REVIEW ARTICLE

Medicinal plant-derived therapeutics for treatment of neoplasms in modern and traditional systems of medicine

DAYA N MANI1# • SEEMA SHUKLA2# • YOGENDRA N SHUKLA1,3*

ABSTRACT

Cancer poses an important challenge for mankind. Plants have provided major remedies and clues for its treatment. Plant-derived compounds (phytomolecules) are an important source of several clinically-useful anticancer drugs. Here we summarize the current status of plant-based therapies for cancer treatment. Examples of clinically-useful anticancer phytomolecules are taxol, vincristine, vinblastine, camptothecin derivatives – topotecan and irinotecan, and etoposide derived from epipodophyllotoxin. Several promising compounds like, combretastatin A-4 phosphate and flavopiridol are in various stages of clinical development. IPI-926, a semi-synthetic analog of steroid alkaloid cyclopamine, has shown promise against several cancers including pancreatic cancer and leukemia and has been under clinical trials. Besides, there are several other promising molecules that are receiving attention. Most of the drugs are directly used after isolation and purification from renewable resources or they can be produced after efficient chemical modification of the same. Simultaneously, it must be appreciated that traditional systems of medicine like Ayurveda have also described cancer-like diseases (with alternative names like Arbuda, Granthi and Gulma) and prescribed plant-based therapies for curing them. Logically, if modern science takes cues from Ayurveda and targets such plants, a higher probability of hit rates in anticancer drug discovery is expected.

INTRODUCTION

Cancer is the second major cause of deaths after cardiovascular diseases (Amin et al., 2009). The disease is characterized by unregulated proliferation of cells. Plants have provided a potent arsenal of phytomolecules against cancer (Hartwell, 1982; Pezzuto, 1997). Over 60% of currently used anticancer drugs are obtained from natural sources, including plants, microbes and marine life, among which plants stand out as the most important source of effective anticancer agents (Cragg et al., 2005; Newman et al., 2003).