

mTOR信号通路与细胞生长调控

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mTOR (the mammalian target of rapamycin) 是一个进化上十分保守的蛋白激酶, 属于PIKK (the phosphatidylinositol kinase-related kinase) 超家族, 作为Ser/Thr激酶而起作用。它可以汇聚和整合来自于营养、生长因子、能量和环境压力对细胞的刺激信号, 进而通过下游效应器(4EBP1和S6Ks)调节细胞生长。mTOR信号通路还影响胚胎干细胞和早期胚胎的发育, 并且与肿瘤、肥胖及代谢紊乱等疾病有关。对mTOR信号通路的生理功能、分子组成和调节机制的研究不仅可以深入了解细胞生长调控的机制, 而且对于相关疾病的治疗具有重要意义。

The mTOR signaling pathway and the regulation of cell growth

The mammalian target of rapamycin (mTOR) is an evolutionarily conserved protein kinase that belongs to the phosphatidylinositol kinase-related kinase (PIKK) family and functions as a serine/threonine kinase. mTOR can integrate and converge a wide range of signals, including intracellular and extracellular nutrients, growth factors, energy and stress conditions, thereby regulating cell growth through the downstream effectors 4EBP1 (the eIF4E-binding protein 1) and S6Ks (ribosomal protein S6 kinases). Thus, mTOR acts as a central regulator of cell growth and cell cycle to mediate the underlying biological processes. The mTOR pathway plays a role in the development of the embryonic stem cell and early embryo and also is relevant to a variety of diseases, such as tumor, obesity and metabolic disorders. Further researches in the physiological functions, molecular components and the signal regulation of the mTOR pathway not only can thoroughly elucidate the molecular mechanism for cell growth, but also are very important to the clinical treatment of diseases.

关键词

mTOR; 信号转导(Signal transduction); 细胞生长(Cell growth); 调控(Regulation)