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视神经损伤后SDF-1及其受体CXCR4在大鼠视网膜中的分布和表达:

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Title: Distribution and expression profile of SDF-1 and its receptor CXCR4 in rat retinas after optic nerve injury

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关键词: SDF-1; CXCR4; 视网膜; 星形胶质细胞; Müller细胞; 视神经损伤

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摘要: 目的 观察Long Evans大鼠视神经损伤后不同时间基质细胞衍生因子-1 (stromal cell-derived factor-1, SDF-1) 及其受体CXCR4在视网膜中的分布及表达变化。 方法 将21只成年Long Evans大鼠分为正常组和视神经损伤后1、3、5、7、15 d及30 d组, 每组3只, 采用免疫荧光染色和免疫印迹法(Western blot)检测各组大鼠视网膜SDF-1、CXCR4的分布及表达变化。 结果 免疫荧光染色发现视神经钳夹伤大鼠SDF-1主要定位表达于视网膜内、外界膜之间的星形胶质细胞及Müller细胞, 并与GFAP共表达, SDF-1阳性细胞数量随视神经损伤时间延长先增多后减少, 伤后5 d达高峰。CXCR4主要表达于视网膜神经节细胞层、外核层及内核层; Western blot证实视网膜SDF-1的水平随视神经损伤出现先升高后降低的趋势, 与正常组相比, 视神经损伤组第1、3、5、7天水平显著升高 ($P<0.05$)。而CXCR4的表达在视神经损伤后各时间点无明显改变 ($P>0.05$)。 结论 视神经损伤后, 视网膜星形胶质细胞及Müller细胞中的SDF-1表达先增强后减弱, 且与视神经损伤后胶质活化相关。

Abstract: **Objective** To observe the distributions and expression profiles of stromal cell-derived factor-1 (SDF-1) and its receptor CXCR4 in the retinas during repair period after partial optic nerve injury in Long Evans rats. **Methods** A total of 21 adult rats were randomly and equally divided into 7 groups, normal group, the injury group, and the groups in 1, 3, 5, 7, 15 and 30 d after optic nerve crushing. Immunofluorescence assay and Western blotting was applied to detect the location and the quantity of SDF-1 and CXCR4 expression in the retina. **Results** Immunofluorescence staining revealed that the expression of SDF-1 was co-localized in the activated GFAP-positive astrocytes and Müller cells between the pre-retinal and post-retinal membrane. The amount of SDF-1 positive cells were in a trend of increasing to decreasing with the injury time prolonging, and reached a summit in 5 d after injury. CXCR4 staining was mainly present in the ganglion cell layer, inner nuclear layer and outer nuclear layer of the retina. Western blotting revealed that the expression of SDF-1 protein was increased at the first day and then decreased at the 7th day after injury. The expression of SDF-1 in 1, 3, 5 and 7 d after optic nerve injuring was increased significantly than normal group ($P<0.05$). While, the expression of CXCR4 protein

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had no change after injury ($P>0.05$). Conclusion The quantity of SDF-1 is increased first and then decreased in the astrocytes and Müller cells after optic nerve injuring, which is related to the activation of glial cells after injury.

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