This results in localized spongiosis, papule, vesicles, and bullae.

**Type IV Hypersensitivity Reaction Pathoflow: Allergic Contact Dermatitis**

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IL-6 will influence more T-cells differentiate into T-helper17 thus activating more neutrophils to come to the site of injury.

IL-1 will stimulate adjacent T-cells to proliferate and differentiate.

Clinical manifestations include redness, itchiness, swelling, and blisters with 24-72 hours.

The accumulating activated macrophages will release lysosomal enzymes, complement proteins, and reactive oxygen species which causes the tissue damage, thus presenting as contact dermatitis.

TNF-a is powerful pro-inflammatory cytokine that will draw monocytes to the site of injury via chemotaxis. These monocytes will differentiate into activated macrophages.

T-cytotoxic cells inadvertently attacks neighbouring nucleated skin cells with MHC1 and cause damage to the tissues.

T-cytotoxic cells are recruited to the site of injury and destroy target cells directly using perforin. T-cytotoxic cells also release granzymes which cause keratinocyte apoptosis.

IFN-g will improve the macrophages ability to phagocytose and will stimulate the macrophages to release TNF-a, interleukin-1 (IL-1), and IL-6.

The T-helper1 cell will release a cytokine called interferon-g (IFN-g) which activates macrophages, natural killer cells, T-cytotoxic cells, and neutrophils.

The T=helper17 cell will activate inflammatory actions and draw neutrophils and monocytes to the site.

The subsequent exposure to the allergen will alert Langerhans cells and Keratinocytes who will then present the antigen to the T-helper1 cells and T-helper17 cells.

The haptens bind with proteins in the skin to become immunogenic which alerts the immune system. This activates resident macrophages called Langerhans cells (LC).

Poison ivy touches skin and urushiol haptens penetrate through the epidermis to the dermis.

The LC comes into contact with the antigen and phagocytoses it.

The APC releases Tumor Necrosis Factor-a (TNF-a) which triggers an inflammatory response.

**Elicitation Phase:** A subsequent exposure to the allergen will initiate a Type IV Hypersensitivity response.

**Sensitization Phase:** First exposure to the antigen that results in the development of a hypersensitivity.

APC releases interleukin6 (IL-6) and transforming growth factor-b (TGF-b) which makes the T-helper cell differentiate into T-helper17 cells.

The APC releases cytokines that stimulates the proliferation of T-cells and activates macrophages.

The naïve T-helper cells recognize the APC and attach to the MHC2 via the CD4 protein.

The LC then travels to the regional lymph nodes where they present the antigen on the MHC2 receptor. The LC is now considered an antigen presenting cell (APC).

This causes the APC to release the cytokine interleukin-12 (IL-12) which makes T-helper cells proliferate into T-helper subtype 1 (T-helper1).

The T-helper cells will release interleukin-2 (IL-2), stimulating the T-cells to proliferate and differentiate into various T-cells.

The sensitized T-helper17 and T-helper1 cells (memory cells) will enter circulation and respond during subsequent exposures.

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