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The concept of immune privilege was previously considered a phenomenon restricted to tissues such as brain, eye and pregnant uterus. However, the definition of immune privilege has been extended to other forms of modified immune responses, such as the “impaired” immune response to tumors. Both cancer cells and cells of the developing placenta (trophoblasts) create a microenvironment supportive of immunologic privilege and angiogenesis. For instance, cancer cells similar to trophoblasts actively modulate the host immune response by promoting regulatory T cells, inducing M2-polarized macrophages, and preventing cytotoxicity by NK cells and cytotoxic T cells. By comparing immunologic patterns within physiologic (placenta) and pathologic (cancer) tissues, we have an opportunity to identify common immune suppressive pathways that can serve as targets to overcome immune exhaustion in patients with cancer. Furthermore, placental materials from healthy and complicated pregnancies are readily available and offer the opportunity of understanding basic mechanisms of immune tolerance (in healthy pregnancy) and immune rejection (during complicated pregnancy). We envision that the understanding of mechanisms of tolerance within immune-privileged organs will provide insights into the mechanisms influencing tumor-immune escape as well as novel strategies to enhance immunity to cancer.

Selected Publications

Appearance and disappearance of the mRNA signature characteristic of Treg cells in visceral adipose tissue: age, diet, and PPARγ effects.
Cipolletta D, Cohen P, Spiegelman BM, Benoist C, Mathis D.
Proc Natl Acad Sci USA. 2015 Jan 13;112(2):482-7.

Consortium biology in immunology: the perspective from the Immunological Genome Project.

Benoist C, Lanier L, Merad M, Mathis D, Immunological Genome Project.
Nat Rev Immunol. 2012 Oct;12(10):734-40.

PPAR-γ is a major driver of the accumulation and phenotype of adipose tissue Treg cells.
Cipolletta D, Feuerer M, Li A, Kamei N, Lee J, Shoelson SE, Benoist C, Mathis D.
Nature. 2012 Jun 28;486(7404):549-53.

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