

Effect of snake venom on prostate cancer: a systematic review

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Abstract

Introduction: Prostate cancer is the second deadly cancer in men. One way to deal with tumor resistance is using natural sources like snake venoms that contain a wide spectrum of anti-cancer components. The aim of this study was to review the anti-neoplastic property of snake venom against prostate cancer.

Methods and Results: In this systematic review, based on PRISMA guidelines, two persons independently searched MeSH and other relevant terms like “snake venom”, “prostatic neoplasms” and 3 others in databases including PubMed, Medline, Scopus, Sciverse(Elsevier, ScienceDirect), Cochrane library, Sid, Magiran, and iranmedex up to October 2017, and all articles with considered inclusion criteria were added to the study. 82 articles were obtained by primary searching and after removing irrelevant and duplicate articles 14 articles with all inclusion criteria were added to this study. Many snake venoms' components are effective on prostate cancer; some of them changed gene expression of tumor cells while others like enzymes have a direct effect on cancer cells. Although there are many compounds with anti-cancer property in snake venoms there are some with carcinogenic effect. For example Prokineticins and Hyaluronidase in some venoms induced angiogenesis and growth of the tumor. *Walterinnesia aegyptia* venom alone and its combination with silica nanoparticles, Rhodostomin, a proteinase from *Vipera lebetina*, *Vipera lebetina turanica* venom, cysteine-rich secretory proteins, Disintegrins, lectin and many other components had wide range of anti-cancer properties like inhibiting cancer cells' invasion, migration, growth, and their adhesion to the extracellular matrix, inducing apoptosis by down-regulated antiapoptotic proteins like Bcl-2 and increasing the expression of proapoptotic proteins like Bcl-2-binding component 3, Bax, caspase-3, caspase-9 and other mechanisms.

Conclusions: Snake venoms are good sources for treating prostate cancer but application of nanoparticles in combination with venoms could make the results more efficient. However, their side effects must be considered.

Key words: Prostatic Neoplasms, Snake Venom, Prostate Cancer, Antineoplastic Agents.