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The diversified function and potential therapy of ectopic olfactory receptors in non-olfactory tissues

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Abstract

Olfactory receptors (ORs) are mainly distributed in olfactory neurons and play a key role in detecting volatile odorants, eventually resulting in the production of smell perception. Recently, it is also reported that ORs are expressed in non-olfactory tissues including heart, lung, sperm, skin, and cancerous tissues. Interestingly, ectopic ORs are associated with the development of diseases in non-olfactory tissues. For instance, ectopic ORs initiate the hypoxic ventilatory responses and maintain the oxygen homeostasis of breathing in the carotid body when oxygen levels decline. Ectopic ORs induce glucose homeostasis in diabetes. Ectopic ORs regulate systemic blood pressure by increasing renin secretion and vasodilation. Ectopic ORs participate in the process of tumor cell proliferation, apoptosis, metastasis, and invasiveness. Ectopic ORs accelerate the occurrence of obesity, angiogenesis and wound-healing processes. Ectopic ORs affect fetal hemoglobin levels in sickle cell anemia and thalassemia. Finally, we also elaborate some ligands targeting for ORs. Obviously, the diversified function and related signal pathway of ectopic ORs may play a potential therapeutic target in non-olfactory tissues. Thus, this review focuses on the latest research results about the diversified function and therapeutic potential of ectopic ORs in non-olfactory tissues.

... .. angiogenesis; diabetes; ectopic expression; olfactory receptors; oxygen metabolism; tumor.

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