

A. How to diagnose virus infections?

1. Virus culture: The gold-standard, reference method. However, it is not used routinely in clinical practice because:

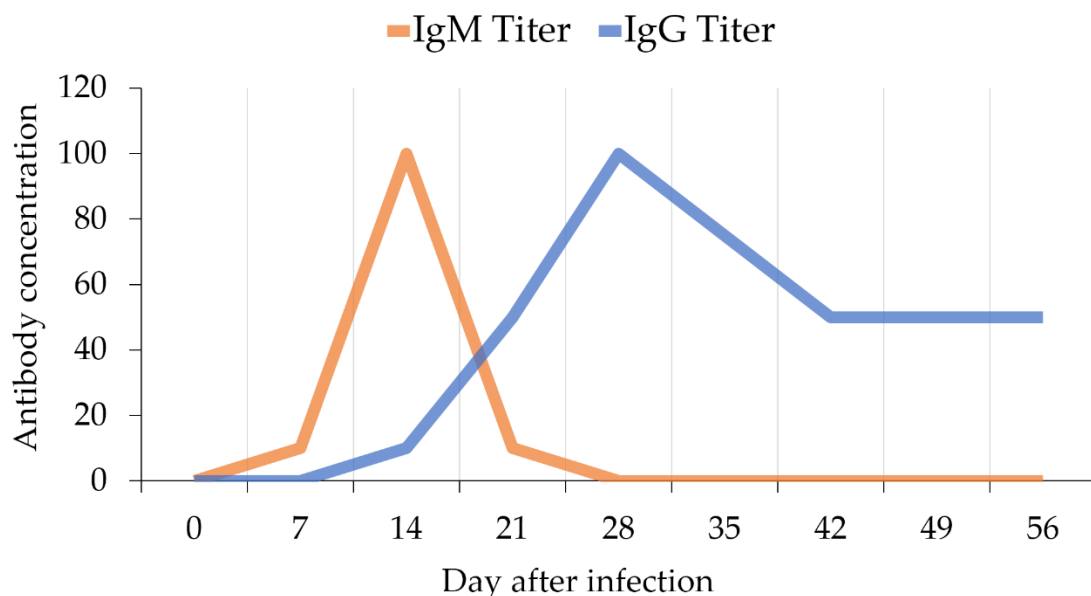
- A. Many viruses are difficult to grow in culture.
- B. Virus culture is often difficult and complex process.
- C. Slow.

2. Serology. The study of serum that contains antibodies. Blood is two parts (cells + fluid that have proteins). The fluid part is called serum. Antibodies are part of these serum proteins. Antibody is also called immunoglobulin (immuno=immunity, globulin=proteins that look like spheres). كُروية الشكل

Specific virus infections will cause specific antibody production. So, if these specific antibodies are present, it means that the infection by that specific virus occurred.

For example, virus A will cause the production of antibody A, virus B will cause the production of antibody B and virus C will cause the production of antibody C.

Let's assume that viruses A, B, and C cause influenza-like disease (fever, cough, fatigue). We want to reach a specific diagnosis. We take a blood sample. We separate the cells from serum. We take the serum. We test the serum for antibodies. We find antibody B. Then, we can reach a specific diagnosis. VIRUS B caused this influenza-like disease.



Important Note: This is the only material required for the exam in addition to the following textbook: Jawetz, Melnick, & Adelberg's Medical Microbiology

For any questions you can contact me through the following email: malik.sallam@ju.edu.jo

Antibodies are produced in the following order: immunoglobulin M (IgM) in the first 1-2 weeks. Immunoglobulin G (IgG) in the first two months. IgM will disappear in a few weeks. IgG will stay in the blood for long time. So, IgM=**recent** infection and IgG=**past** infection

Disadvantage of serology: the body will take 1-2 weeks for antibody production. So, serology is NOT helpful for very EARLY diagnosis.

The details of serology tests will be covered later on during the Immunology lectures.

3. Antigen detection. We look for the specific virus proteins.

For example, virus A have antigen A, virus B have antigen B and virus C have antigen C.

Let's assume that viruses A, B, and C cause influenza-like disease (fever, cough, fatigue). We want to reach a specific diagnosis. We take a sample through the nose or throat. We test the sample for antigens. We find antigen C. Then, we can reach a specific diagnosis. VIRUS C caused this influenza-like disease.

4. Molecular detection. We look for specific DNA or RNA sequence in the virus genome. This can be done using different methods. The most common method used for molecular detection is **Polymerase Chain Reaction (PCR)**.

5. Histopathologic examination of cells or tissue infected by the virus. Specific changes in the cells can give an idea about the virus that caused the infection.

6. Clinical diagnosis. Sometimes, certain signs and symptoms can help to reach the diagnosis of virus infection.

B. How to treat virus infections?

- Usually symptomatic treatment. Treat the symptoms. Fever → antipyretic. Pain → analgesic. Dehydration → fluids. Cough → antitussive.
- Antiviral drugs can be used for several virus infections.
- Antiviral drugs can reduce the severity of infection.
- Antiviral drugs can reduce the duration of symptoms.
- Antiviral drugs can help to control a few chronic infections.
- Antiviral drugs can help to cure hepatitis C chronic infection.

Important Note: This is the only material required for the exam in addition to the following textbook: Jawetz, Melnick, & Adelberg's Medical Microbiology

For any questions you can contact me through the following email: malik.sallam@ju.edu.jo

- Development of resistance, high cost and side effects are the major problems of antiviral drugs.
- Interferons have non-specific broad-spectrum antiviral activity and can be used.
- Antibiotics can NOT help to treat virus infections. المضادات الحيوية
- Antibodies CAN help to treat virus infections. الأجسام المضادة



World Business Markets Breakingviews Video More

WORLD NEWS OCTOBER 2, 2020 / 11:36 PM / UPDATED 2 YEARS AGO

Trump treated with experimental antibody cocktail for COVID-19

By Deena Beasley, Diane Bartz

4 MIN READ



Source: <https://www.reuters.com/article/uk-health-coronavirus-usa-trump-treatmentUKKBN26N3CO>

C. How to prevent virus infections?

1. Passive immunization. تُعطى أجسام مضادة جاهزة للمريض أو لمنع الإصابة

Mother to child through the placenta. Mother to child through breast milk. Specific antibodies taken from persons immune to the disease and given to a person at risk of infection.

2. Active immunization (Vaccination).

The Gold standard prevention method.

Several types:

- A. Live attenuated
- B. Inactivated
- C. Subunit

3. Behavioural changes and non-pharmaceutical interventions.

Examples:

- A. Clean needles/syringes
- B. Infection control measures in hospitals
- C. Personal protective equipment (PPE) including face masks

Important Note: This is the only material required for the exam in addition to the following textbook: Jawetz, Melnick, & Adelberg's Medical Microbiology

For any questions you can contact me through the following email: malik.sallam@ju.edu.jo

Lecture 3: 23 October 2023

Principles of diagnosis, treatment and prevention of virus infections

Malik Sallam, MD, PhD

Important Note: This is the only material required for the exam in addition to the following textbook: Jawetz, Melnick, & Adelberg's Medical Microbiology

For any questions you can contact me through the following email: malik.sallam@ju.edu.jo