

LETTER TO THE EDITORS

# Effect of rituximab on anti-donor T-cell responses

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Both the authors wrote the letter.

Dear Editors,

We read with interest the paper by Schachtner et al in the March issue of *Transplant International* [1], reporting that (i) the presence of anti-donor IFN- $\gamma$  producing T-cells pretransplantation, measured by ELISPOT, was predictive of T-cell-mediated rejection (TCMR) particularly after ABOi transplantation, but less so after ABOc transplantation and (ii) a reduced proportion of patients developed anti-donor IFN- $\gamma$  producing T cells after ABOi compared with after ABOc. They postulated several reasons for their findings, including the impact of rituximab used during their ABOi induction protocol.

We believe our published observations using ELISPOT are pertinent to help interpreting Schachtner's data. We have documented anti-donor-specific IFN- $\gamma$  production by CD4<sup>+</sup> T cells by ELISPOT, in two cohorts of transplant recipients with chronic rejection [2–4]. By adding whole donor protein preparations into CD8-depleted PBMC, the ELISPOT assays in our studies measured the activity solely of the sensitized indirect pathway of allorecognition. Although Schachtner et al used whole donor PBMC, so were potentially measuring a combination of direct and indirectly reactive anti-donor cells, the data they present suggest that they too were mostly detecting indirect alloreactivity. TCMR involves T cells with both direct and indirect allospecificity [5]. We also compared the IFN- $\gamma$  produced when CD25<sup>+</sup> regulatory T cells or CD19<sup>+</sup> B cells were depleted from PBMC, to infer the functional impact of these cells on anti-donor responses.

We showed that B lymphocytes play an important role as antigen-presenting cells for IFN- $\gamma$  production by indirect

pathway anti-donor T cells [2]. However, responses were complex, with evidence in some patients that IFN- $\gamma$  production was regulated either by CD4<sup>+</sup>CD25<sup>+</sup>CD39<sup>hi</sup> regulatory T cells or by CD10<sup>+</sup>CD24<sup>+</sup>CD38<sup>+</sup> transitional B cells. We could associate these patterns of anti-donor responsiveness with rate of deterioration in graft function in both cohorts [3,4], suggesting that the ELISPOT was measuring activity of immune cells involved in damaging the graft. Importantly, we showed that optimizing immunosuppression could stabilize graft function, in association with either increased regulation of anti-donor activity by Tregs or transitional cells or complete suppression of activity. In contrast, we found that rituximab, which depleted >95% of all circulating B cells for a prolonged period, led to a prolonged reduction in the relative proportion of transitional B cells but maintained the relative proportion of memory B cells. Thus, it abolished all evidence of B-cell regulation in ELISPOTS, but did not reduce the proportion of ELISPOTS showing B-cell-dependent anti-donor IFN- $\gamma$  production.

We believe these findings are highly pertinent and provide a context that helps understand those reported by Schachtner et al. By depleting most B cells for a prolonged period, rituximab removes an important antigen-presenting cell population for indirect alloreactive T cells, explaining the reduction in de novo anti-donor activity post-ABOi transplantation. But by selectively reducing the relative proportion of transitional B cells but not memory B cells, rituximab also potentially enhances the relative strength of pre-existing anti-donor IFN- $\gamma$  indirect pathway alloresponses capable of mediating TCMR.

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## Conflict of interest

The authors have declared no conflicts of interest.

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