INTRODUCTION: The use of ASCs has recently been proposed to improve autologous fat transfer for soft tissue augmentation by increasing graft retention and quality. However, the safety of using ASCs in breast reconstructive surgery has not been addressed. The primary goal of this study was to determine the safety of using ASCs in fat transfer techniques related to breast reconstruction by investigating proliferation, and migration of estrogen receptor (ER) and progesterone receptor (PR) positive and negative breast cancer cell lines in the presence of ASC conditioned medium (CM).

METHODS: A wound healing assay was used to measure breast cancer cell migration in the presence of ASC CM. 3.5 x 10^5 MDA-MB-231 (ER/PR negative) or MCF-7 (ER/PR positive) breast cancer cells were plated in 12-well dishes and allowed to adhere for 24 hours. Cultures were incubated with CM at the following percentages: 0%, 20%, or 50% CM following a 'scratch' wound and were cultured for an additional 6 hours or 48 hours. Photographs of the cultures were taken at times 0 and 6 hours (MDA-MB-231), and 0 and 48 hours (MCF-7) and analyzed using Scion Image (Scion Corp., Frederick, MD) for percent gap closure.

RESULTS: ASC CM stimulated migration of MDA-MB-231 and MCF-7 breast cancer cells: MDA-MB-231 and MCF-7 cells exhibited an increase in gap closure by over 60% (P < 0.001) and 15% (P < 0.0001), respectively, after being exposed to 50% ASC CM. The data also indicate a greater dose-response between 20% and 50% CM in MDA-MB-231 when compared to MCF-7 (21.91% and 25.47% for MDA-MB-231, and 35.70% and 36.57% for MCF-7 at 20% and 50% CM, respectively).

CONCLUSIONS AND FUTURE DIRECTIONS: The increased migratory rate of breast cancer cells after exposure to ASC CM suggest that caution and further experimentation are needed to determine whether supplementation of autologous fat transfer with ASCs will be a safe practice for breast reconstruction. The angiogenic and metastatic properties of these ASCs co-cultured with breast cancer cell lines are currently being studied in vitro and in vivo.