

Reversal of differentiation in mesenchymal stem cells derived from human femoral bone marrow

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Role of soluble induction factors is well known for inducing respective differentiation for mesenchymal stem cells by incorporation into culture media. In current experiment we have observed effect of switching these soluble factors in induction media. Alkaline phosphatase (ALP) enzyme activity a well known biochemical marker for osteogenic potential for preosteocytes was observed to significantly rise after induction by osteogenic factors proving efficacy of osteogenic induction. Media switch from osteogenic to adipogenic reduces osteogenic differentiation capacity of cells as proved by decrease in ALP activity.

Osteogenic capacity of mesenchymal stem cells (MSC) was observed to diminish with longer incubation with adipogenic conditions. This phenomenon overlaps with same duration for cytoskeleton changes observed during first 72 hours of induction. Cells induced with osteogenic media changed actin filament configuration from parallel to more angular and cross linked accompanied by higher number of stress fibres, while adipogenic condition produced shorter filaments. Induction into adipocytes during same duration can be reversed but delayed and lower reversal obtained at later differentiation stages.