

# IMMUNOLOGY – Practical- week 11

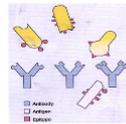
## Immunization and Vaccines Detection – Immune Status Tests

Antibody identification involve analysing a patient's sample (usually blood) for the presence or absence of a particular antibody (qualitative) or for the amount of antibody that is present (quantitative). Antibodies are part of the body's immune system. They are immunoglobulin proteins that help protect people against microscopic invaders such as viruses, bacteria, chemicals, or toxins.

### Principles of Vaccination

#### Antigen

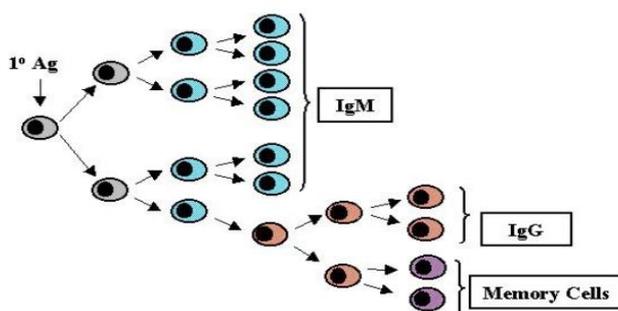
- A live or inactivated substance (e.g., protein, polysaccharide) capable of producing an immune response



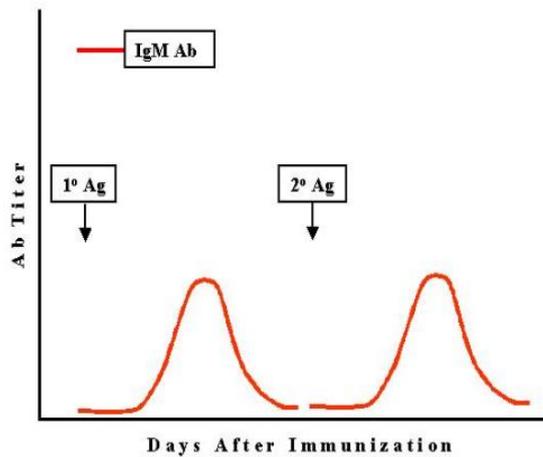
#### Antibody

- Protein molecules (immunoglobulin) produced by B lymphocytes to help eliminate an antigen

Each antibody that is produced is unique. It is created to recognise a specific structure on an invading foreign cell or particle. The specific structure that is recognised is called an antigen. Antibodies attach to the antigens, creating antigen-antibody complexes (immune complexes) that serve as signals for the rest of the immune system to destroy the cell or particle.



There are five different classes of immunoglobulins (IgM, IgG, IgE, IgA, and IgD). The three most frequently measured are IgM, IgG, and IgE. IgM and IgG antibodies work together to produce short-term and long-term protection against infection. IgE antibodies are primarily associated with allergies in the western world, though are also involved in parasite immunology and elimination.



The first time someone is exposed to a foreign substance, like a virus or bacterium, it may take the immune system up to two weeks to make an antibody blueprint and to produce enough of a specific antibody to fight the infection. This initial response consists primarily of IgM antibodies. Several weeks later, usually after the immediate threat has passed and the infection has resolved, the body creates IgG antibodies. It remembers the blueprint for fighting this microorganism and maintains a small supply of antibodies (a mixture of both IgM and IgG). The next time the body is exposed to the same foreign substance, it will respond much more strongly and quickly, to provide primarily IgG antibody protection.

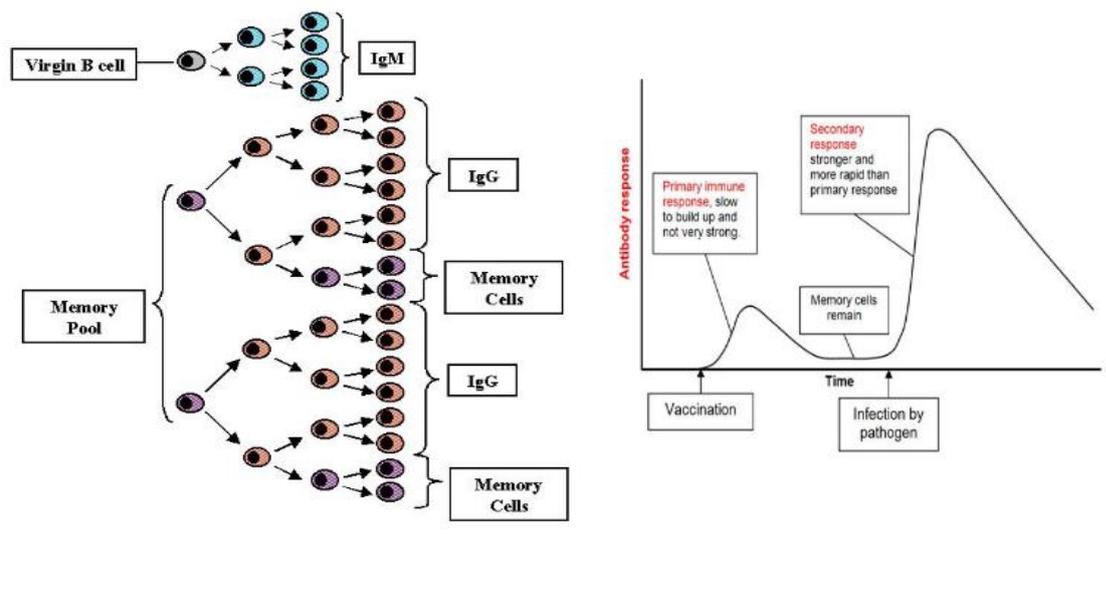
## **immunization**

### **Principles of Vaccination**

#### **Immunity**

- **Self vs. nonself**
- **Protection from infectious disease**
- **Usually indicated by the presence of antibody**
- **Very specific to a single organism**
- **prevent or lessen the serious symptoms of disease**
- **by blocking the spread of a bacterium, bacterial toxin, virus, or other microbe to its target organ**
- **or by acting rapidly at the site of infection.**

Vaccines are designed to trigger production of antibodies prior to exposure to a potentially infective microorganism. Vaccines use either a weakened version of the microorganism (one that cannot cause infection) or an isolated protein that mimics an antigen structure on the surface of the microorganism. Thus, the vaccine provides a relatively safe initial exposure to generate the blueprint for future protection.



Vaccines generate an initial immune response to create IgM antibodies and a secondary response that provides a supply of IgG antibodies. The antibodies generated by the vaccine provide long-term, rapid-response protection (termed immunity). Additional booster shots are sometimes given after the first vaccination to raise the concentration of antibodies in the blood to a level considered to be sufficiently protective (provide adequate immunity). Some vaccines rely entirely on the induction of T-cell responses e.g. varicella (chickenpox/shingles) and antibody production is less important.

**Titer tests confirm whether or not an individual has received specific immunizations and vaccinations against certain diseases, or, in some cases, has previously contracted these illnesses and no longer has an active infection. This can determine if a booster shot is needed, if the immune system is over-reactive to your own tissues, potentially indicating an autoimmune disorder, or if the immunization shot causes a strong enough response against the disease. Serum titers are blood tests that measure whether you are immune to a given disease(s). More specifically a quantitative serum titer is a titer with a numerical value indicating your actual degree of immunity to a disease(s). Detection of IgM antibodies tends to indicate a recent initial exposure to an antigen whereas detection of total or IgG antibodies indicates exposure some time ago.**

#### Sources:

[https://www.jfmed.uniba.sk/fileadmin/jlf/Pracoviska/ustav-mikrobiologie-a-imunologie/VLa/imu\\_pract\\_11\\_vakcinacion.pdf](https://www.jfmed.uniba.sk/fileadmin/jlf/Pracoviska/ustav-mikrobiologie-a-imunologie/VLa/imu_pract_11_vakcinacion.pdf)

<https://www.labtestsonline.org.au/learning/test-index/antibody-tests>

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