Nuclear transfer to reprogram adult patient cells into stem cells demonstrated

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The capacity to reprogram adult patient cells into pluripotent, embryonic-like, stem cells by nuclear transfer has been reported as a breakthrough by scientists from the US and the Hebrew University of Jerusalem.

The work, described in the journal *Nature*, was accomplished by researchers from the New York Stem Cell Foundation Research Institute and Columbia University and by Nissim Benvenisty, the Herbert Cohn professor of Cancer Research and director of the Stem Cell Unit at the Institute of Life Sciences at the Hebrew University of Jerusalem, and his graduate student Ido Sagi. The latter assisted in the characterization of the pluripotent nature of these cells.

Pluripotency means the ability of stem cells to develop into all the cells of our body, including those in the brain, heart, liver and blood. In 2012, the Nobel Prize in Physiology or Medicine was awarded for two discoveries showing that mature (differentiated) cells can be converted into pluripotent, embryonic-like cells, either by forced expression of genetic factors or by transfer of cell nuclei into female eggs, in a process called "reprogramming."

However, the actual ability to reprogram cells from humans by nuclear transfer had only been accomplished until now by using fetal cells for this purpose, until this latest work involving reprogramming of adult patient cells demonstrated by the researchers from the US and the Hebrew University, as described in the new Nature article.

Future research should allow further characterization of these novel, pluripotent cell types and their comparison to other stem cells. "Human pluripotent stem cells generated from adult cells may change the face of medicine," says Prof. Benvenisty, leading to totally new, personalized genetic therapy involving the reprograming of a patient's own cells to achieve cell replacement and healing.

More information: "Human oocytes reprogram adult somatic nuclei of a type 1 diabetic to diploid pluripotent stem cells." Mitsutoshi Yamada, et al. *Nature* (2014) DOI: 10.1038/nature13287. Received 04 February 2014 Accepted 27 March 2014 Published online 28 April 2014

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