Hypersensitivity Type IV

Type IV hypersensitivity, also known as delayed-type hypersensitivity, involves T-cell activation after being presented antigens by antigen presenting cells. Macrophages are activated and cytokines are released, leading to tissue injury.



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Delayed-Type Hypersensitivity
Delayed-sign
Type IV hypersensitivity is also known as delayed-type hypersensitivity, which leads to immune inflammation 1-10 hours after exposure to the antigen.

T Cell Mediated
Tennis Ball
This hypersensitivity is T-cell mediated, and involves CD4⁺ and CD8⁺ cells. Antigen presenting cells (APCs) cause CD4⁺ cells to secrete cytokines, activate phagocytes, and recruit neutrophils, which leads to tissue injury. Some types of delayed-type hypersensitivity signal the CD8⁺cells to directly kill tissue.

Antibody Independant
Ant-tie-body Independence-protest
It is important to know that this process is antibody Independent. T lymphocytes encounter antigens by APCs and directly react.

Macrophages Activated
Mac-men Activated
After encountering APCs (antigen-presenting cells), CD4⁺T Cells activate macrophages, which serve to eliminate the offending antigen. The cost of this, however, is sustained, continued inflammation and tissue injury.

Examples

Transplant Rejection
Train-plant Derailed
Delayed hypersensitivity also plays a major role in chronic transplant rejection as a result of cytotoxic T cell destruction of donor cells (host versus graft rejection) or recipient cells (graft versus host rejection).

PPD Skin Test
Pea-PD officer
The tuberculin reaction, Mantoux test, or PPD, where the protein-containing antigen of the tuberculin bacillus is injected intracutaneously. In previously exposed patients induration and reddening occurs within 8-12 hours and peaks at 24-72 hours. It occurs because of accumulation of mononuclear cells, CD4+ T cells and macrophages.

Contact Dermatitis
Contact-sports Dermatologist examining rash
Contact dermatitis is another example of DTH (delayed-type hypersensitivity), and can occur from contact with the antigenic component of poison ivy or oak. It causes vesicular dermatitis in areas of contact.

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