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Synovial-Derived Stem Cells (SDSCs) and Telocytes: possible involvement in osteoarticular pathologies

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Osteochondral defects may progress in osteoartithis (OA) that is one of the most common causes of articular pain and disability in an ageing population [1]. OA affects cartilage, the subchondral bone and the synovial tissue; therefore, it is currently defined as a disease of the whole joint [2]. Recent researches are focusing on an in-depth characterisation of synovial membrane (SM) and cells isolated from OA to elucidate their role in the pathogenesis and/or regeneration of joint diseases. SM is a specialized mesenchymal tissue that includes two layers, the intima and the subintima, and hosts mesenchymal stromal cells, called Synovial-Derived Stem Cells (SDSCs) [3] that confer an intrinsic ability of regeneration to SM and/or may be involved in early stages of osteoarticular diseases. Recently, the presence of telocytes (TCs), a peculiar type of interstitial cells characterized by extraordinary long cytoplasmic processes (telopodes) has been demonstrated in SM [4]. The aim of our research was to isolate SDSCs from osteoarthritic subjects and evaluate their morphology, phenotype, differentiation potential and capability to activate Peripheral Blood Mononuclear Cells (PBMCs) in comparison with cells isolated form healthy subjects. A peculiar attention to the presence of TCs was paid. SM was obtained during surgery for total knee arthroplasty in OA subjects (mean age 76±3). Control SM was harvested form 2 young subjects, gender matching, undergoing leg amputation. Histological and ultrastructural analyses evidenced the presence of TCs in SM of both normal and OA subjects. No significant differences in SDSCs behaviour were observed between healthy and OA subjects except for the isolation and maintenance of TCs that was possible only from SM of OA patients. Co-culture of SDSCs with PBMCs highlight the generation of active osteoclasts from PBMCs only in the presence of SDSCs derived from OA subjects, whilst control SDSCs could generate multinucleate but not active osteoclasts. Further studies are still necessary to clarify the role of telocytes and its secretome in osteoarthritis to develop new effective therapeutic strategies.

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Key words

Synovial membrane, Stem cells, Telocytes, Osteoartithis.

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