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Synthesis and chemical reactions of the steroidal hormone 17 α -methyltestosterone

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Structural modifications of natural products with complex structures like steroids require great synthetic effort. A review of literature is presented on the chemistry of the steroidal hormone 17 α -methyltestosterone that is approved by Food and Drug Administration (FDA) in the United States as an androgen for estrogen-androgen hormone replacement therapy treatment. The analog also offers special possibilities for the prevention/treatment of hormone-sensitive cancers. The testosterone skeleton has important functionalities in the molecule that can act as a carbonyl component, an active methylene compound, α , β -unsaturated enone and tertiary hydroxyl group in various chemical reactions to access stereoisomeric steroidal compounds with potent activity. In addition, microbiological methods of synthesis and transformation of this hormone are also presented.

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Do cartilage-derived progenitor cells potential vary with OA progression?

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Background & Purpose: Osteoarthritis disease process represents a slowly evolving condition of the cartilage, which undergoes several stages and takes several years. Recent research confirmed the presence of cartilage - derived progenitor cells (CPC) in both normal and osteoarthritic cartilage. However, there is only limited information concerning whether CPC markers changes in osteoarthritis progression. The purpose of this study is to confirm the change of cartilage-derived progenitor cells vary with OA progression? To do this, a follow up of the evolution of MPC markers in OA cartilage at different grades from mild OA to severe was performed.

Materials & Methods: Specimens of human osteoarthritic tibial plateau were obtained from ten patients undergoing total knee replacement (TKR). Each sample had been classified into a mild or severe group according to OARSI scoring assessment. Cells were taken from each specimen and mRNA expression levels of CD 105, CD 166, Sox9, Acan and Col II A1 were measured at day 0 and day 14 (2 weeks in vitro culture). Furthermore, nucleostemin and collagen II expression were studied by immunofluorescence.

Results: Cells isolated from areas of mild OA displayed better proliferation capacity compared to cells isolated from severe OA cartilage. Two weeks expansion of cells isolated from mild OA – areas resulted in a significant increase of mRNA levels CD 105 and CD 166. The comparative analysis of proliferated cells from mild OA versus severe OA showed that mild OA – proliferated cells expressed significantly higher levels of CD105, CD166, Sox9 and Acan mRNA expression. Furthermore, the expression of differential markers studied was present in all cells derived from mild OA cartilage. Note that all the cells positively stained for nucleostemin MSC marker but few cells only expressed collagen II.

Conclusion: These results show a high number of cells that express mesenchymal progenitor cell markers in human mild degenerated cartilage. Notably, cells originating from mild OA cartilage seem to be more useful in identifying progenitors in cartilage.

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