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Notochordal Cell-Derived Therapeutic Strategies for Discogenic Back Pain

Abstract

An understanding of the processes that occur during development of the intervertebral disk can help inform therapeutic strategies for discogenic pain. This article reviews the literature to identify candidates that are found in or derived from the notochord or notochordal cells and evaluates the theory that such factors could be isolated and used as biologics to target the structural disruption, inflammation, and neurovascular ingrowth often associated with discogenic back pain. A systematic review using PubMed was performed with a primary search using keywords “(notochordal OR notochord) And (nerves OR blood vessels OR SHH OR chondroitin sulfate OR notch OR CTGF) NOT chordoma.” Secondary searches involved keywords associated with the intervertebral disk and pain. Several potential therapeutic candidates from the notochord and their possible targets were identified. Studies are needed to further identify candidates, explore mechanisms for effect, and to validate the theory that these candidates can promote structural restoration and limit or inhibit neurovascular ingrowth using in vivo studies.

對椎間盤源性腰痛的脊索細胞衍化治療策略

理解椎間盤發展中所發生的過程能幫助明白椎間盤源性疼痛的治療策略。本文是回顧文獻以確認哪些因素是來自或衍化自脊索或脊索細胞，並鑑定這些理論的因素可以個別考慮，並作為生物指標以確定與間盤源性腰痛的有關的結構破壞，炎症和神經血管向內生長。使用 PubMed 進行有系統的搜索，在首次使用關鍵字“（脊索的或脊索）和（神經或血管，或 SHH，或硫酸軟骨素或凹口或 CTGF）不是脊索瘤。”第二次使用與椎間盤和疼痛相關的關鍵字搜索。幾個由脊索和其可能的目標的潛在性治療因素已確定了。需要加以研究以進一步確定這些因素，探索機制的效果，並以體內研究驗證該理論以確定這些因素可以促進結構恢復，並限制或抑制神經血管向內生長。