

T cells



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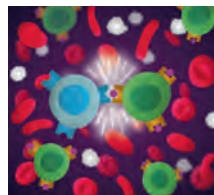
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Close-up view of a T cell detecting a specific antigenic peptide presented by a target cell. Credit: Chris Ryan/Springer Nature Limited

T cells are crucial components of the immune system that provide protection from infection and maintain immune homeostasis, but in the wrong context they can contribute to immunopathology and disease. Here we highlight important moments since their first description and discovery in 1961, and the subsequent development of the topic of T cell biology and its therapeutic potential.

From the initial description of the function of the thymus and the first reference to T cells by Jacques Miller, Max Cooper and colleagues ([Milestone 1](#)), a new immunological era of adaptive immunology was born, and T cell biology rapidly evolved in line with the technological advances of the past half century. Global efforts have led to a deeper understanding of the development and composition of the T cell compartment and of the characteristic immunobiology of effector and regulatory populations, in addition to their varied functions in immunopathology, spanning autoimmunity, cancer, allergy and infectious diseases.

These insights have advanced the overall understanding of the immune system, contributing to the 1996 Nobel prize awarded to Peter C. Doherty and Rolf M. Zinkernagel for establishing and exploring the role of T cells in protection from viral infection. Building on the foundations of T cell immunology, a range of translational applications and approaches have resulted in new therapeutic interventions. For example, the 2018 Nobel prize was awarded to James P. Allison and Tasuku Honjo for their work on CTLA-4 and PD-1 that subsequently led to immune checkpoint blockade and an explosion in cancer immunotherapy research. Furthermore, the world has witnessed the accelerated design and global application of efficacious vaccines that engage and induce immunological protection, including T cell immunity, to counter emerging infectious diseases, including COVID-19.

The Milestones and papers featured here represent the efforts and work of numerous research teams that together have sequentially defined and shaped the understanding of T cell biology. These Milestones are by no means an exhaustive list, and we acknowledge the large body of work and contributions to the field of T cell biology that have not been included. We apologize in advance for any such omissions and extend our gratitude to all the researchers who have advised and contributed to this endeavour. We hope the interactive timeline, video and animation content available in the online version provide a celebratory overview of T cell biology.

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