Development of a 3D coculture system to study adipocyte and lymph node cell interactions

Conference or Workshop Item

How to cite:


For guidance on citations see FAQs.

© [not recorded]

Version: [not recorded]

Link(s) to article on publisher’s website:

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online’s data policy on reuse of materials please consult the policies page.
Development and validation of a 3D lymph node-adipocyte co-culture system

S. Daya, A. Loughlin & H. MacQueen

Dept of Biological Sciences, The Open University, Milton Keynes, England

INTRODUCTION: White adipose tissue is involved in localised paracrine interactions with lymph node cells. Localised immune challenges with lipopolysaccharide stimulate the release of Tumour Necrosis Factor-α (TNF-α) and interleukins 4, 6, 8 and 10 from lymph node cells. This in turn directs adipocytes to respond by releasing fatty acids from their triacylglycerol stores. This mechanism is believed to be of great importance as it provides energy and metabolic precursors to the lymph node cells during the immune response.

We have developed a long term 3-dimensional co-culture system with adipocytes and lymph node cells for the purpose of investigating interactions between these cells in vitro. (Patent application number 0606764.9).

METHODS: Preadipocytes were isolated from the popliteal adipose tissue depot. The cells were expanded then seeded into a type I collagen gel. The preadipocytes were induced to differentiate over a 14 day period. The lymph node cells were isolated by teasing apart the node and releasing the cells into a petri dish containing culture medium. Present experimental work with the 3D system is aimed at introducing lymph node cells, in proportions similar to those found in intact lymph nodes, among differentiated adipocytes.

RESULTS: Differentiating preadipocytes in vitro showed multiple lipid droplet accumulation and similar protein expression patterns to those of mature adipocytes in vivo.

OVER 80% (n=10000) of lymph node cells were viable after isolation from the popliteal node and over 75% (n>5000) of these cells remained viable in the system. T cells were the major cell type (52.1%) among the mixed cell population isolated from the popliteal lymph node (assessed by flow cytometry), followed by B cells, dendritic cells and macrophages.

DISCUSSION & CONCLUSIONS: Present experimental work with the culture system is aimed at introducing lymph node cells, in proportions similar to those found in intact lymph nodes, among differentiated adipocytes and observing interactions and the establishment of a spatial relationship between them. Co-cultures will be used to investigate the lymph node adipocyte interactions following immune stimulation (lipopolysaccharide treatment) measuring production of inflammatory mediators (cytokines) and lipolytic activity.


ACKNOWLEDGEMENTS: This work is supported by a BBSRC studentship.