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The Effect of a Cyclooxygenase 2 Inhibitor on Early Degenerated Human Nucleus Pulposus Explants

Study Design　Preclinical in vitro culture of human degenerated nucleus pulposus (NP) tissue.

Objective　Cyclooxygenase 2 inhibitors (e.g., celecoxib) inhibit prostaglandin E2 (PGE2) production, and they have been shown to upregulate regeneration of articular cartilage. In this study, we developed an explant culture system for use with human tissue and tested the potential of celecoxib.

Methods　NP explants were cultured with or without 1 μM of celecoxib and were analyzed at days 0 and 7 for biochemical content (water, sulfated glycosaminoglycans, hydroxyproline, and DNA), gene expression (for disk matrix anabolic and catabolic markers), and PGE2 content.

Results　Water and biochemical contents as well as gene expression remained close to native values after 1 week of culture. PGE2 levels were not increased in freshly harvested human NP tissue and thus were not reduced in treated tissues. Although no anabolic effects were observed at the dosage and culture duration used, no detrimental effects were observed and some specimens did respond by lowering PGE2.

Conclusions　Human degenerated NP explants were successfully cultured in a close to in vivo environment for 1 week. Further research, especially dosage-response studies, is needed to understand the role of PGE2 in low back pain and the potential of celecoxib to treat painful disks.

環氧化酶 2 抑製劑對早期人類退化髓核組織外植體的影響

研究設計　　臨床前體外培養人類退化髓核（NP）組織。

目的　環氧合酶 2 抑製劑（例如 塞來昔布）抑制前列腺素 E2（PGE2）產生，並且它們已被證實為上調關節軟骨的再生。在這項研究中，我們開發了一個外植體培養系統用於人體組織和測試塞來昔布的潛力。

方法　NP 外植體在具有或不具有 1 μM 塞來昔布的環境下培養，並在第 0 天和第 7 天進行生化含量分析（水，硫酸化糖胺聚醣，羥脯氨酸，和 DNA），基因表達（對於間盤基質的合成代謝和分解代謝的標記物），和 PGE2 含量。

結果　培養一周後，水和生化內容，以及基因表達仍接近原始值。在新鮮取得的人類 NP 組織的 PGE 2 水平沒有增加，因此在處理過的組織亦沒有減少。雖然在使用的劑量和培養

時間並沒有觀察到合成代謝作用，但亦沒有觀察到有害的影響和透過降低 PGE2 一些標本產生回應。

結論　人類退化 NP 外植體成功地培養在接近體內環境 1 週。進一步的研究，特別是劑量反應研究，是需要了解 PGE2 對腰痛的角色和塞來昔布對治療痛楚的椎間盤的潛力。