

Cell –mediated(Type IV) Hypersensitivity

Learning objectives: At the end of lecture, the students should be able to:

- 1-Define cell-mediated(type IV) hypersensitivity.
- 2-Define delayed type hypersensitivity,
- 3-Describe the morphological features of cell-mediated hypersensitivity.
- 4-Explain the sequence of cellular events in delayed type hypersensitivity.
- 5-Discuss types, sources, actions of cytokines in delayed type hypersensitivity.
- 6-Define T cell-mediated cytotoxicity.
- 7-Explain the mechanisms of T cell-mediated cytotoxicity.

Cell-mediated (Type IV) hypersensitivity

- Definition.

- Pattern of immunologic response:

- 1-variety of intracellular microbiologic agents {such as a bacterium [*Mycobacterium tuberculosis*], viruses, fungi, protozoa, and parasites.}

- 2-skin sensitivity to chemical agents.

- 3-graft rejection.

- 4-many autoimmune diseases.

Forms of cell-mediated (type IV) hypersensitivity

-Forms:

1-Delayed type hypersensitivity (CD4+helper T lymphocytes.

2-T cell-mediated cytotoxicity (CD8+ T cell)

Delayed type hypersensitivity

- Definition.
- Examples(such as tuberculin reaction)
a protein-lipopolysaccharides component of the tubercle bacillus.

Features of delayed type hypersensitivity

-Morphology:

- * At site of reaction reddening and induration.
- Dermal edema and deposition of fibrin in interstitium.
- *hypertrophy and hyperplasia of endothelial cells.
- *Presence of CD4+(helper) T lymphocytes.
- *Presence of granuloma and granulomatous inflammation.

Cellular events in delayed type hypersensitivity

- Antigen presenting cells.
- CD4+ T cells.
- TH1 cells----Cytokines secretion.

Cytokines secretion in delayed type hypersensitivity

-Sources.

-Types.

- *Interleukine-12 (IL-12).

- *Interferon-gamma (IFN-).

- *Interleukine-2 (IL-2).

- *Tumor necrosis factors (TNF).

- *Chemokines

-Actions.

T cell-mediated cytotoxicity

- Definition.
- Examples.
- The role of cytotoxic T lymphocytes(CTLs) in:
 - 1-elimination of virus-infected cell.
 - 2-tumor immunity.

Mechanisms of T cell-mediated cytotoxicity

-Mechanisms:

1-Perforine-granzyme-dependent killing.

2-Fas-Fas Ligand-dependent killing.

Questions:

- Q1) Describe the histopathological features of granuloma in delayed type hypersensitivity.
- Q2) Describe the histopathological features of contact dermatitis.
- Q3) Discuss the mechanism of perforine-granzyme pathway.
- Q4) Discuss the mechanism of fas-fas ligand pathway.
- Q5) Explain the roles of cytokines in pathogenesis of T cell-mediated injury.

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