Medical Xpress

Fat stem cells safe for breast reconstruction when cancer is dormant: study

September 16 2010

Fat-derived stem cells can be safely used to aid reconstruction of breast tissue after mastectomy as long as there is no evidence of active cancer, according to researchers at the University of Pittsburgh School of Medicine. Their findings are available in *Tissue Engineering Part A*.

Plastic surgeons have long moved fat from one part of the body into the breasts for reconstruction, but with some complications and a varying success rate, explained senior author Vera S. Donnenberg, Ph.D., assistant professor of surgery, Pitt School of Medicine. More recently, they have considered adding stem cells derived from adipose, or fat, tissue (ADSC) or the bone marrow to the transferred fat with the aim of supporting graft integration by enhancing new blood vessel formation.

"But it has not been clear whether these stem cells are safe for breast cancer patients because they could send growth signals that promote tumor reactivation or provide new blood vessels for the tumor," Dr. Donnenberg said. "Our research suggests that this risk is real if the patient still has active tumor cells, but is safe when the cells are inactive or resting."

For the study, the researchers collected adipose tissue that would have been discarded during "tummy tuck" procedures performed by study co-author J. Peter Rubin, M.D., associate professor of surgery, Pitt School of Medicine, whose team has several federally funded projects underway to develop fat grafting and stem cell therapies for reconstruction of a variety of tissues.

The researchers isolated ADSC from normal fat and mixed them with human breast cancer cells obtained directly from patients. After two weeks in culture they found that ADSC greatly encouraged the growth of tumor cells. In a followup experiment, the researchers injected small numbers of highly purified active or resting tumor cells under the skin of mice either with ADSC or with previously irradiated tumor cells. The combination of active tumor cells and ADSC led to dramatic tumor growth, while injections of resting tumor cells were not affected by co-injection of either ADSC or irradiated tumor cells.

"There is already some clinical evidence that breast reconstruction with transplanted fat is safe. Our findings lead us to conclude that augmentation of fat grafts with additional ADSC should be postponed until there is no evidence of active cancer," Dr. Donnenberg said. "Our data in the mouse suggest that dormant cancer cells are not sensitive to the growth signals sent by the ADSC."

Provided by University of Pittsburgh

Citation: Fat stem cells safe for breast reconstruction when cancer is dormant: study (2010, September 16) retrieved 4 May 2024 from https://medicalxpress.com/news/2010-09-fat-stem-cells-safe-breast.html