Nurses Content
Downloaded from nursescontent.com

Immunological and Biological Preparations

Pharmacology

Vaccines, immunoglobulins, sera, immunosuppressants, immunostimulants and principles of immunisation.

For educational purposes only.

CHAPTER 19 / PHARMACOLOGY 19. Immunological and Biological Preparations

1. Introduction

Immunological preparations induce, supply, stimulate or suppress immune responses. Biological medicines include products such as vaccines, antibodies, recombinant proteins and selected cell-derived therapies. Their storage, handling and adverse-effect profiles may differ from small-molecule drugs.

2. Types of immunity

Type	Description	Example
Innate	Immediate nonspecific defence	Skin barrier, phagocytes.
Adaptive	Antigen-specific response and memory	B- and T-cell responses.
Active natural	Immune response after infection	Immunity following selected infections (not a recommendation to acquire infection).
Active artificial	Immune response induced by vaccination	Hepatitis B vaccine.
Passive natural	Transfer of maternal antibodies	Placental IgG transfer.
Passive artificial	Administration of preformed antibodies	Rabies immunoglobulin.

Active immunity usually develops over time and may establish memory. Passive immunity is more immediate but generally temporary and does not itself establish the same memory response.

3. Vaccines and classification

Vaccine type	Examples	Characteristics
Live attenuated	BCG, MMR, oral polio in relevant programmes	Weakened organisms; induce immune response; special pregnancy and immunocompromise precautions.
Inactivated	IPV, inactivated hepatitis A	Nonreplicating pathogen components; may need repeated doses.
Toxoid	Tetanus, diphtheria	Inactivated toxin induces antitoxin immunity.
Subunit / recombinant	Hepatitis B, HPV	Selected antigen components.
Conjugate	Hib, pneumococcal conjugate vaccine	Polysaccharide linked to carrier protein improves immune response.

Nurses Content
Downloaded from nursescontent.com

Viral vector / mRNA	Selected modern vaccines	Deliver genetic instructions or antigen via defined platform; product-specific indications.

4. Principles of immunisation

Use the current national schedule, approved product, patient age, medical eligibility, interval and route/site. A delayed series usually does not require restarting, but follow specific schedule guidance. Screen for serious allergy to prior dose or components and relevant immunosuppression. Mild illness is not generally a reason for unnecessary deferral. Live vaccines require special assessment during pregnancy and significant immunosuppression; contraindications are product-specific. Explain benefits and potential reactions and obtain appropriate consent.

5. Vaccine storage and administration

Many routinely used vaccines are stored at +2 to +8 C, but requirements vary by product and stage of distribution. Some are freeze-sensitive; others have different temperature and light requirements. Use temperature-monitored equipment, protect from inappropriate freezing or heat, check expiry and vaccine vial monitor where applicable. During a temperature excursion, quarantine affected stock, label it not for use and obtain authorized guidance; do not automatically discard or use it. Use only supplied/authorized diluent and observe reconstitution and open-vial policies. Storage guidance should follow India's UIP and product instructions [11].

Nursing care after vaccination

Record patient details, product, batch, dose, route/site, time and vaccinator according to programme. Give a return date and expected reaction advice. Observe according to protocol and maintain emergency preparedness. An adverse event following immunisation (AEFI) is an event after vaccination, not proof that the vaccine caused it. Report serious or relevant events promptly; assess and manage anaphylaxis immediately if suspected.

6. Immunoglobulins, antisera and antitoxins

Preparation	Role	Precautions
Human normal immunoglobulin / IVIG	Replacement for selected immune deficiencies or immunomodulation	Infusion reactions, thrombosis, renal injury and haemolysis risks; monitor product rate.
Specific immunoglobulins	Rabies, tetanus, hepatitis B immunoglobulin	Selected post-exposure protection; timing and administration are indication-specific.
Anti-D immunoglobulin	Prevention of RhD alloimmunisation	Verify eligibility and obstetric/transfusion protocol.
Antiserum / antivenom	Antibodies against selected toxins or venoms	Specialist emergency use; anaphylaxis and serum sickness risk.

Rabies post-exposure care combines appropriate wound care, vaccination and immunoglobulin or indicated monoclonal product for eligible exposures. Infiltration technique and dose depend on approved protocol; do not substitute vaccine for immunoglobulin or vice versa where both are indicated. Severe envenomation needs emergency assessment; not every bite requires antivenom. Never use an unapproved serum product.

Nurses Content
Downloaded from nursescontent.com

7. Immunosuppressants

Glucocorticoids, calcineurin inhibitors (tacrolimus, ciclosporin), antimetabolites (azathioprine, mycophenolate) and selected biological agents reduce immune activity. Uses include transplant rejection prevention and autoimmune conditions. Risks include infection, malignancy, marrow suppression, renal injury or metabolic effects depending on agent. Tacrolimus and ciclosporin require carefully timed levels in relevant settings. Do not stop transplant medicines abruptly. See Chapter 21 for additional classification.

8. Immunostimulants and biological response modifiers

G-CSF (filgrastim) increases neutrophil production in selected settings. Interferons modify immune signalling and have specific antiviral or oncological uses, although many indications now use other therapies. Immune checkpoint inhibitors enhance antitumour responses and can cause immune-related inflammation (Chapter 21). These are not general immunity boosters and should not be used without a defined indication.

9. Examination questions

Long answer questions

1. 1. Classify vaccines and explain principles of immunisation, storage and nursing care.
2. 2. Discuss immunoglobulins, antisera and immunomodulatory agents.

Short answer questions

- Active/passive immunity; toxoids; cold chain; AEFI; IVIG; tacrolimus.

Very short answer questions

- Example of passive artificial immunity? - Rabies immunoglobulin.
- Example of a toxoid vaccine? - Tetanus toxoid-containing vaccine.
- Does an AEFI automatically prove vaccine causation? - No.

10. Quick revision

Vaccines induce active immunity; immunoglobulins provide passive protection. Live and inactivated vaccines differ in eligibility. Verify cold-chain requirements for each product. Biological agents require indication-specific reaction monitoring.

Conclusion

Safe immunological pharmacotherapy requires correct product selection, storage, administration, surveillance and informed communication.

Nurses Content
Downloaded from nursescontent.com

Practice questions

Choose one best answer. The answer key and explanations follow the questions.

1. What is the purpose of linking a polysaccharide antigen to a carrier protein in a conjugate vaccine?

A. Improve the immune response

B. Provide preformed antibodies only

C. Make every product resistant to freezing

D. Eliminate all need for immune recognition

2. A vaccine storage temperature excursion is detected. What should the nurse do with the affected stock?

A. Return it to routine use without recording the event

B. Quarantine it, label it not for use and obtain authorized guidance

C. Use it immediately to avoid wastage

D. Discard it automatically without assessment

3. What does the term adverse event following immunisation establish?

A. The event is always an allergic reaction

B. The event never needs reporting

C. An event occurred after vaccination, without by itself proving causation

D. The vaccine has definitely caused the event

Nurses Content
Downloaded from nursescontent.com

Answer key and explanations

1. A - Improve the immune response

Conjugation improves the immune response to the polysaccharide antigen.

2. B - Quarantine it, label it not for use and obtain authorized guidance

Affected vaccine stock requires quarantine and authorized assessment.

3. C - An event occurred after vaccination, without by itself proving causation

An AEFI describes timing and requires assessment; it does not alone establish causation.

Source and attribution

Online chapter: https://nursescontent.com/learn/pharmacology/unit-19-immunological-and-biological-preparations/

Downloaded from Nurses Content. Branding identifies the delivery website. Original author credits, third-party licences and applicable rights remain unchanged.