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Can glass be the answer for *in-vitro* bone differentiation?

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Three dimensional tissue culture is gaining more interest as being more physiological model that increases cell to cell contact and consequently enhances stem cell differentiation and matrix formation. This model is gaining more interest as an alternative for animal testing according to the 3Rs guidelines. Previously, we have reported different modifications for the classical 3D models for pellet cultures system in order to enhance the processes of osteogenesis and chondrogenesis of human bone-marrow-derived stromal cells and human fetal-femur-derived cells. Hereby, we investigated the effect of different materials on the pellet formation. When the cells were cultured on glass tubes, the cells formed a monolayer rather than coalesce together to form a pellet. After 10 days, the cell layer has self-assembled itself to form a 3D sphere that was at least 16 times the size of pellets formed in similar conditions on a plastic surface. Extensive osteoid was formed in these self-assembled spheres, which had folded into sheets with chondrogenic matrix in between. These unusual constructs offer a new model to test the effect of drugs on bone formation. In addition, combining few constructs may help to fill a bone gap as a potential and novel approach in regenerative medicine.

Biography

Ahmed T El-Serafi was graduated from the College of Medicine, Suez Canal University, Egypt and obtained his master degree in Medical Biochemistry from there. He had his Ph.D. degree in the field of the bone and cartilage regeneration from the Centre for Human Development, Stem Cells and Regeneration, Institute of Developmental Sciences, Developmental Origin of Health and Disease division, University of Southampton, UK. Ahmed is currently an assistant professor in the University of Sharjah, UAE and he is establishing stem cells research line within the Sharjah Institute of Medical Research.

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