Establishment of a drug screening system for chondrogenic differentiation of mesenchymal stem cells.

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Defects in articular cartilage ultimately results in loss of joint function in rheumatoid arthritis. To investigate the influences of anti-rheumatoid drugs on chondrogenic differentiation of mesenchymal stem cell (MSC), *in vitro* and *in vivo* screening system were established. MSCs were collected and palleted in 4-microtube strips for chondrogenic induction. Quantification of formed micromasses was performed by three dimensional T2-weighted magnetic resonance imaging. For *in vivo* screening, scaffold or scaffoldless cartilaginous tissue were transplanted to NOD/ShiJic-scid mice for 2 months. The cartilaginous tissues were then explanted and the expressions of chondrogenic markers, including aggrecan and CD44, were assessed. We examined influence on inducted differentiation cartilages by methotrexate (MTX) and prednisolone (PSL). The volume of the chondrogenic spheroid in the presence of MTX was decreased in a dose-dependent manner, whereas no significant effect of PSL on chondrogenic differential potency were observed. The MSC-derived cartilaginous spheroid provides an effective screening tool to get the impact of anti-rheumatoid drugs on cartilaginous regeneration.