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Review Article

Role of Tyrosine Kinase Inhibitors in Modulating Chondrocyte Activity and Cartilage Diseases

Abstract:

Tyrosine kinases (TK) are critical enzymes involved in cellular processes in the joints, such as proliferation, differentiation, and apoptosis. These inhibitors target key pathways involved in cartilage degeneration and inflammation, offering hope for improved management of these conditions. This review examines the role of TK inhibitors in modulating chondrocyte activity and explores their therapeutic potential in cartilage-related diseases, including rheumatoid arthritis (RA) and osteoarthritis (OA). A search has been conducted across several relevant publications using the terms cartilage regeneration, chondrocyte activity, OA, RA, and TK inhibitors in PubMed and Google Scholar to construct this review. TK inhibitors have the potential to manage inflammatory and degenerative joint disorders. Tofacitinib, gefitinib, imatinib and other TK inhibitors have anti-inflammatory effects through various pathways, aiding in treating cartilage diseases. Tofacitinib and baricitinib are already approved for RA, while other TK inhibitors are under continuous investigation for approval in RA and OA. Nonetheless, certain obstacles like serious side effects, limited joint-specificity, and inadequate clinical research impede their utilization. Despite these challenges, TK inhibitors signify a promising treatment strategy for joint diseases, presenting the potential to improve disease management strategies and promote cartilage regeneration.