

# Type III immunopathological reaction

**Type III immunopathologic reaction, based on immunocomplex formation** (type III reaction, Arthus type), is a **humoral** immunopathologic reaction. Partially it is similar to atopy, but is caused by **IgG** antibodies. In this reaction an antibody together with the antigen forms immunocomplexes. This depends on the amount of, size, structure, physical-chemical properties, if the immunocomplexes get phagocytosed, or if they are stored in tissues.

## Principle

Immunocomplexes either bind to Fc-receptors, or activate complement triggering a cascade of damaging reactions, where neutrophils play a major role, & mast cells play a supportive role. As a result an inflammatory response develops (which can proceed to chronicity).

The reaction time is long. The reaction does not occur until a sufficient amount of antibodies is produced, which is after approximately 2 weeks. The transient immunocomplex reaction leads to the removal of the infectious agent by a physiological mechanism.

Manifestations accompany most acute infections (pain of joints, muscles etc.). A **pathologic** reaction occurs when there is an excessive amount of antigen. Immunocomplexes most frequently accumulated in the kidneys, on the surface of endothelium, and in joint synovium.

Symptoms include glomerulonephritis, vasculitis, and arthritis. The so called **serum sickness** develops after the administration of the therapeutic **xenogenic serum**.

**Arthus's reaction** is an experimental model of the serum sickness. It involves sensitizing an animal with an antigen and subsequently inducing a local reaction after applying an intradermal injection containing the antigen.

## Examples of diseases

- **Serum sickness.**
- **Exogenous allergic alveolitis / Farmers lungs:** IgG against various inhalatory antigens (e.g. fungal components of hay).
- **Systemic lupus erythematosus:** autoimmune, autoantigenic components of the cell nucleus.
- **Cryoglobulinemia:** immunocomplex consists of pathologic and normal (physiologic) immunoglobulins.
- **Rheumatoid arthritis:** in some symptoms, the immunocomplexes are made up of rheumatoid factors, that are antibodies against Fc-fragments of other antibodies.
- **Sterile consequence of infectious diseases:** in susceptible individuals, after infections, damage to tissues can occur. This damage can even have an autoimmune character. The following can develop: poststreptococcal glomerulonephritis, endocarditis with rheumatoid arthritis, postinfectious arthritis up to chlamydial, Salmonella, Shigella diseases in individuals with HLA-B27.
- **Arthus phenomenon** – local necrosis in the area of repeated antigen injections.

## Prognosis

Most immunocomplex reactions regress and disappear after the source of the antigen is destroyed. Only in the case of autoantigens (**SLE**) worsening and chronic damage can occur.

## Links

### Related articles

- Allergy
- Type I immunopathological reaction
- Type II immunopathological reaction
- Type IV immunopathological reaction

### External links

- Imunopatologická reakce III. typu – Youtube video ([https://www.youtube.com/watch?v=SyxzU2SI\\_Yw](https://www.youtube.com/watch?v=SyxzU2SI_Yw))

### Used literature

- HOŘEJŠÍ, Václav – BARTŮŇKOVÁ, Jiřina. *Základy imunologie*. 3. edition. Praha : Triton, 2008. 280 pp. ISBN 80-7254-686-4.