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Novel in vitro three dimensional cultures of human intestinal cell lines to develop 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 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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