-effective considerations and so on have been outlined [1-7]. It serves as a vehicle for improving the therapeutic outcomes to wider population of cancer patients. At present, growing numbers of doctors and patients are familiar and utilized these kinds of clinical efforts. Yet their focus is largely located in one or two types of ICC (DST and PG). From technical points of views, integrated approaches might be more useful. This article addresses this topic and central dogma of PCT/ICT.

Introductions of different PCT/ICT strategies and new insights

DST and PG are popularly utilized in clinics, especially on several rich developed countries [8,9]. But we have found out that no single type of PCT strategies work well to largest parts of clinical situations. DST [10,11] or PG [12-14] is unsatisfactory in patients with advanced cancer patients. Thought tumor volumes in cancer patients are commonly shrinking, patients' survival has improved very little by DST utility [10,11]. Many key issues of clinical PCT, such as increasing drug number in the DST, development of active and specific anticancer or antimetastatic drugs [15-18], may improve some parts of clinical conditions. However, this is not enough nowadays.

Sequencing cancer genomes gradually increase our capability to pinpoint tumor genomes and biomarker abnormality. Detection of human or cancer genetic, transcript, protein or glycoprotein molecular and bioinformatics need less and less moneys in future. As a result, cancer biomarker or bioinformatics detection-based PCT strategy will also improve with technical innovations in the future [9]. This is an emerging discipline of PCT/ICT worldwide [19-22].

Cancer metastasis treatments

90% cancer patient mortality is caused by neoplasm metastasis. In future, new disciplines such as individualized antimetastatic chemotherapy and individualized assistant chemotherapy may soon come into reality. The greatest drawback of present individualized cancer chemotherapy is to target primary tumors rather than metastatic lesions [15-18] in clinical applications. Inconvenience, high costs [23,24] and lack of effective antimetastatic drugs [25,26] greatly compromise our efforts in the field of PCT/ICT studies. Individualized antimetastatic chemotherapy might better serve the patients with neoplasm metastasis.

In the past, we can see that each PCT strategy provides information of tumor characters (pathology) and pharmacology (drug sensitivity) singularly. These two patterns

of biomedical information are not overlapped. Thus, we are sure that future trend is to introduce integrated ones of PCT (having information of both tumor and drug) even from the attitude of patients (decision aids) [27,28]. Only through these methodology integrations, we can greatly help patients.

Conclusion

The ultimate goal of PCT/ICT is to properly utilize anticancer drugs. To guide proper drug utility, PCT strategies seem to be the best options. No matter which type of PCT strategies is used in clinics, it ought to be highly effective and reasonable cost. New PCT strategies might be established from this idea. In the past 10 years, the focus of ICT/PCT strategies has been transformed from DST into PG. In the next decades, we hypothesize that ICT/PCT strategies will be transformed from DST [10,11] to PG [12-14] to cancer biomarker/bioinformactics oriented therapy to individualized antimetastatic therapy [15-18] and finally combine patho-pharmacology information of all. New era of ICT/PCT is coming to us, are we ready for that yet [29,30].

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