

细胞表面 β 1, 4-半乳糖基转移酶1功能研究进展

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β 1, 4-半乳糖基转移酶1 (β 1, 4-galactosyltransferase 1, β 4GalT1)是人们研究最广泛、最深入的糖基转移酶之一。 β 4GalT1的基因编码了长形和短形两种蛋白,长形的 β 4GalT1比短形的 β 4GalT1在胞浆区多了13个氨基酸的尾巴,正是由于这种差异造成了 β 4GalT1定位以及功能上的不同,短形的 β 4GalT1和部分长形的 β 4GalT1分布在高尔基体上,发挥糖基转移酶的基本功能,还有一部分长形的 β 4GalT1分布在细胞表面,发挥粘附分子样作用,在精卵结合、神经突触生长、神经元迁移、肿瘤细胞迁移等过程中有非常重要的意义。文章主要从 β 4GalT1的基本结构、 β 4GalT1与多种配体之间的相互作用介导了细胞不同的生物学功能、 β 4GalT1与细胞骨架蛋白的关系等几个方面综述细胞膜表面 β 4GalT1的研究进展。

Recent advances in β 1, 4-galactosyltransferase 1

β 1, 4-galactosyltransferase (β 4GalT1) is a Golgi-resident type II membrane enzyme. The gene for β 4GalT1 encodes two polypeptides, long and short, which differ by a 13 amino acid extension on the amino terminal end of the long isoform. With the use of human multiple tissue Northern blots β 4GalT1 transcript has been shown to be present in most tissues except for brain, lung and small intestine, which contained little transcript and its expression is enhanced in the mammary gland during lactation. It is an amazing enzyme, mediating cellular interaction during sperm: egg binding, embryonic cell-cell adhesion, cell migration, neurite outgrowth and et al. It resides in two distinct subcellular locations, where it performs different functions. All short and most long β 4GalT1 are localized in the trans-Golgi complex, where it participates in cellular glycosylation. A subpopulation of β 4GalT1 is also present on the plasma membrane, where it binds to specific glycoside residues on multiple extracellular ligands, and mediates cell-cell as well as cell-matrix interactions for a variety of cells. When expressed on the surface, β 4GalT1 associates with the actin cytoskeleton and, upon ligand-induced aggregation, induces cell-type specific intracellular signal cascades. The following review on β 4GalT1 focused on the interaction with multiple extracellular ligands and the cytoskeleton.

关键词

β 1, 4-半乳糖基转移酶1 (β 1, 4-galactosyltransferase 1); 配体(ligands); 细胞骨架(cytoskeleton)