

Transplantation immunology

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This Special Focus on Transplantation Immunology issue of *Chimerism* features papers focusing on the role of chimerism in transplantation immunology. The field of immunologic tolerance, which owes its origins to an experiment of nature resulting in hematopoietic mixed chimerism,¹ is the subject of our featured Forum article—a debate between Jeff Mold and Colin Anderson on the implications for tolerance of the layered development of the human immune system (p. 62).² Jeff argues that different species (e.g., mice vs. humans) have different solutions to achieve tolerance, with a preponderance of Treg in fetal life being critical for primates, while Colin considers the primary rules for tolerance are instead conserved and argues for the primacy of central tolerance.

The impact of fetal chimerism resulting from pregnancy on the outcome of organ transplantation in women of childbearing age is the subject of a Cutting Edge View

by Ma et al., which considers the immunologic consequences of the melange of donor-, grandmother-, and fetal-derived cells present in the transplant recipient (p. 71). Miura et al. review the literature on mesenchymal stromal cells, and their apparent benefit as an addition to hematopoietic stem cell transplantation, despite their lack of successful long-term engraftment (p. 78).

Original Research Papers by Hirayama et al. (p. 84), Solgi et al. (p. 87) and Kornblit et al. (p. 95) add to the growing literature on diagnostic and therapeutic uses of chimerism in transplantation. Finally, an addendum to previously published article by van Besien et al.³ attempts to deal with the relationship of maternal microchimerism to success of umbilical cord blood transplantation success as an anti-leukemia treatment, originally proposed by van Rood and colleagues (p. 102).⁴

The cover art was provided by Louise McCune, and depicts the artist's conception of the layered development of the human immune system, from the regulation-dominant fetal immune system, to the emergence at birth of an aggressive defense of the host from pathogens.

References

- Owen RD. Immunogenetic consequences of vascular anastomoses between bovine twins. *Science* 1945; 102:400-1; PMID:17755278; <http://dx.doi.org/10.1126/science.102.2651.400>
- Mold JE, Venkatasubrahmanyam S, Burt TD, Michaëlsson J, Rivera JM, Galkina SA, Weinberg K, Stoddart CA, McCune JM. Fetal and adult hematopoietic stem cells give rise to distinct T cell lineages in humans. *Science* 2010; 330:1695-9; PMID:21164017; <http://dx.doi.org/10.1126/science.1196509>
- Van Besien K, Liu H, Jain N, Stock W, Artz A. Umbilical cord blood transplantation supported by third-party donor cells: rationale, results, and applications. *Biol Blood Marrow Transplant* 2013; 19:682-91; PMID:23142329; <http://dx.doi.org/10.1016/j.bbmt.2012.11.001>
- van Rood JJ, Scaradavou A, Stevens CE. Indirect evidence that maternal microchimerism in cord blood mediates a graft-versus-leukemia effect in cord blood transplantation. *Proc Natl Acad Sci U S A* 2012; 109:2509-14; PMID:22232664; <http://dx.doi.org/10.1073/pnas.1119541109>