Hedgehog信号通路与肿瘤的研究新进展

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Title: New progress in research on Hedgehog signaling pathway and tumor

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摘要: Hedgehog（Hh）信号通路在果蝇中被首次发现。该信号通路能有效调控哺乳动物的胚胎发育过程，此外，在调控细胞的分化、增殖、血管形成及肿瘤形成方面起重要作用。Hh信号通路是一个Hh-Ptch-Smo-Gli的级联反应过程。该通路的配体包括：Hedgehog配体［Sonic Hh（SHh）、Indian Hh（IHh）和Desert Hh（DHh）］，Ptch受体（Ptch1、Ptch2），Smoothened受体（Smo），融合同源物（Sufu）的抑制因子，驱动蛋白Kif7，蛋白激酶A（PKA）和环腺苷一磷酸（cAMP）。该级联反应中的终末转录因子Gli调控的下游基因过度表达可能是导致肿瘤产生的关键因素。许多研究者已经发现，Hegehog信号通路与一系列人类实体瘤的形成关系密切。本文就近年来Hedgehog信号通路及其与肿瘤关系的研究进行综述。

Abstract: The Hedgehog (Hh) signaling pathway was first discovered in drosophila，which can effectively regulate the development of mammalian embryos.In addition，it plays an important role in regulating cell differentiation，proliferation，angiogenesis and tumor formation.The Hh signaling pathway is a cascade reaction process of Hh-Ptch-Smo-Gli.Ligands for this pathway include Hedgehog ligands
［Sonic Hh (SHh)，Indian Hh (IHh)，and Desert Hh (DHh)］，Ptch receptor (Ptch1，Ptch2)，Smoothened receptor (Smo)，fusion homologs (Sufu) inhibitor，kinesin Kif7，protein kinase A (PKA) and cyclic adenosine monophosphate (cAMP).The overexpression of downstream genes，which regulated by the terminal transcription factor Gli in this cascade reaction，may be a key factor leading to tumor.Researchers have discovered that the Hegehog signaling pathway is closely related to the formation of a series of human solid tumors.This paper reviews the research of Hedgehog signaling pathway and its relationship with tumors in recent years.

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