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FOXP3+ T regulatory cell ameliorates vascular integrity in the rejection of mouse orthotopic airway allografts

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Microvascular loss may be a root cause of chronic rejection in lung transplants, which leads to the bronchiolitis obliterans syndrome. Previous research implicates T regulatory cell (Treg) as a key component of immune modulation, however, Treg has never been examined as a reparative mediator to salvage microvasculature during transplantation. Here, we reconstituted purified Tregs in to orthotopic airway allografts, and serially monitored allografts for tissue oxygenation, microvascular perfusion for four weeks. We demonstrated that Tregs reconstitution significantly improve graft tissue oxygenation, microvascular flow, epithelial repair, number of CD4+CD25highFOXP3+ Tregs, followed by an upregulation of proinflammatory, angiogenic and regulatory genes, while prevented subepithelial deposition of CD4+T cells at d10, and collagen at d28 post-transplantation. Altogether, these findings demonstrated that Treg-mediated immunotherapy has the potential to preserve microvasculature and rescue allograft from sustained hypoxic/ischemic phase, limits airway tissue remodeling, and therefore may be a useful therapeutic tool to prevent chronic rejection after organ transplantation.

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