The Role of Tachykinins in Cancer Promotion and Progression

Mحل انتشار:
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خلاصه مقاله:
Tachykinins, including substance P (SP), neurokinin A and B, are a family of neuropeptides. The biological actions of tachykinins are mediated through the neurokinin-1 (NK-1), NK-2 and NK-3 receptors. SP is the most important member of the tachykinin family which has the highest affinity for the NK-1 receptor and shows a widespread distribution throughout the body. SP regulates many physiological and pathophysiological functions. It has been proven that SP and NK-1 receptors are overexpressed in a number of different cancer types, such as pancreatic cancer, gastric and colon carcinomas, breast cancer, Prostate cancer, ovarian carcinoma, thyroid cancer, glioblastoma, CNS neoplasms, lung cancer, astrocytoma, neuroblastoma and neuroendocrine carcinoma, etc. Activation of NK-1 receptors by SP triggers multiple cell signaling pathways, e.g., extracellular signal regulated protein kinases (ERK)/3, which are potentially relevant for tumor growth and progression and protecting the cell from apoptosis. Moreover, SP mediates antiapoptotic responses in human tumor cells by activating Akt or protein kinase B, a serine-threonine protein kinase that becomes activated via phosphatidylinositol-3-kinase (PI3K). It is also known that after binding to the NK-1 receptor, SP induces a rapid change in cellular shape, such as membrane blebbing, which is important in cell movement, cell spreading, and cancer cell infiltration. In addition, SP stimulates angiogenesis by increasing the proliferation of endothelial cells. NK-1 receptor antagonists inhibit the above mechanisms, offering an appropriate method for cancer treatment. Also, it has been evidenced that plasma tachykinin is a convenient tumor marker for the diagnosis and follow-up of patients with carcinoid tumors. In this review, we highlighted the involvement of the SP/NK-1 receptor system in treatment, diagnosis, prognosis and follow up of the patient suffering from above mentioned diseases for a better understanding and hence a better management of cancers.
کلمات کلیدی:
Tachykinin, Cancer, Substance P, NK1 receptor, Neuropeptides

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