Imunopharmacology

Immunomodulatory substances

The main function of IS: to remove dead, impaired, or cancerous cells as well as to protect against infections and inorganic substances and to adequately react to these stimuli

Inadequate reaction may lead to impairment of the organism and to development of disease

Immunomodulatory substances: act on components of immune system by a direct or indirect mechanism

function of the IS can be potentiated (immunostimulation) x supressed (immunosuppression)

immunostimulants x immunosuppressants

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Immunosuppressants

used to treat autoimmune diseases (i.e., disorders of immunity caused by pathological reactivity to internal antigens)

in severe allergic conditions (i.e., pathological hypersensitivity to external antigens)

in transplantation medicine - as prevention of transplantation rejection

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Non-specific immunosuppressants

Glucocorticoids (earlier talk)

Cytostatic drugs with an immunosuppressive effect

Substances that bind to immunophilins:

cyclosporine A: a cyclic polypeptide acquired from soil bacteria
it affects primarily Th1 lymphocytes by decreasing the production of IL-2
it has significant interactive potential with substances inhibiting CYP450

AE: nephrotoxicity, hepatotoxicity (TDM recommended)

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Non-specific immunosuppressants

Substances that bind to immunophilins:

tacrolimus - macrolide antibiotic

(MoA similar to the action of cyclosporine A)

10-100 times more effective than cyclosporine A (but also more nephrotoxic)

metabolised in the liver by CYP450 enzymes

AE: the same as with cyclosporine A + alopecia

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Non-specific immunosuppressants

Other substances

mycophenolate mofetil: intervenes with the synthesis of guanosine nucleotides and inhibits the proliferation of T and B lymphocytes

used in combination with cyclosporine A and glucocorticoids

AE: diarrhoea, nausea, leukopenia

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Non-specific immunosuppressants

Biologicals

They affect immunocompetent cells by acting as antibodies against T and/or B lymphocytes or IL-2

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Specific immunosuppressants

The use of specific allergen immunotherapy is widespread in practice

Aim: to evoke immunologic tolerance to an allergen, which induces a pathological response from the organism

Gradually increasing doses of a specially modified allergen are given for a period of 3-5 years

Administration: sublingually or injections

Indication: pollen allergies, mite allergies, mould spore allergies, pet allergies bronchial asthma mediated by IgE antibodies.

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Immunostimulants

Specific immunostimulants

Vaccination against infectious disease

Vaccines are modified, in so far as that they can induce an immune reaction with immunological memory, which will prevent the development of an infectious disease. Vaccines are derived from live, attenuated strains of microorganisms, modified bacterial toxins, and vaccines containing only a certain immunogenic part of a microorganism.

Anti-tumour vaccines

consist of activated dendritic cells, which provoke an immune response against tumour antigens

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Immunostimulants

Non-specific immunostimulants:

Origin: synthetic or bacterial origin or they can be products of the immune system, which are acquired by, for example, recombinant techniques

Synthetic immunomodulators

levamisole: originally an anthelmintic drug

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Immunostimulants

Non-specific immunostimulants:

Synthetic immunomodulators

isoprinosine: a purine derivative, which besides immunostimulant properties also has an antiviral effect

Indication: repeated herpetic infections (today it has been replaced by specific antiviral drugs against herpes viruses)

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Immunostimulants

Non-specific immunostimulants:

Bacterial immunomodulators

extracts from bacteria or bacterial lysates

Their application activates macrophages.

Indication: repeated infections of airways and the urinary tract

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Immunostimulants

Non-specific immunostimulants:

Products of the immune system

transfer factor: a dialysate of homogeneous leucocyte mixture that has been acquired from healthy blood donors

It activates both specific and non-specific immunity.

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Immunostimulants

Non-specific immunostimulants:

Products of the immune system

cytokines - have biological effects, which is why they are used.

Interleukin 2 (Il-2): used for antitumor therapy and under certain conditions after bone marrow transplantation.
Interferon alpha (**INF-α**): interferes with large number of viruses in the cell and has an antitumor effect. It is indicated for infectious hepatitis B and C and oncologic diseases.
Interferon beta (**INF-β**): has similar effects to interferon alpha. It is used to treat multiple sclerosis, hepatitis B and C, and for oncologic diseases.
Interferon gamma (**INF-γ**): has the same basic biological properties as other interferons. It is indicated for immunodeficiency disorders and antitumor therapy.

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