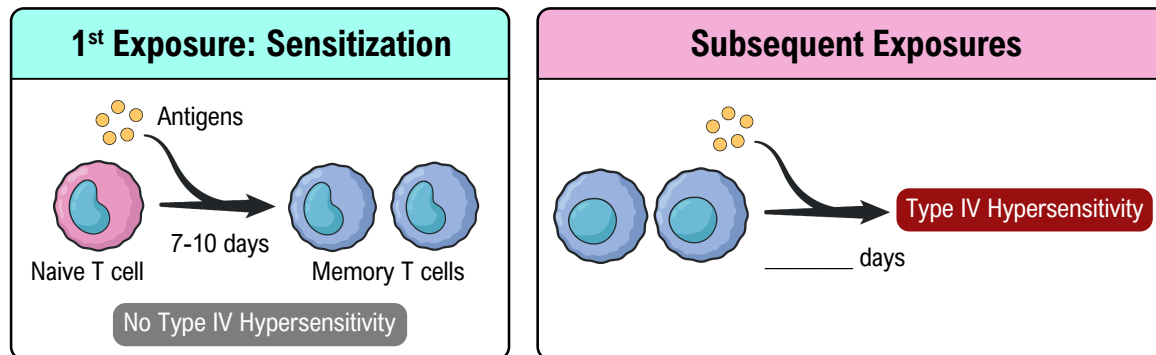


## TOPIC: TYPE IV HYPERSENSITIVITIES

### Type IV Hypersensitivity

- ◆ **Type IV (Delayed Cell-Mediated) Hypersensitivity:** a *delayed*, \_\_\_\_-cell mediated immune overreaction.
  - T cells *sensitized* during 1st exposure to foreign antigens; subsequent exposures are problematic.
  - Response is \_\_\_\_\_; peak response typically occurs ~24-72 hours after re-exposure.
  - Can also occur in response to \_\_\_\_\_-antigens if there is a failure in self-tolerance mechanisms.



- ◆ We'll cover \_\_\_\_\_ common examples: contact dermatitis & tuberculin hypersensitivity.

### EXAMPLE

Match the following types of hypersensitivity with their correct definition:

Type I Hypersensitivity ____	1. Antibodies bind to cell-bound antigens & trigger their destruction.
Type II Hypersensitivity ____	2. Mediated by T cells; usually don't become apparent for a few days.
Type III Hypersensitivity ____	3. Immediate response due to release of proinflammatory mediators.
Type IV Hypersensitivity ____	4. Immune complexes avoid phagocytosis & are deposited in cells/tissues.

### PRACTICE

How do type IV hypersensitivity reactions differ from type I hypersensitivity reactions?

- The length of time between second antigen exposure and the body's hypersensitivity reaction.
- Type I reactions can be triggered by any antigen while type IV reactions are triggered by foreign cells only.
- Type I reactions occur after an individual has been sensitized to an allergen while type IV reactions happen during first exposure/sensitization.
- Type I reactions are triggered by immune complexes and type IV reactions are triggered by foreign cells.

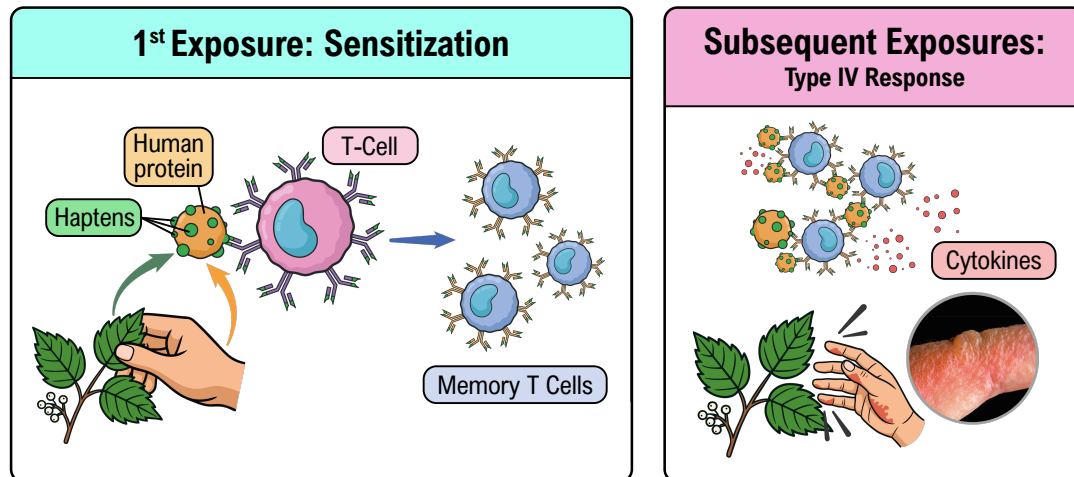
## TOPIC: TYPE IV HYPERSENSITIVITIES

### 1) Contact Dermatitis

◆ **Allergic Contact Dermatitis:** red, itchy, irritable, \_\_\_\_\_ rash, often caused by direct *contact* with *haptens*.

▸ **Hapten:** small molecule that must \_\_\_\_\_ to larger, host proteins to become immunogenic.

- Examples: latex products, leather, & oils on poison ivy.



NOTE: A \_\_\_\_\_ test can determine the cause of the dermatitis.

### PRACTICE

Which of the following statements about haptens is correct?

- Haptens are large, immunogenic proteins.
- Haptens can only be produced artificially, they are not found in the natural environment.
- Haptens are the cause of hemolytic transfusion reactions.
- Haptens are small molecules that become immunogenic when they bind to a larger host protein.

### PRACTICE

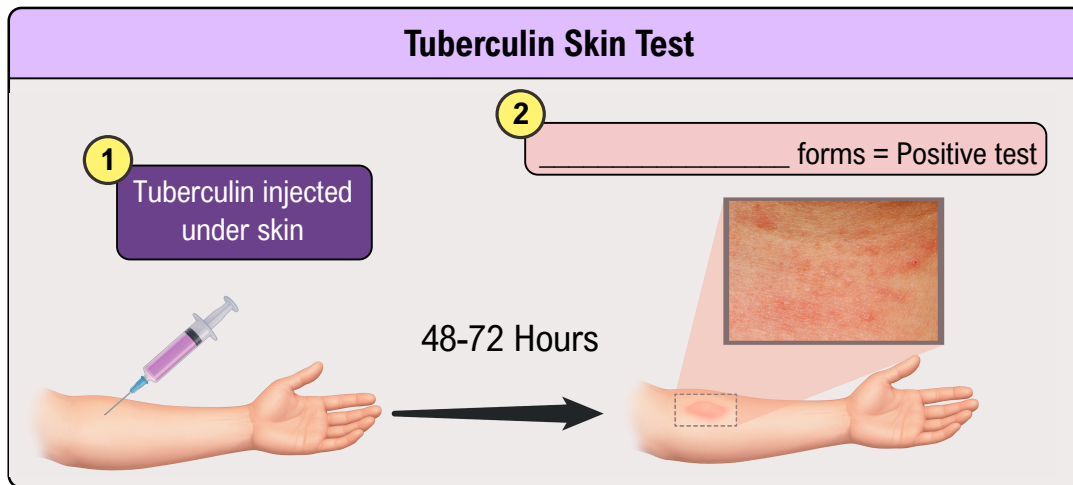
Which of the following statements describes why contact dermatitis is a type IV hypersensitivity reaction?

- Haptens bind with proteins & become immunogenic leading to a delayed, T cell-mediated immune response.
- Antibodies migrate to the site of contact & mediate an immune response.
- Contact dermatitis causes a skin rash, which is unique to type IV hypersensitivities.
- Contact dermatitis is caused by foreign antigens; other hypersensitivities are usually caused by self-antigens.

## TOPIC: TYPE IV HYPERSENSITIVITIES

### 2) Tuberculin Skin Test

- ◆ **Tuberculin (PPD) Skin Test:** a screening test using *tuberculin* to check for a type IV tuberculin hypersensitivity.
  - **Tuberculin:** purified protein derivative extracted from *Mycobacterium tuberculosis* (causes Tuberculosis, \_\_\_\_).
- ◆ A positive reaction only shows that the immune system has been previously \_\_\_\_\_ to TB-like proteins.
  - It can't distinguish if they have, have had, or were vaccinated against TB (it just flags risky people).



### **PRACTICE**

Red, raised, and hardened skin patches in association with tuberculin injections are called indurations. Which cells are responsible for triggering the immune response to the tuberculin which results in indurations?

- a) Sensitized B cells.
- b) Sensitized T cells.
- c) Sensitized plasma cells.
- d) Anti-tuberculin antibodies.

### **PRACTICE**

Which of the following statements about the tuberculin skin test is true?

- a) Patients who have not been exposed to *Mycobacterium tuberculosis* antigens will have a positive test result.
- b) Patients with a positive result may not know for a few days because it is a delayed hypersensitivity reaction.
- c) Patients who have not contracted TB but have been sensitized to TB antigens will have a negative test result.
- d) Patients who have recently had a TB infection will have a positive result, but patients vaccinated against TB will have a negative result.