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Confluence-associated proliferation and osteogenic differentiation of bone marrow mesenchymal stem cell (BMMSCs)

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In cellular therapy field, the impact of confluence degree to harvest or differentiate BMMSCs and the effect created by cell-to-cell contact remains controversial. Therefore, the impact of 20, 50, 70, 80 and 100% confluences on BMMSCs proliferation properties, ERK and p-ERK proteins expression and glucose consumption rate was studied. Confluence-associated osteogenic differentiation efficiency was identified by determining calcium deposition, alizarin red staining, alkaline phosphatase activity and osteopontin and osteocalcin genes expression. There was a correlation between confluence% and density. Viability was declined at the lower and higher confluences. The highest CFU-F, Brd-U uptake and population doubling were obtained at 80% confluence. ERK band intensity in 100% confluent BMMSCs was lower. Bands of p-ERK were highly detectable at 70% and 80% confluences. Glucose consumption rate at 70% and 80% confluences were higher than at 20% and 100% confluences. Although higher osteogenic differentiation appeared at 80% confluence, it was also extended at 100% confluence. Osteopontin gene expressed among all confluences while osteocalcin gene was highly expressed in 70% confluence. We concluded that the optimum seeding density for maximal expansion and harvesting purposes is 80% confluence and up to 100% confluence for osteogenic differentiation to trigger the process to be more cost effective.

Biography

Faten A M Abo-Aziza has completed her PhD from Beni-Suef University in 2012 and Post-doctoral studies from Kyushu University, Graduate School of Dental Science, Japan. She is currently serving as a Researcher of Clinical Pathology at the National Research Center, Cairo, Egypt. Her research interest is Mesenchymal Stem Cells Application.

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