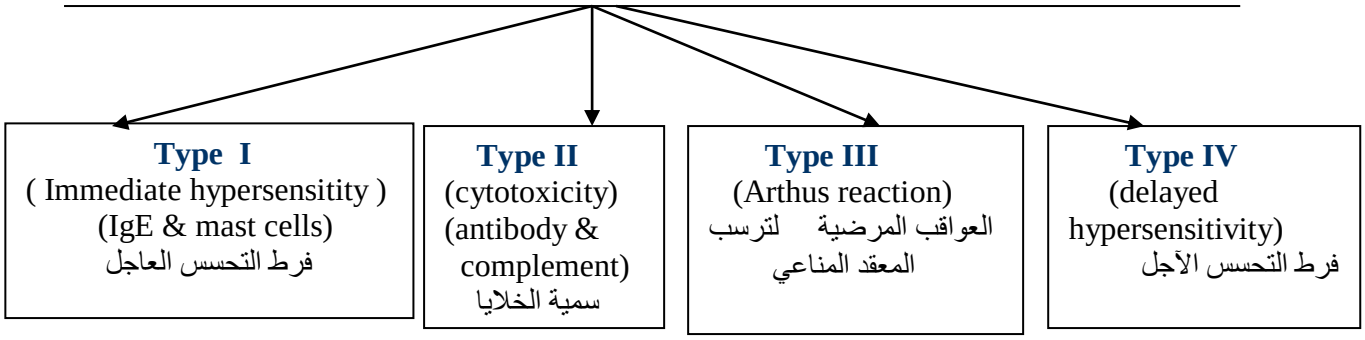
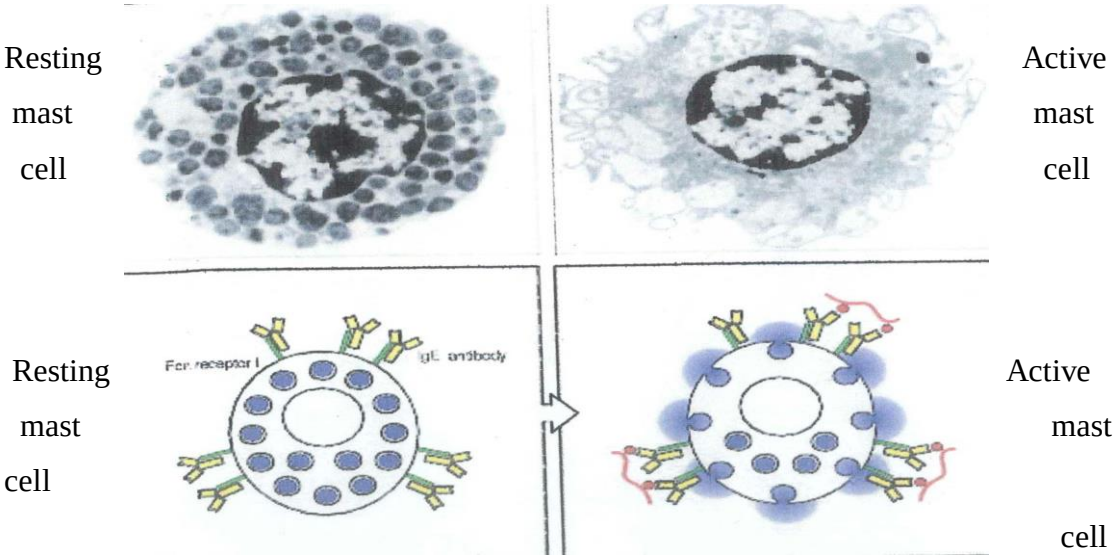
Immunological Mechanisms

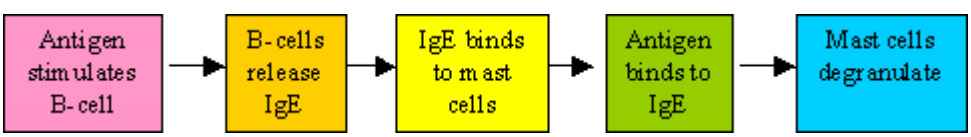
(Mechanisms of Immuno-pathology in parasitic infections)



Type I (Immediate hypersensitivity)

Develops when antigen combines with IgE antibody attached to the surface of mast cells. The interaction results in release of histamine and other vasoactive substances which produce vasodilatation, increased capillary permeability and smooth muscle contractions.





Examples: - **Swimmer' s itch** due to penetration of non-human schistosome cercariae.
– **Leaking or burst hydatid cyst**.

Type II (Cytotoxic reactions)

These depend on complement fixing antibodies which become attached to cell surfaces and following activation of complement, resulting in lysis or impaired integrity of the cell.

Examples:

1) Anaemia in malaria:

   IgM and IgG and complement were detected on the surface of parasitized red blood cells.

2) **Chagas disease** with acute infection with parasitemia followed within a few months by signs of chronic myocarditis or megacolon.

Type III (Arthus reactions)

These depend on injurious immune complexes comprising antigen, complement- fixing antibodies and complement. Such complexes when deposited or trapped in tissues cause an increase in capillary permeability, an entry of phagocytes and tissue damage, perhaps due to the release of lysosomal enzymes from disrupted polymorphs.

Examples:

1) Nephrotic syndrome in *Plasmodium malariae* infection. IgG and IgM deposites were detected in the glomeruli.
2) Nephritis also reported in African trypanosomiasis and in leishmaniasis and in some helminth infections as schistosomiasis and trichinosis. But evidence of immune complex etiology is not certain.

3) Acute schistosomiasis (**Katayama fever**) with fever eosinophilia, splenomegaly, lymphadenopathy and urticaria.

Type IV (Delayed hypersensitivity)

Type IV is **a cell- mediated immune response** which depends on the interaction of antigen with antigen-sensitive lymphocytes with subsequent release of lymphokines, leading to a variety of responses including changes in capillary permeability and effects on other lymphocytes, macrophages and eosionophils. This type primery rely on T-cells rather than upon antibody and is locally manifested by infiltration of cells.

Examples:

1. Leishmaniasis, characterized by a spectral disease similer to leprosy.
2. Schistosomiasis (due to *S. mansoni* & *S. haematobium*) is a granulomatous disease.
3. The papular skin eruption of Swimmer's itch appears to have a delayed as well as immediate hypersensitivity component, based on sensitization.
4. The local lymphatic inflammation in filariasis due to dead adult worms or pre-adult larval stages.
5. The inflammation around *Trichinella* larvae in muscles.