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In the Spotlight

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Pregnancy-Induced Immune Changes Impact Cardiovascular Function Postpartum

During pregnancy, the maternal immune system plays a central role as it suffers significant alterations in order to promote the required immune tolerance that allows the semiallogeneic fetus to thrive.[1,2] These immunological changes are complex and have been the object of intensive investigation, with many recent reports published herein[3-9] and elsewhere.[10,11] Despite this work, the topic is far from being completely understood and continues to be on the forefront of scientific research.

It has been demonstrated that during pregnancy, there is an expansion of regulatory T cells, CD18 T cells specific for paternal and fetal antigens and enhanced turnover in other leukocyte populations. In addition, it has been shown in mice that many of these T-cell regulatory changes persist postpartum and have an impact on subsequent pregnancies and on the subsequent maternal immune response. Moreover, T-cell subset manipulation has also revealed modified cardiovascular abnormalities during normal rodent pregnancy and in rodent models of pregnancy-associated hypertension.[2] However, how these T-cell regulatory changes contribute to postpartum maternal cardiovascular behavior has not been fully examined and the question of whether altered immunity modifies pregnancy-induced changes in the vascular system remains unanswered.

In the current issue, Bonney and colleagues explore this topic by comparing changes in function and remodeling of systemic resistance vessels 4 weeks postpartum in normal C57BL/6 (B6) and immune-deficient mice, the recombinase 1-deficient/B6 ($Rag1^{-/-}$), which have genetic absence of T and B cells, but have natural killer T cells, in order to focus on the critical role of the adaptive immunity.[12]

Their results show that immune deficiency did not change responsiveness to acetylcholine (ACh) and phenylephrine at baseline but decreased arterial distensibility and increased stiffness postpartum. Adoptive transfer of CD8 T cells into $Rag1^{-/-}$ mice decreased response to ACh while increasing distensibility and wall thickness. Additionally, Bonney and colleagues observed that the postpartum vessels from CD4-deficient mice, which have B cells and CD8 T cells, but no CD4 cells, show increased distensibility and decreased responsiveness to ACh as compared to postpartum $Rag1^{-/-}$, in a pattern similar to that seen in $Rag1^{-/-}$ given CD8 T cells prior to mating.

Altogether, the studies presented by Bonney et al suggest that T cells and their associated factor, particularly the CD8 T cells, play a key role in the postpartum remodeling of maternal resistance vessels. This highlights the importance of pregnancy-induced immune changes in the subsequent cardiovascular maternal response.

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