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New insights into facial transplantation

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In 2009, the first face transplant was performed at Brigham and Women's Hospital (BWH), and lead surgeon, Dr. Bohdan Pomahac has been pioneering the procedure since. However, understanding the technical challenges, particularly around how the recipient accepts or rejects the donated face, is just beginning. Following any transplant, including facial transplant, T cells in the recipient mount an immune response to the donated tissue, threatening rejection. This process is successfully managed through immunosupression medication so that the recipient is able to tolerate the transplanted face. Now, researchers at BWH have made a discovery that provides new insight into the body's rejection process. Researchers have demonstrated that immune cells, or T cells, involved in the rejection process are significantly of donor origin. These findings are published in *Modern Pathology* on January 17, 2014.

"The conventional belief about face transplant was that rejection is directly related to the recipient T cells attacking the donor T cells of the face, which are perceived as foreign to the recipient's immune system," explained Christine Lian, MD, a skin pathologist at BWH and lead author of this study. "We now need to rethink this process. Based on our findings, it is clear that the donor T cells, which are transferred as part of the new face, play a significant role in the rejection process as well."

The researchers examined 131 face transplant biopsy specimens from a total of five patients who received a face transplant between 2009 and 2013 at BWH. The samples were examined by conventional microscopy for categorizing the level of rejection and guiding immunosuppressant

therapy, and additional antibody based biomarkers were also applied. The use of biomarkers allowed the researchers to differentiate between the donor and recipient cells under the microscope. Researchers found that during active rejection episodes, many to most of the immune cells in the face specimens that were involved in the rejection were of donor origin.

"The participation of these donor immune cells in face transplant rejection represents a paradigm shift in the understanding of the rejection process," explained George F. Murphy, MD, director of Dermatopathology at BWH and a senior author of this study. "One intriguing possibility that now exists is that the transplanted faces are not simply passive targets vulnerable to rejection, but carry along with them their own army of immune cells that may defend the face against attacking recipient cells in order to thwart the rejection process," says Murphy.

Researchers note that more studies need to be done to better understand these complex immune cell interactions, but these new findings will help to develop the best diagnostic and therapeutic strategies that, for the first time, will consider include immune cells from the donor as well as the recipient.

Provided by Brigham and Women's Hospital