Understanding immune system interplay to improve organ transplant success

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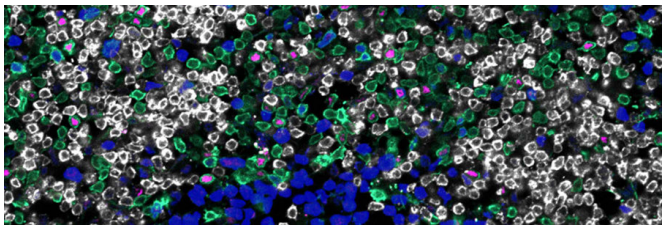

Credit: Babraham Institute

A rare opportunity to analyse both blood and tissue samples from human transplant recipients has allowed immunology researchers at the Babraham Institute to pinpoint how an immunosuppressive drug works to prevent the production of antibodies against the transplanted tissue. This understanding, gained through working together with transplant research immunologists in Oxford, may lead to improved ways of identifying transplant recipients at risk of rejection and treating autoimmune disease.

As described in a paper published today, the researchers assessed the effect of treatment with an immunosuppressive drug called tacrolimus on a type of immune cell called T follicular helper cells (Tfh). These cells are central to the production of antibodies and are a target of therapeutic strategies to manage unwanted destructive antibodies, for example in auto-immune diseases or in organ transplantation.

Blood and lymph nodes samples were analysed from 61 kidney transplant recipients, some of which had been treated with tacrolimus before the transplant operation. Using both blood and lymph node samples allowed the comparison of circulating immune cells with their counterparts residing in the lymph nodes.

The researchers identified that tacrolimus specifically reduced the number of both circulating Tfh cells and Tfh cells found in the lymph nodes. Confirming this is important for monitoring donor recipients post-transplant which can only be done using blood samples. Reduced numbers of Tfh cells overall would be expected to correlate with suppressed organ rejection whereas a high Tfh cell number would be indicative of an immune response potentially causing organ damage.

Babraham Institute group leader and joint senior author, Dr. Michelle Linterman, said: "Now we have identified tacrolimus as a drug that can inhibit T follicular helper cells and reduce the formation of antibodies, it suggests we can use this drug as a way to treat conditions where the action of T follicular helper cells is an underlying cause of disease."

These findings identify the diagnostic relevance of using Tfh cells as a biomarker to assess the immunosuppression status of organ recipients. They point to developments in patient care based upon the status of their immune system, giving a more accurate picture than allowed by current methods monitoring the levels of immunosuppressive drugs in the body.

More information: Elizabeth F. Wallin et al, The Calcineurin Inhibitor Tacrolimus Specifically Suppresses Human T Follicular Helper Cells, *Frontiers in Immunology* (2018). DOI: 10.3389/fimmu.2018.01184

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