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Biologically Based Therapy for the Intervertebral Disk: Who Is the Patient?

Abstract

The intervertebral disk (IVD) is a fascinating and resilient tissue compartment given the myriad of functions that it performs as well as its unique anatomy. The IVD must tolerate immense loads, protect the spinal cord, and contribute considerable flexibility and strength to the spinal column. In addition, as a consequence of its anatomical and physiological configuration, a unique characteristic of the IVD is that it also provides a barrier to metastatic disease. However, when injured and/or the subject of significant degenerative change, the IVD can be the source of substantial pain and disability. Considerable efforts have been made over the past several decades with respect to regenerating or at least modulating degenerative changes affecting the IVD through the use of many biological agents such as growth factors, hydrogels, and the use of plant sterols and even spices common to Ayurvedic medicine. More recently stem/progenitor and autologous chondrocytes have been used mostly in animal models of disk disease but also a few trials involving humans. At the end of the day if biological therapies are to offer benefit to the patient, the outcomes must be improved function and/or less pain and also must be improvements upon measures that are already in clinical practice. Here some of the challenges posed by the degenerative IVD and a summary of some of the regenerative attempts both in vitro and in vivo are discussed within the context of the vital question: "Who is the patient?"

用於椎間盤以生物學為基礎的治療：誰是病人？

椎間盤（IVD）是一個令人極感興趣的和有彈性的組織區劃令它能表現出各種各樣的功能同時擁有其獨特的解剖結構。IVD 必須承受巨大的載荷，保護脊髓和促成重要的靈活性和強度予脊柱。此外，由於其解剖和生理構造，IVD 的其中一種獨特的特徵是它對轉移性疾病提供了一個屏障。然而，當受傷和/或受明顯的退化性改變，IVD 可以了是痛楚和殘疾的主要源頭。在過去數十年間，已作出相當大的努力在對於 IVD 再生或至少調較退化性改變的影響，透過使用的許多生物製劑，如生長因子，水凝膠，和使用的植物固醇，甚至在印度草醫學常用的香料。最近幹/祖先細胞和自體軟骨細胞主要用於椎間盤疾病的動物模型，但也有一些人類測試。當有一天如果生物療法能提供好處給病人，結果必須提高功能和/或減少疼痛，還必須改善在現有臨床診治已有的指標。在文中的重要問題：“誰是病人？”的範圍內，一些因退化性 IVD 引致的挑戰和總結了一些嘗試在體外和體內再生的技術已討論了。