CHAPTER TWELVE

HYPERSENSITIVITY

Hypersensitive reactions occur, when the immune system injures the host, by reacting inappropriately or excessively.

Easy reading

Technical information

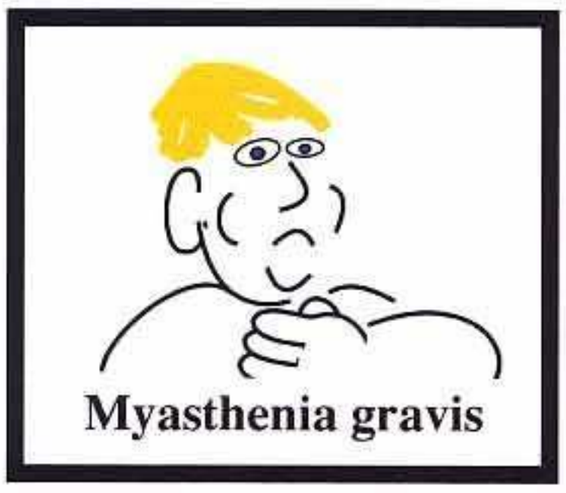
TYPE 1 HYPERSENSITIVITY

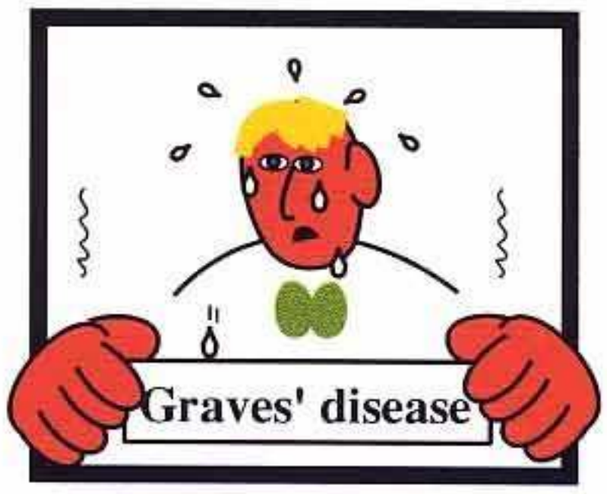
Type 1 hypersensitivity reactions can vary from a simple bout of sneezing, to a life-threatening anaphylactic reaction. However, what they have in common, is that the reactions occur within minutes of the person coming into contact with something (ie a peanut).

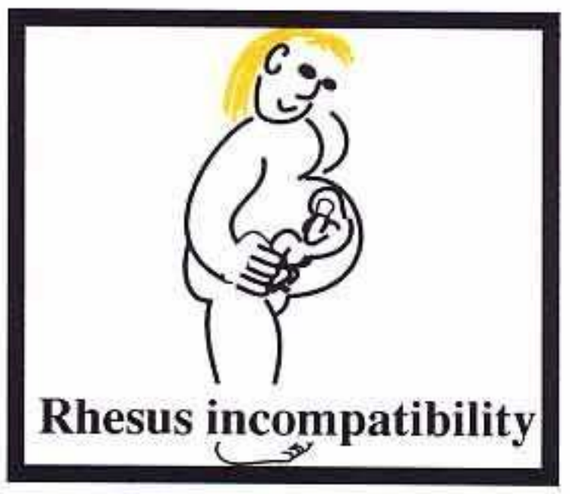
WHY ARE TYPE 1 HYPERSENSITIVE REACTIONS SO RAPID?

Adjoining IgE already lining surface of the mast cell, 'grab' the same object. This triggers the mast cell into releasing its stored histamine (see page 54).

TYPE 2 HYPERSENSITIVITY

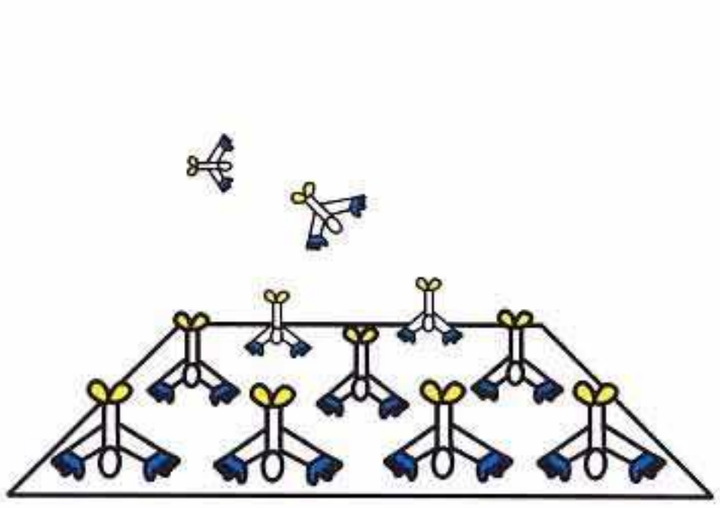




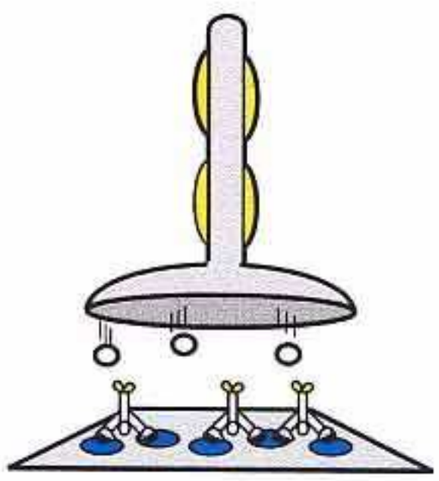


These are just a few examples of type 2 hypersensitive reactions.

THE MECHANICS OF A TYPE 2 HYPERSENSITIVE REACTION



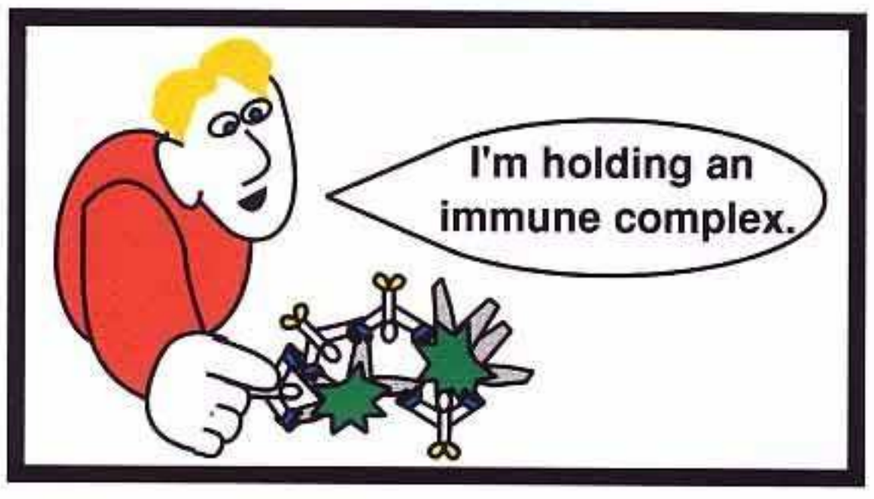
IgG antibodies attach onto the surface of a cell, one layer deep.



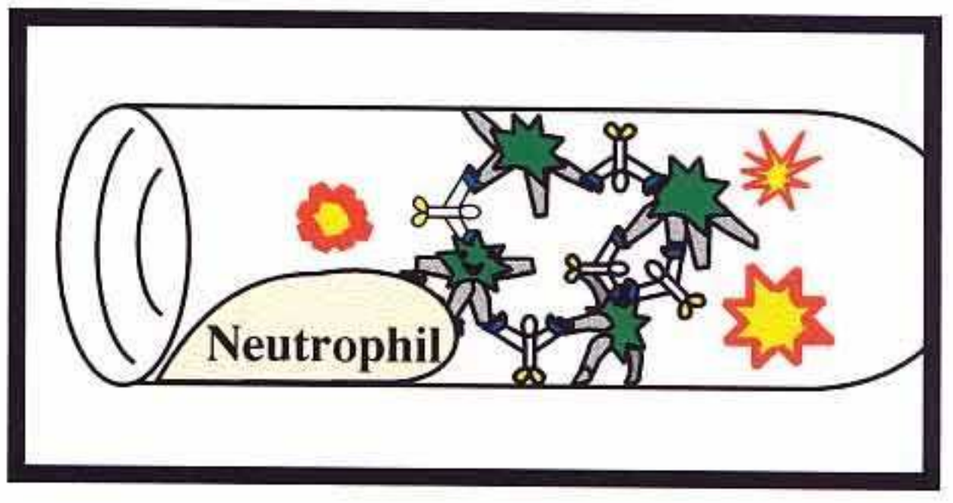
The affected cell is then 'eaten', 'blown apart' by complement, or simply prevented from working.

TYPE 3 HYPERSENSITIVITY

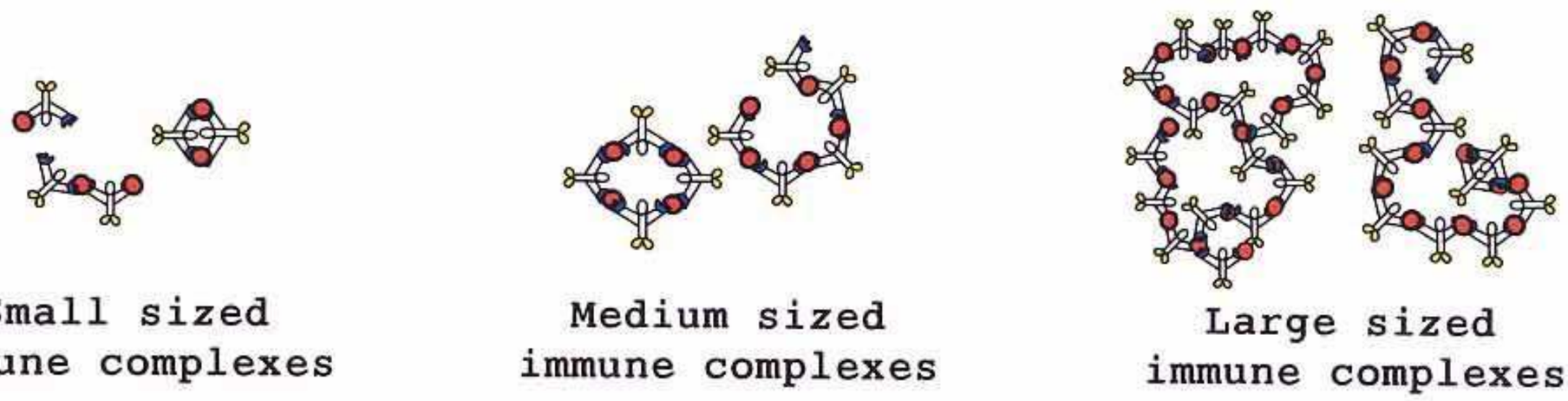
Type 3 hypersensitive reactions produce characteristic lumpy - bumpy deposits.



Normally, material clumped together by antibodies (an immune complex), is 'eaten' by macrophages living in the spleen or the liver.



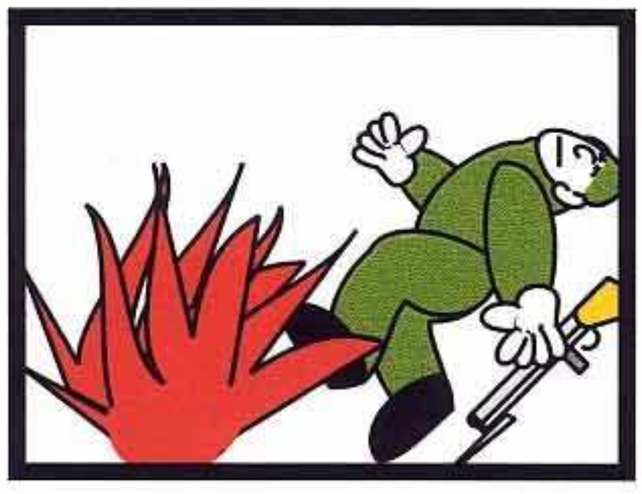
But if an immune complex gets trapped in a blood vessel, an inflammatory response will quickly follow.



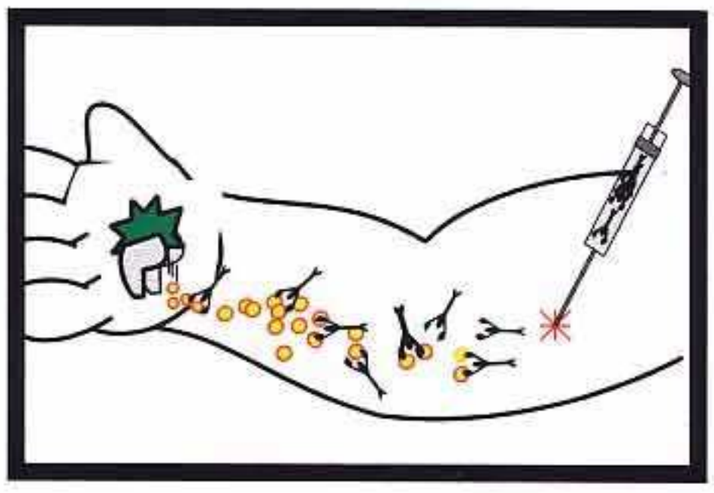
Most people make small or large sized complexes, which are eliminated in the liver and spleen. But a few people produce medium sized complexes, which for an unknown reason, tend to become trapped in the wrong places!

SERUM SICKNESS

This is an example of a systemic type 3 hypersensitive reaction, where immune complexes become deposited all over the body.

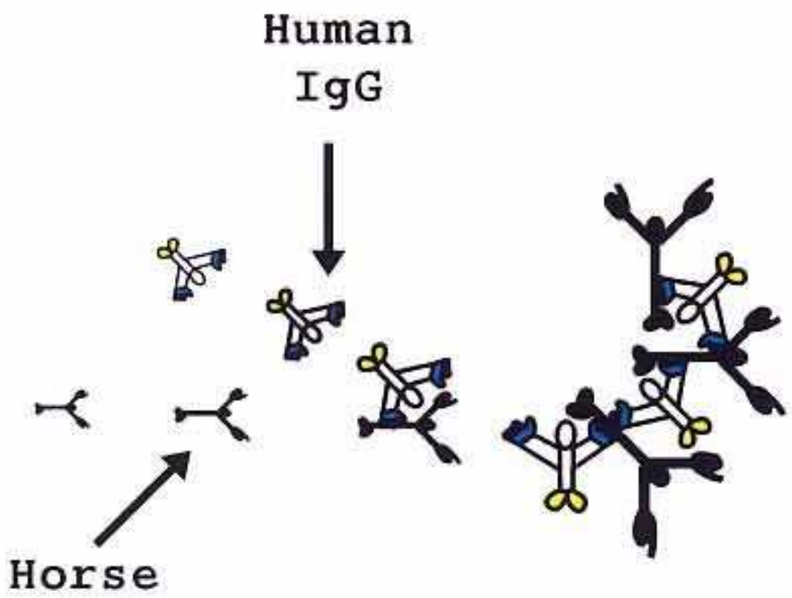


During the First World War, many injured soldiers died from tetanus (see page 106).

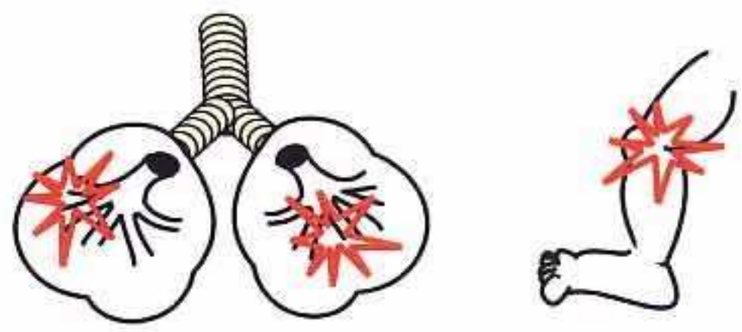


To prevent this, injured soldiers were given horse serum, containing anti-tetanus IgG antibodies.

But a few of the soldiers then experienced kidney problems, skin rashes and joint pains.



As horse IgG is foreign material, human IgG were made against them. The resulting complexes, would then be eliminated in the spleen.

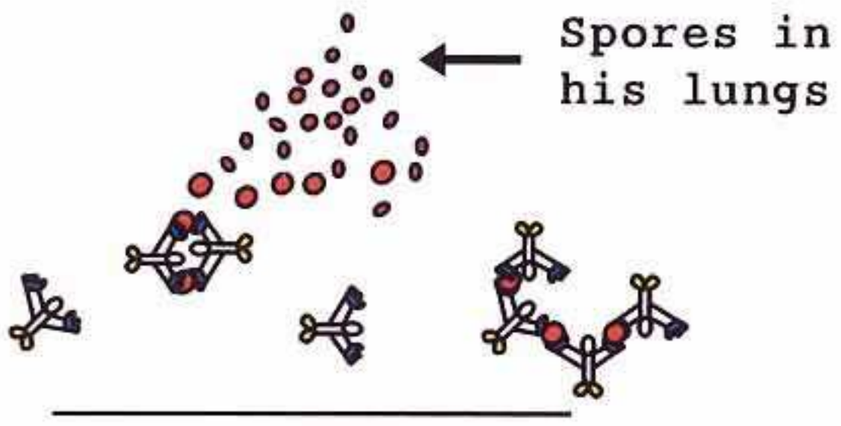


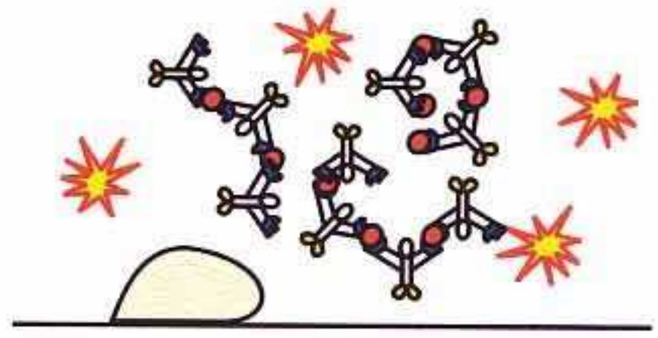
But for a few, these complexes became lodged in the kidneys, lungs or joint synovium, which caused an inflammatory response.

FARMER'S LUNG

An example of a local type 3 hypersensitive reaction.

8 to 10 hours after working with spoilt hay, this farmer experiences breathing problems.





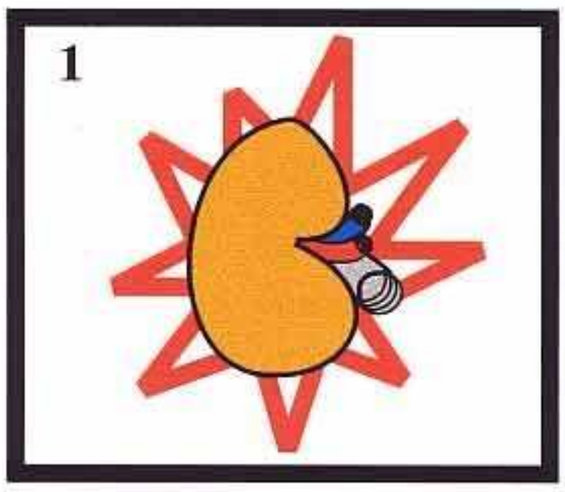
Spores entering his lungs are 'grabbed' by IgG antibodies.

Complement activation attracts neutrophils and these increase the inflammatory response.

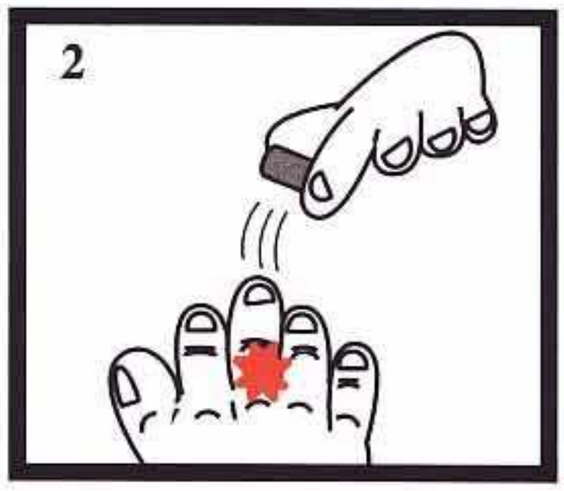
When immune complexes accumulate in the tissues during a local type 3 reaction, it is sometimes called an "Arthus reaction".

TYPE 4 HYPERSENSITIVITY

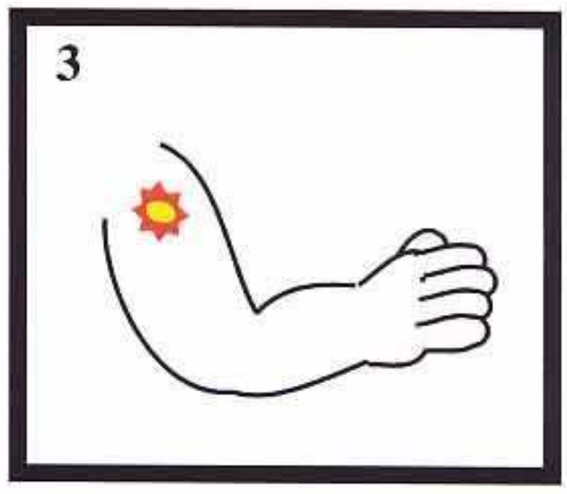
Examples of this type of hypersensitivity include:-



Transplant rejection.

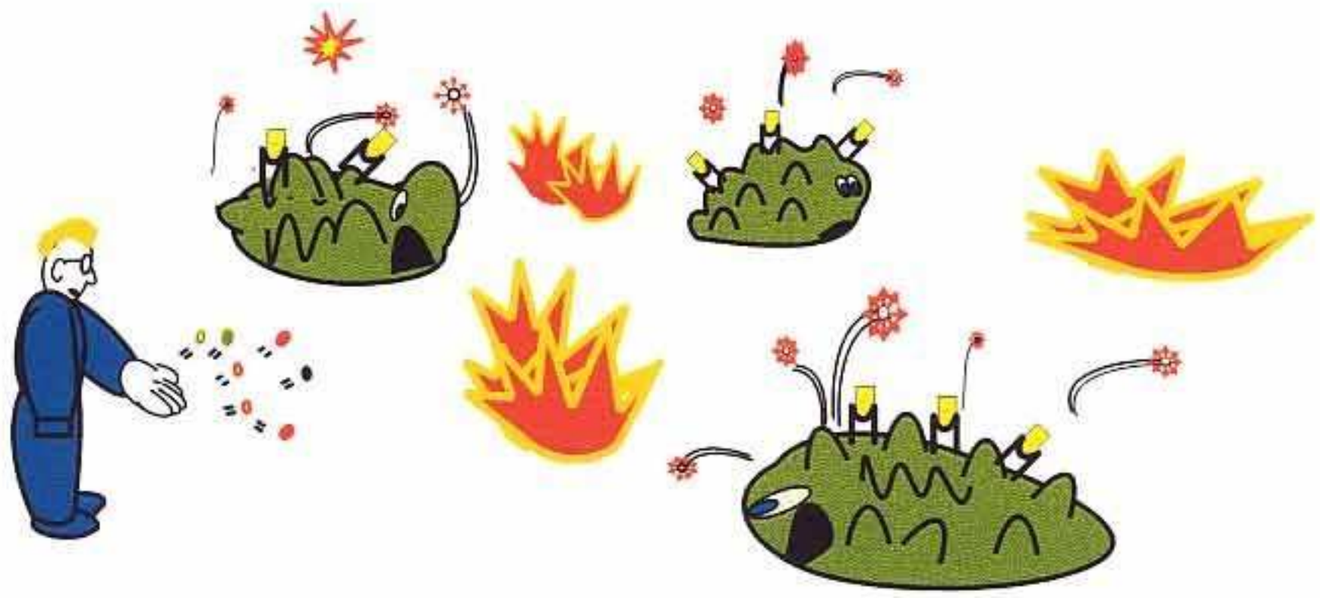


Contact sensitivity.



A positive heaf test.

A skin rash can develop a day or so after coming into contact with certain chemicals or metals (ie a nickel ring).



Type 4 hypersensitivity reactions result from the over-stimulation of local macrophages by T helper cells.