

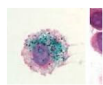
Physiopathological mechanisms in granuloma

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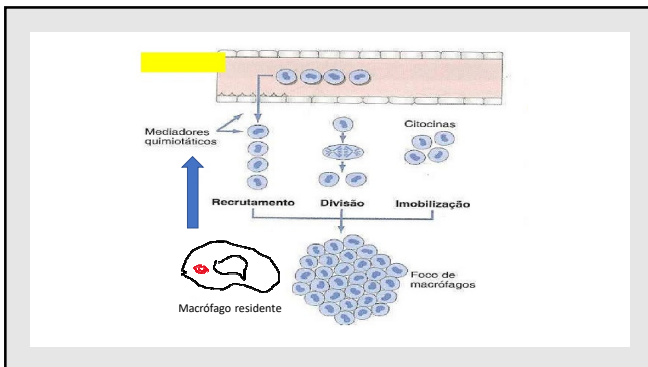
- "Physiopathological" is an adjective that means relating to or characteristic of physiopathology, which is the study of the altered bodily functions and processes that occur due to a disease or injury. It combines physiology (the study of normal body function) with pathology (the study of disease) to understand the underlying physical changes and mechanisms of illness.

AI Macrophages are specialized immune cells that are essential for the permanence of tattoos by engulfing and containing ink particles in the skin. During the tattooing process, these "big eaters" swallow the foreign ink pigments, which they cannot fully digest. Because the macrophages are unable to break down the ink, they become saturated and remain in the dermis. When a [tattooed macrophage](#) dies, it releases the ink, which is then ingested by new, incoming macrophages, creating a continuous cycle that keeps the ink in place.



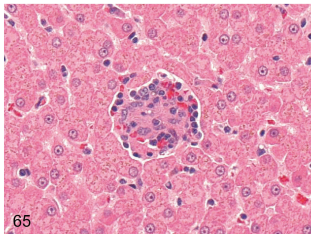
Granuloma

- A granuloma forms when the immune system can't eliminate a harmful substance, such as a persistent infection or foreign material, leading to the formation of a localized cluster of immune cells.
- Macrophages, or [histiocytes](#), are central to this process, as they attempt to contain and digest the "dangerous" substance. When macrophages can't break down the substance, they differentiate into [epithelioid cells](#) and some fuse to form [multinucleated giant cells](#).
- These cells, along with other immune cells like T lymphocytes and dendritic cells, then aggregate to form a granuloma, which functions to isolate and wall off the irritant, preventing its spread.

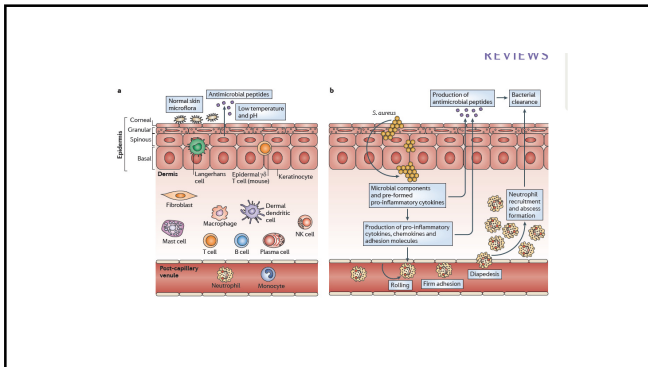


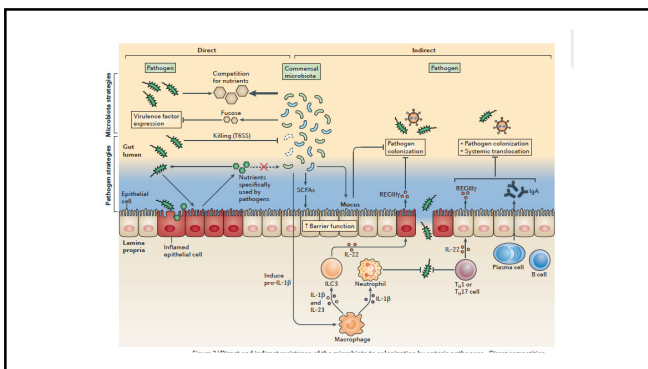
Liver: Microgranuloma.

Microgranuloma is accumulation of inflammatory cells, mainly macrophages, lymphocytes and a small number of neutrophils, and may be associated with minute necrosis of hepatocytes. It is found frequently.


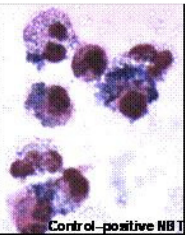


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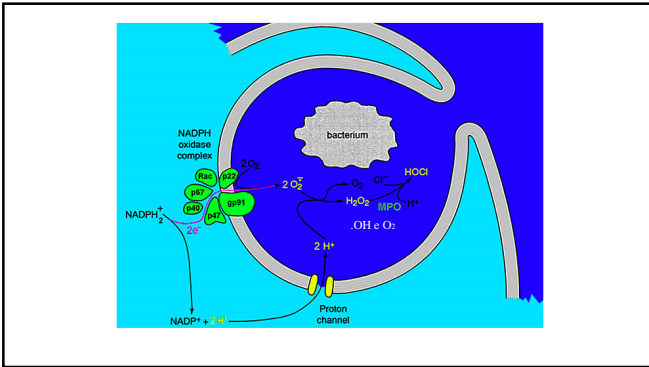


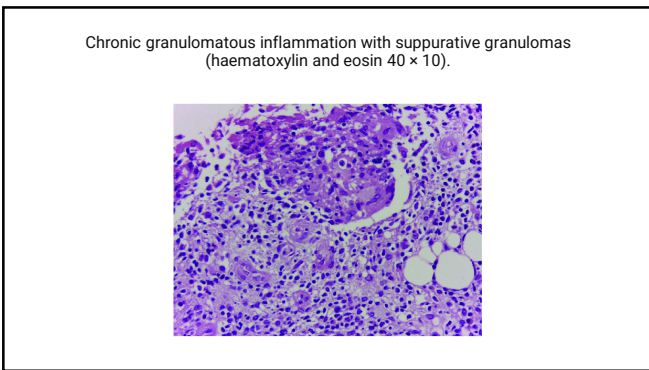


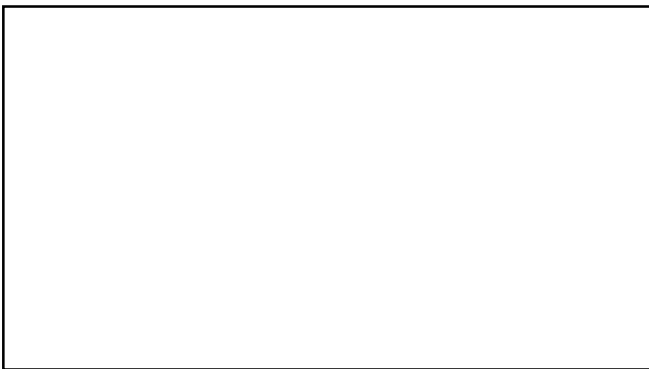
Chronic Granulomatous Disease (CGD) is caused by defects in an enzyme, NADPH oxidase, that phagocytes need to kill certain bacteria and fungi. Mutations in one of five different genes can cause these defects.

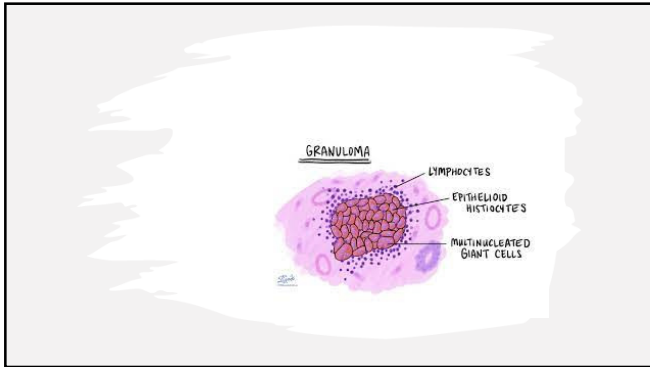



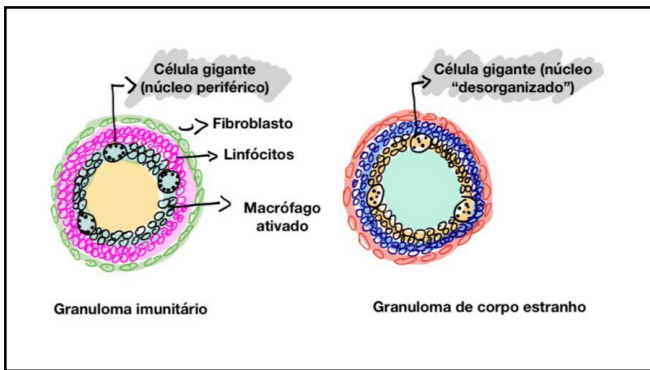
X91⁺ CGD-negative NBT
Control-positive NBT

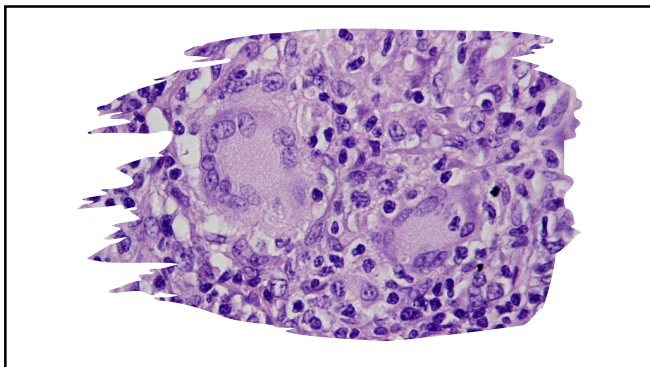


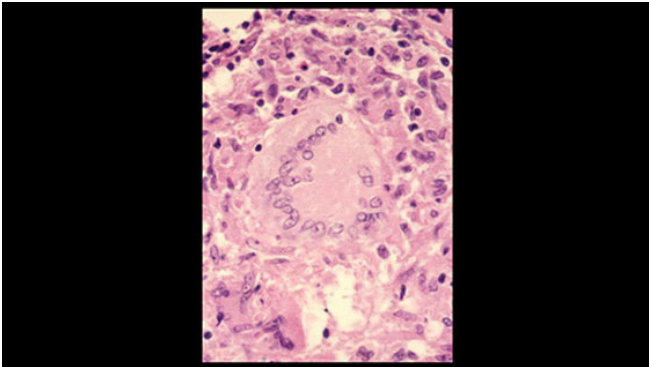


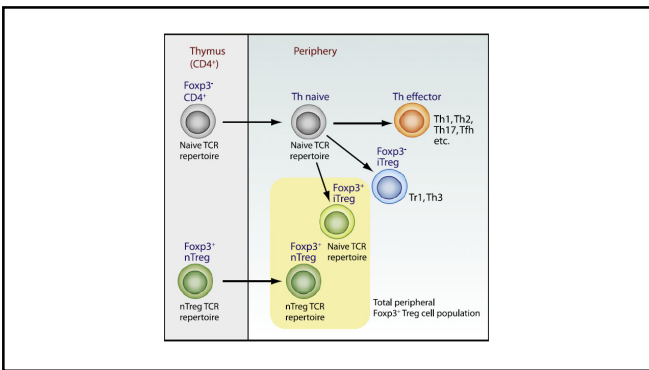


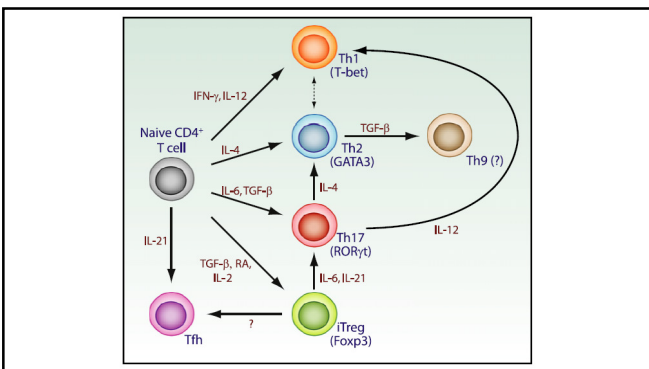


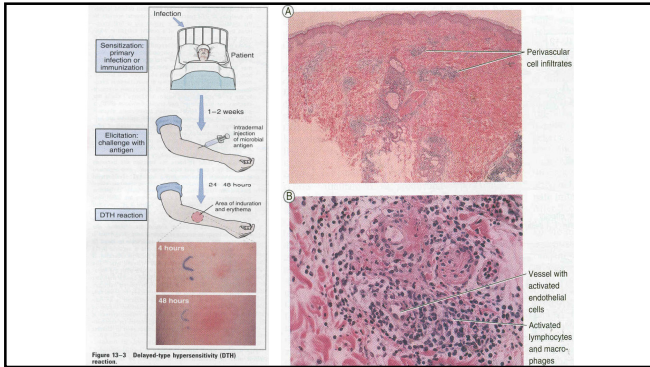


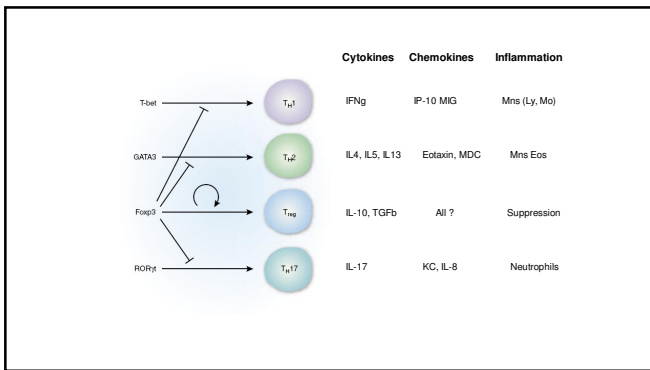


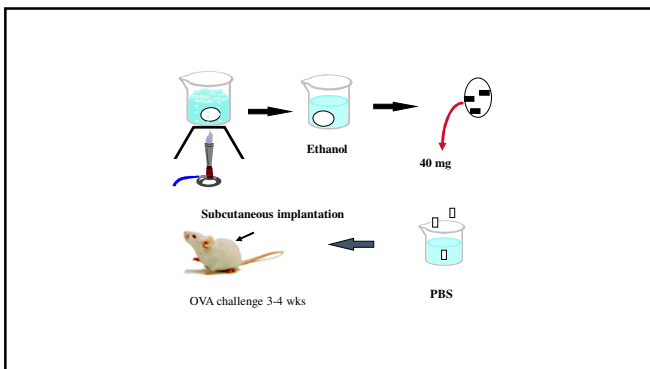


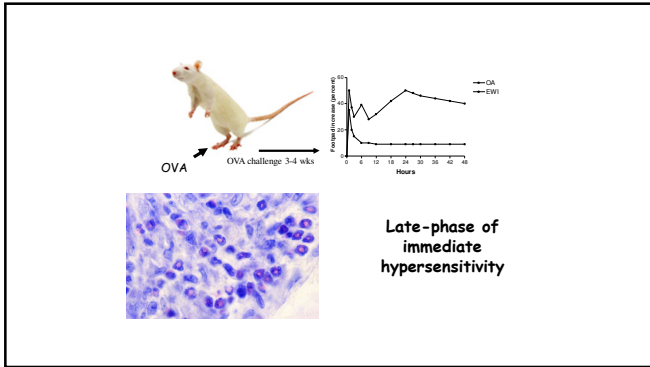


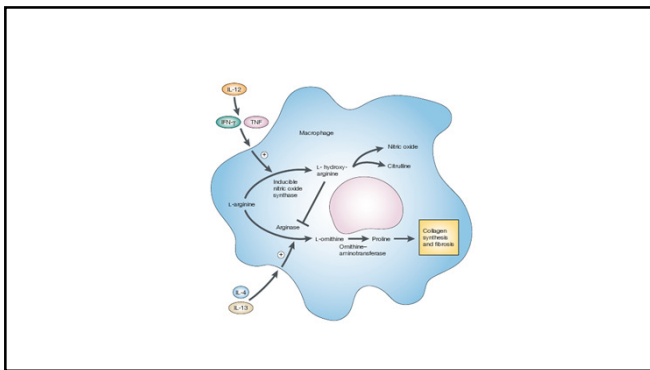


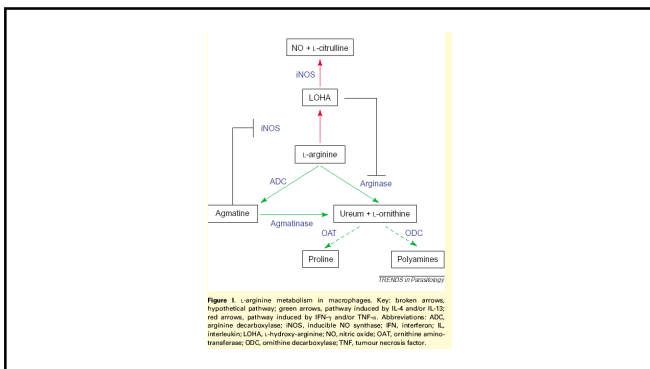


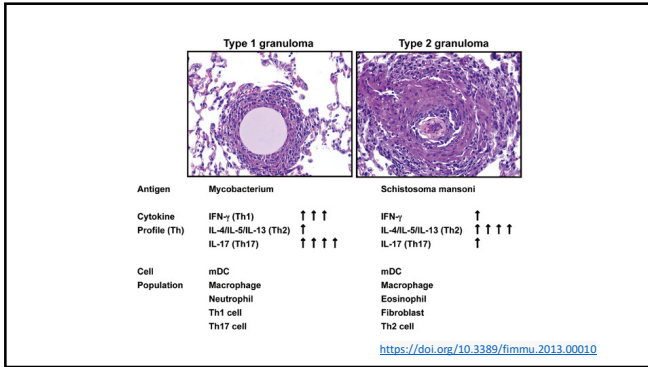


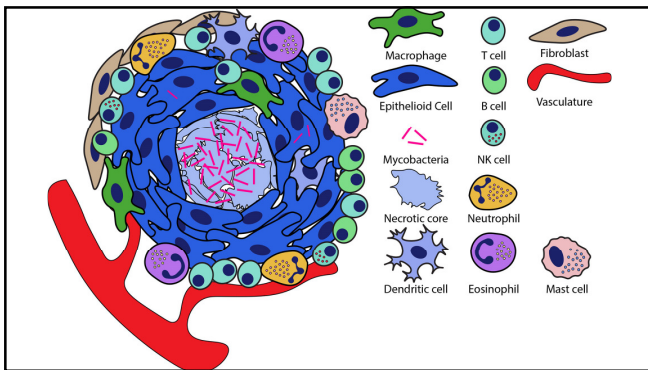


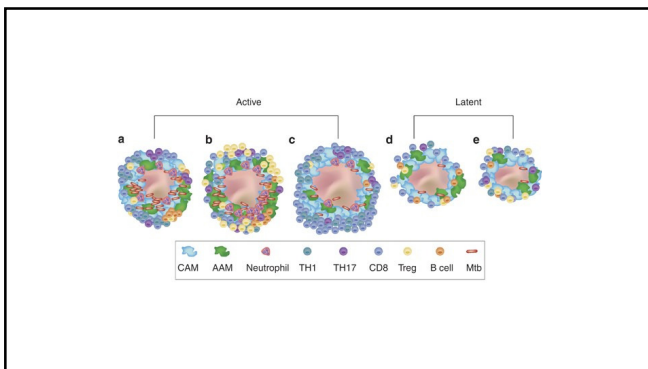


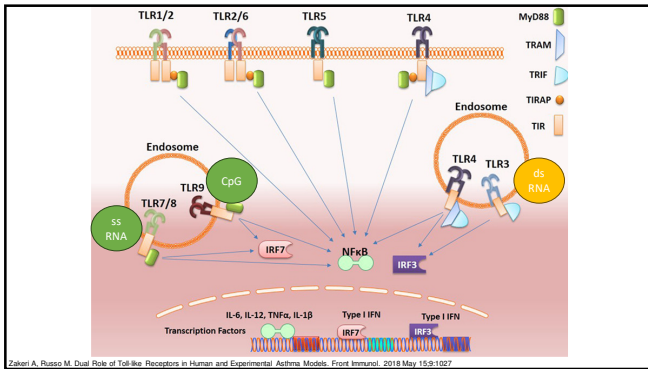


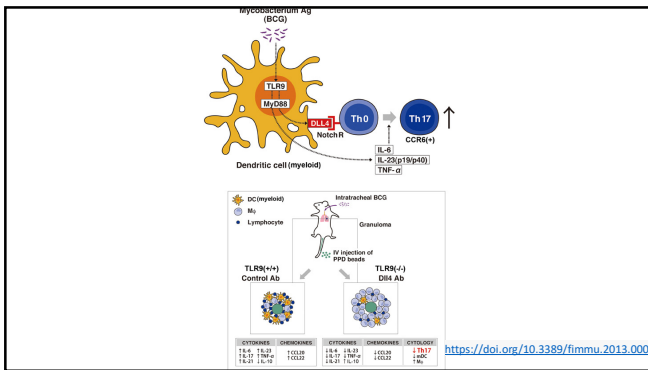












The TLR9-Notch ligand (dII4) on *Mycobacterium*-dependent granuloma formation.

- Myeloid DCs (mDCs) play an important role in inducing the differentiation of Th17 cells through the TLR9 effector pathway that upregulates the Notch ligand dII4.
- In vivo* granuloma formation induced by BCG/*Mycobacterium* Ag demonstrates larger granuloma formation in TLR9-knockout mice (TLR9^{-/-}) with decreased numbers of Th17 cells (CCR6⁺) and mDCs in the lungs when compared with lung granulomas from WT mice.
- Further, TLR9^{-/-} mice showed an increase in IL-10 with a concomitant decrease in Th17 cell-related cytokines (IL-17, IL-6, IL-21, IL-23, and TNF-α) and a decrease in the levels of the chemokines CCL20 and CCL22, important for DC migration, compared with levels in WT mice.
- The decreased expression of dII4 and the perturbation of the indicated cytokine and chemokine expression levels led to the abrogation of the Th17 phenotype in the
- Anti-DII4 Ab treated mice with the concomitant increase in granuloma size. Accompanying these phenomena, there was a decrease in Th17 cells and mDCs in the lungs of Anti-DII4 Ab treated mice and an increase in lung macrophages.

