

AB064. 127. Evaluating the suitability and oncological safety of autologous breast cancer patient derived adipose derived stem cells for use in breast regeneration

Niamh O'Halloran, Katie Gilligan, Roisin Dwyer, Michael Kerin, Aoife Lowery

Lambe Institute for Translational Research, Discipline of Surgery, National University of Ireland Galway, Galway, Ireland

Background: Breast reconstruction improves quality of life for breast cancer patients requiring mastectomy. Limitations of implant reconstruction have directed research towards adipose-derived stem cells (ADSCs) to develop novel regenerative surgery approaches to breast reconstruction. Our aim was to investigate the regenerative potential and suitability of autologous ADSCs from breast cancer patients, focusing on the effect of adipose tissue depots and neoadjuvant chemotherapy (NAC).

Methods: ADSCs were isolated from the breast of patients undergoing primary breast cancer surgery and those having surgery post NAC, and abdomen of breast cancer patients

and healthy controls. A stem cell population was identified by flow cytometry and multilineage differentiation. Oil Red O quantified the adipogenic potential of isolated ADSCs. Expression of adipogenic and potential cancer driver genes was quantitated using real-time quantitative polymerase chain reaction (RQ-PCR). ADSC secretome was analysed for specific cytokines at early and late adipogenesis using Chemi-array and ELISA.

Results: ADSCs from 20 breast cancer patients (5 breast cancer, 5 breast post-NAC, 5 abdominal) and five controls were isolated and identified as a stem cell population by cell surface markers and demonstration of multilineage differentiation potential. The NAC group demonstrated better adipogenic potential than the breast cancer group. ADSCs post-NAC had lower expression of oncologic genes *VEGFA*, *HGF* and *FGF2* than the breast cancer group. Breast cancer ADSCs demonstrated increased expression of MMP-2, MMP-11 and FGF-2 in cell conditioned media.

Conclusions: The suitability and oncological safety of autologous ADSCs isolated from breast cancer patients is influenced by adipose tissue depot and neoadjuvant treatment.

Keywords: Breast reconstruction; mastectomy; tissue engineering

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