Chapter 5
Nature's Warriors: Terpenes for Management of Prostate Cancer

Devender Singh
Guru Gobind Singh College of Pharmacy, India

Pardeep Kumar Mehla
Guru Gobind Singh College of Pharmacy, India

Bharat Bhushan Bahmani
Guru Gobind Singh College of Pharmacy, India

Anil Kumar
Guru Gobind Singh College of Pharmacy, India

Hitesh Malhotra
Guru Gobind Singh College of Pharmacy, India

ABSTRACT

Prostate cancer is a hormone-related neoplastic diseases with the highest mortality rate globally. Cancer cells are becoming resistant to chemotherapeutic agents, resulting in an urgent need for novel therapeutic compounds or alternatives to treat cancer. Phytochemicals could provide one of the most effective ways of controlling cancer through chemoprevention. A number of natural bioactive phytoconstituents including polyphenols, terpenoids, taxanes, and alkaloids showed their activity against prostate cancer. Based on several studies of clinical and epidemiological research, consuming a diet rich in terpenoid compounds lowers the risk of prostate cancer. Terpenoids may be the greatest remedy for treating prostate cancer because of their structural resemblance to human hormones, ability to halt the proliferation

DOI: 10.4018/979-8-3693-6972-2.ch005

of tumor cells, and ability to eradicate them by blocking a number of cancer-specific targets such as the NF-κB, proteasome, and Bcl-2 (an anti-apoptotic protein). The chapter describes the role of various terpenoids in the treatment of prostate cancer.

INTRODUCTION

One of the main reasons of people death worldwide, particularly in the developing nations, is neoplastic disorders. It is projected that the global death toll from cancer would rise further and surpass 13.1 million by 2030. Furthermore, it is anticipated that by 2030, there would be 15.5 million new instances of cancer, up from 11.3 million in 2007 (Matus et al., 2017). Uncontrolled cell proliferation, which can occur in a variety of tissues and spread to nearby and distant tissues, is the root cause of cancer (Shokoohinia et al., 2018). Numerous cancer forms that are often diagnosed have been identified by oncology investigations, including colorectal, prostate, breast, lung, bronchus, liver and stomach cancer (Giovannucci et al., 2010). Prostate cancer was the 2nd most prevalent cancer worldwide in 2020, accounting for over 1.4 million new cases. It also ranked as the fifth most prevalent reason for cancer associated mortality in males, resulting in almost 375,000 deaths. Furthermore, it is the most common diagnosed carcinoma in men in greater than half of the worldwide countries (112/185) (Sung et al., 2021). Globally, the incidence and mortality of prostate cancer rise with age. Sixty-six is the average age at diagnosis (Panigrahi et al., 2019). Disruption of the epithelial lineage is seen in prostate cancer and in fact in the hypothesised pre-malignancies of the illness, which is followed by a skewing of cell population numbers (Grisanzio & Signoretti, 2008). Prostate carcinomas exhibit a dominant luminal phenotype, the basement membrane is disrupted or absent, and reactive stroma are present, which encourage cancer growth by heterotypic signalling. It is reasonable to assume that the culprit must have a luminal phenotype in the hunt for the cell-of-origin capable of establishing the tumors. However, a less evident but more widely accepted option in humans is a basal cell origin (Packer & Maitland, 2016). Family history, heredity, nutrition, medicine, infectious diseases, and sexual variables are risk factors for prostate cancer. Urinary dysfunction is linked to prostate cancer. Prostate and faecal incontinence, as well as tingling numbness in the legs, can result from advanced cancer's metastasis to other regions of the body, such as the vertebrae, pelvis, or ribs compressing the spinal cord (Mustafa et al., 2016). Aggressive prostate cancer may be treated with high-intensity focused ultrasound radiation treatment, external beam radiation therapy, chemotherapy, some oral chemotherapeutic drugs like Temozolomide (TMZ), hormone therapy, cryosurgery or a combination of these routes for treatment (Hong et al., 2010). Prostate cancer treatment has grown increasingly aggressive and extensive due to