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Novel *in vitro* three dimensional culture of human intestinal cell lines to develop a 3D model for inflammatory bowel disease

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In order to develop an *in vitro* 3D cell culture model which mimics the natural environment of the small intestine, pNIPAM-Laponite hydrogel system was investigated. Human colonic adenocarcinoma cell lines: Caco-2 and HT29-MTX have been widely used in *in vitro* 3D culture system as these cells have the ability to differentiate into enterocyte-like cells and mucus producing goblet cells respectively; and exhibit the properties of intestinal epithelia. For these reasons each cell line and co-cultures were investigated in suspension and layered cultures using the novel pNIPAM hydrogels, cultures were maintained under static culture or dynamic culture for up to 8 weeks. Cell viability was assessed using Alamar Blue assay, and histological stains: H&E, Alcian Blue-Periodic Acid Schiffs (PAS) were used to investigate cellular morphological and matrix production. Scanning electron microscopy (SEM) was also used to assess the morphology of cells within the hydrogel. Both cell types remained viable and those cultured in layered cultures under dynamic culture formed villus like structures and produced both acidic and neutral mucins. SEM analysis showed the presence of cells within/on the surface of the hydrogel, where cells formed circular clusters of cells forming mosaics with each cell having microvilli. We conclude that the pNIPAM-Laponite hydrogel could provide a novel 3D intestinal *in vitro* model.

Biography

Rasha Hatem Saeed Dosh has completed her MSc from Al-Mustansiriyah University and worked as a Lecturer at University of Kufa College of Medicine/Iraq. She has published 4 papers in college of medicine journals. She is currently a second year PhD student at Sheffield Hallam University/UK.

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