


Chapter 25

Phytopharmaceuticals in Cancer Treatment

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ABSTRACT

Several modern treatment procedures have been received to battle malignancy with the point of limiting lethality. Phytopharmaceuticals are auxiliary metabolites of plant origin which exclusively contain one or more substances as active ingredients or might be a blend of them. Analysts have excitedly attempted to diminish the lethality of current chemotherapeutic agents either by consolidating them with herbals

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or in utilizing herbals alone. Synergy is a procedure where a few substances participate to reach a consolidated impact that is more prominent than the entirety of their different impacts. It may be viewed as a characteristic straight technique that has developed ordinarily by nature to acquire more efficacies at a low cost. This chapter aims to present the fundamental mechanism of the activity of phytochemicals in combination therapy. This chapter additionally features the remarkable synergistic impacts of plant-drug cooperation with an emphasis on anticancer strategies.

INTRODUCTION

Cancer is a complex clinical condition where various molecular pathways and cellular processes are adjusted. Each type of cancer possesses its own unique molecular fingerprint and, at least one of the cancer hallmarks (Hanahan D. and Weinberg R.A., 2011), was altered. Additionally, all malignant growths have a typical common behavior based on uncontrolled expansion and invasion in spite of this heterogeneous situation. This obtrusive phenotype is the genuine clinical issue and, in most cases, still stays unresolved, leading to morbidity and mortality. Despite what might be expected, the molecular promiscuity of certain particles, particularly those from natural origin (Barrajon-Catalan E., et al., 2014), permits them to exert a potential multi-target system of action. Compound promiscuity is defined as specific interaction of small molecules with multiple biological targets representing molecular basis of poly pharmacology, an emerging theme in the field of drug discovery and chemical biology. Promiscuity isn't constantly because of a solitary compound however a blend of compounds, as occurs in some complex natural concentrates. These compounds can interact with various targets, adjusting various pathways or various steps of a similar signaling cascade in cancer. In these cases, each compound can collaborate with one or numerous targets, expanding the pharmacological promiscuity of the whole medication or drug. Also, natural concentrates or their fundamental component can be combined with customary chemotherapy, lessening the development of resistance to antitumor medications and harmful toxic impacts (Rejhová A., et al., 2018).

Cancer, with more than hundred distinct types, is considered as a complicated malady because of the uncontrolled wild expansion of tumor cells and the capability of attacking other tissue through the blood and lymphatic system (Sivin N., 1993). Conventional chemotherapy for treatment of malignant growths, albeit very viable, has been associated with toxicities to normal tissue and organs, which is also a significant dose limited factor. Besides, chemo-resistance is another significant deterrent for successful treatment of cancer (Castaigne S. et al., 1990). There is board disappointment with respect to surgical medical procedure, radiotherapy, and particularly chemotherapy and consequently, treatment of cancer is being re-examined worldwide. The conventional model believed so far that the malignant phenotype is driven by a predominant signal transduction pathway is getting progressively unacceptable. This is because of the presence of resistance to target-and mechanism-based drugs, and hence reflects the hereditary flexibility of the malignant cell genome as well as the redundancy in the pathways that govern kinase signal transduction networks (Warrell R.P. Jr et al., 1991). Based on this, the conventional mono-target chemotherapy protocol for cancer treatment is getting progressively inadequate and may lead cancer cells to develop acquired drug opposition because of the complex signaling pathways associated with cancer (Chen Z.X. et al., 1991). The multi component treatment, in which more than one drugs were utilized simultaneously, is the demonstrated cure for cancers (Compton M.M., 1992). The idea of combination of drugs, with comparable or various modes of action, attempts to bring about synergistic

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