AB070. 125. Evaluation of a hydrogel scaffold seeded with mature adipocytes for breast reconstruction post-mastectomy

Niamh O'Halloran[1], Eimear Dolan[2], Michael Kerin[1], Garry Duffy[2], Aoife Lowery[1]

[1]Lambe Institute for Translational Research, Discipline of Surgery, [2]Discipline of Anatomy, National University of Ireland Galway, Galway, Ireland

Background: Hydrogels are suitable for adipose tissue engineering for breast regeneration due to their ability to mimic native extracellular matrix. The aim of this study was to assess the suitability of adipose tissue seeded hyaluronic acid (HA) hydrogels at varying crosslinking densities and cell loading densities as adjuncts to implant breast reconstruction post-mastectomy.

Methods: One percent and 2% w/v HA at 1× (1 µL/mL H202, 0.24 U/mL HRP) and 2× (2 µL/mL H202, 0.48 U/mL HRP) crosslinking concentration were loaded with lipoaspirate or lipoaspirate enriched with stromal vascular fraction (SVF) of adipose tissue from female patients. Sedimentation rate of adipocytes within the lipoaspirate, metabolic activity (AlamarBlue), Young's modulus (compression) and swelling ratio of the hydrogels were assessed. Histology with Oil Red O staining for intracellular lipid was performed. Maximum cellular loading density of 2× hydrogels was assessed.

Results: The sedimentation rate within 1% hydrogels was more rapid than 2% hydrogels. 1× HA adipose loaded hydrogels had a greater swelling ratio than 2× adipose loaded hydrogels. Young's elastic modulus was higher for 2× compared to 1× hydrogels. Young's modulus decreased as increasing numbers of cells were loaded onto the hydrogel. There was no significant difference in cell metabolic activity between different cell loading densities. Histology demonstrated positive lipid staining by Oil Red O within the hydrogel.

Conclusions: Hyaluronic acid at a 2× crosslinking density is a promising biomaterial for adipose tissue engineering in breast regeneration.

Keywords: Breast reconstruction; mastectomy; tissue engineering

doi: 10.21037/map.2019.AB070

Cite this abstract as: O'Halloran N, Dolan E, Kerin M, Duffy G, Lowery A. Evaluation of a hydrogel scaffold seeded with mature adipocytes for breast reconstruction post-mastectomy. Mesentery Peritoneum 2019;3:AB070.