Type I and II collagen regulation of chondrogenic differentiation by mesenchymal progenitor cells

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摘要

Abstract

Chondrogenic differentiation by mesenchymal progenitor cells (MPCs) is associated with cytokines such as transforming growth factor-beta 1 (TGF-beta1) and dexamethasone. Extracellular matrix (ECM) also regulates the differentiation by MPCs. To definewhether ECM plays a functional role in regulation of the chondrogenic differentiation by MPCs, an in vitro model was used. That model exposed to dexamethasone, recombinant human TGF-beta1(rhTGF-beta1) and collagens. The results showed that MPCs incorporated with dexamethasone and rhTGF-beta1 increased proliferation and expression of glycosaminoglycan (GAG) after 14 days. Type II collagen enhanced the GAG synthesis, but did not increase alkaline phosphatase (ALP) activity. When adding dexamethasone and rhTGF-beta1 MPCs increased mRNA expression of Sox9. Incorporation with type II collagen, dexamethasone and rhTGF-beta1, MPCs induced mRNA expression of aggrecan and enhanced levels of type II collagen, and Sox9 mRNA. In contrast, incorporation with type I collagen, dexamethasone and rhTGF-beta1 MPCs reduced levels of aggrecan, and Sox9 mRNA, and showed no type II collagen mRNA. Altogether, these results indicate that type I and II collagen, in addition to the cytokine effect, may play afunctional role in regulating of chondrogenic differentiation by MPCs.