Microrganismi ed evasione della risposta immunitaria aa 2025-2026

Mayr L et al. (2017) Langerhans cells: the 'Yin and Yang' of HIV restriction and transmission. Trends in Immunology. 25:170-172.

Martín-Moreno A et al. (2019) Dendritic Cells, the Double Agent in the War Against HIV-1. Frontiers in Immunology. 10:2485.

Cambier CJ, Falkow S, Ramakrishnan L. (2014) Host evasion and exploitation schemes of Mycobacterium tuberculosis. Cell. 159:1497-509.

Hmama Z et al. (2015) Immunoevasion and immunosuppression of the macrophage by Mycobacterium tuberculosis. Immunol Rev. 264:220-32.

Ramakrishnan L. (2020) Mycobacterium tuberculosis pathogenicity viewed through the lens of molecular Koch's postulates Curr Opin Microbiol. 54:103-110

Young D et al. (2002) Chronic bacterial infections: living with unwanted guests
Review Nat Immunol. 3:1026-32.

Trends Microbiol. 2017 Mar;25(3):170-172. doi: 10.1016/j.tim.2017.01.009. Epub 2017 Feb

Langerhans Cells: the 'Yin and Yang' of HIV Restriction and Transmission.

Mayr L, Su B, Moog C

Abstract Langerhans cells are specialized sentinels present in the epidermis expressing Langerin, a specific C-type lectin receptor involved in HIV capture and destruction. Recently, the specific mechanism leading to this HIV restriction was discovered. Nevertheless, Langerhans cells can be infected and the way HIV escapes this restriction needs to be unraveled.

Frontiers in Immunol. 10, 2485 2019 Oct 23 eCollection 2019

Dendritic Cells, the Double Agent in the War Against HIV-1

Alba Martín-Moreno [1, 2], Mª Angeles Muñoz-Fernández

Abstract Human Immunodeficiency Virus (HIV) infects cells from the immune system and has thus developed tools to circumvent the host immunity and use it in its advance. Dendritic cells (DCs) are the first immune cells to encounter the HIV, and being the main antigen (Ag) presenting cells, they link the innate and the adaptive immune responses. While DCs work to promote an efficient immune response and halt the infection, HIV-1 has ways to take advantage of their role and uses DCs to gain faster and more efficient access to $CD4^+$ T cells. Due to their ability to activate a

specific immune response, DCs are promising candidates to achieve the functional cure of HIV-1 infection, but knowing the molecular partakers that determine the relationship between virus and cell is the key for the rational and successful design of a DC-based therapy. In this review, we summarize the current state of knowledge on how both DC subsets (myeloid and plasmacytoid DCs) act in presence of HIV-1, and focus on different pathways that the virus can take after binding to DC. First, we explore the consequences of HIV-1 recognition by each receptor on DCs, including CD4 and DC-SIGN. Second, we look at cellular mechanisms that prevent productive infection and weapons that turn cellular defense into a Trojan horse that hides the virus all the way to T cell. Finally, we discuss the possible outcomes of DC-T cell contact.

Cell. 2014 Dec 18;159(7):1497-509. doi: 10.1016/j.cell.2014.11.024.

Host evasion and exploitation schemes of Mycobacterium tuberculosis.

Cambier CJ, Falkow S, Ramakrishnan L.

Abstract

Tuberculosis, an ancient disease of mankind, remains one of the major infectious causes of human death. We examine newly discovered facets of tuberculosis pathogenesis and explore the evolution of its causative organism Mycobacterium tuberculosis from soil dweller to human pathogen. M. tuberculosis has coevolved with the human host to evade and exploit host macrophages and other immune cells in multiple ways. Though the host can often clear infection, the organism can cause transmissible disease in enough individuals to sustain itself. Tuberculosis is a near-perfect paradigm of a host-pathogen relationship, and that may be the challenge to the development of new therapies for its eradication.

Immunol Rev. 2015 Mar;264(1):220-32. doi: 10.1111/imr.12268.

Immunoevasion and immunosuppression of the macrophage by Mycobacterium tuberculosis.

Hmama Z[1], Peña-Díaz S, Joseph S, Av-Gay Y.

Abstract

By virtue of their position at the crossroads between the innate and adaptive immune response, macrophages play an essential role in the control of bacterial infections. Paradoxically, macrophages serve as the natural habitat to Mycobacterium tuberculosis (Mtb). Mtb subverts the macrophage's mechanisms of intracellular killing and antigen presentation, leading ultimately to the development of tuberculosis (TB) disease. Here, we describe mechanisms of Mtb uptake by the macrophage and address key macrophage functions that are targeted by Mtb-specific effector molecules enabling this pathogen to circumvent host immune response. The macrophage functions described in this review include fusion between phagosomes and lysosomes, production of reactive oxygen and nitrogen species, antigen

presentation and major histocompatibility complex class II expression and trafficking, as well as autophagy and apoptosis. All these are Mtb-targeted key cellular pathways, normally working in concert in the macrophage to recognize, respond, and activate 'proper' immune responses. We further analyze and discuss major molecular interactions between Mtb virulence factors and key macrophage proteins and provide implications for vaccine and drug development.

Review Curr Opin Microbiol . 2020 Apr:54:103-110. doi: 10.1016/j.mib.2020.01.011

Mycobacterium tuberculosis pathogenicity viewed through the lens of molecular Koch's postulates

Lalita Ramakrishnan [1]

Abstract

Thirty years ago Stanley Falkow formulated molecular Koch's postulates as a framework to help dissect the contribution of microbial genes to their pathogenicity (Box 1). Three years later, his advice led me to develop Mycobacterium marinum, a close genetic relative of Mycobacterium tuberculosis, as a model for tuberculosis pathogenesis. Here, I discuss insights into M. tuberculosis pathogenicity from studying M. marinum in the zebrafish, and frame them in terms of molecular Koch's postulates. The highly orchestrated life cycle of M. tuberculosis is achieved in substantial measure not by "traditional" pathogen-exclusive virulence genes acquired along its evolutionary history, but rather by genes that are shared with its environmental ancestors. Together, these genes support its tactics of subterfuge and exploitation to overcome host immunity so as to produce the transmissible disease that ensures the evolutionary survival of this obligate human pathogen.

Review Nat Immunol. 2002 Nov;3(11):1026-32.
doi: 10.1038/ni1102-1026.

Douglas Young, Tracy Hussell, Gordon Dougan

Chronic bacterial infections: living with unwanted guests

Abstract

Some bacterial pathogens can establish life-long chronic infections in their hosts. Persistence is normally established after an acute infection period involving activation of both the innate and acquired immune systems. Bacteria have evolved specific pathogenic mechanisms and harbor sets of genes that contribute to the establishment of a persistent lifestyle that leads to chronic infection. Persistent bacterial infection may involve occupation of a particular tissue type or organ or modification of the intracellular environment within eukaryotic cells. Bacteria appear to adapt their immediate environment to favor survival and may hijack essential immunoregulatory mechanisms designed to minimize immune pathology or the inappropriate activation of immune effectors.