

Neutralization test

- The neutralization test is an assay based on the ability of antibody to inactivate the biological effects of an antigen or of a microorganism expressing it. Neutralization applies especially to inactivation of virus infectivity or of the biological activity of a microbial toxin
- in a neutralization test, serum and virus are reacted together in equal volumes and inoculated into a susceptible animal host or cell culture. If antibodies to the virus are present then clinical disease or CPE will not be observed; that is, the virus replication will be inhibited and virus is neutralized
- in the immunological sense refers to the ability of antibodies to block the site(s) on bacteria or viruses that they use to enter their target cell. One example of this within biology is a neutralizing antibody
- Viral neutralization refers to the ability to stop a virus from replicating or infecting cells. It is a common misperception that medicines or vaccines kill an invading virus. The real goal of therapy is to stop the activity of a virus, allowing the immune system to clear it from the body
- The mechanism of neutralization depends on processes obligatory for reproduction of a particular virus, and may involve the following steps: attachment to cell receptors; post-attachment events, internalization (endocytosis); fusion with cell membranes or endosome vesicles; uncoating and/or intracellular localization
- A neutralizing antibody (NAb) is an antibody that is responsible for defending cells from pathogens, which are

organisms that cause disease. They are produced naturally by the body as part of its immune response, and their production is triggered by both infections and vaccinations against infections

- neutralization antibodies are antibodies that defend cells against pathogens or infectious particles by modifying any biological effect they carry, and these particles lose their ability to infect or cause disease. Modifying antibodies form part of the humoral response of the adaptive immune system against viruses, intracellular bacteria, and bacterial toxins

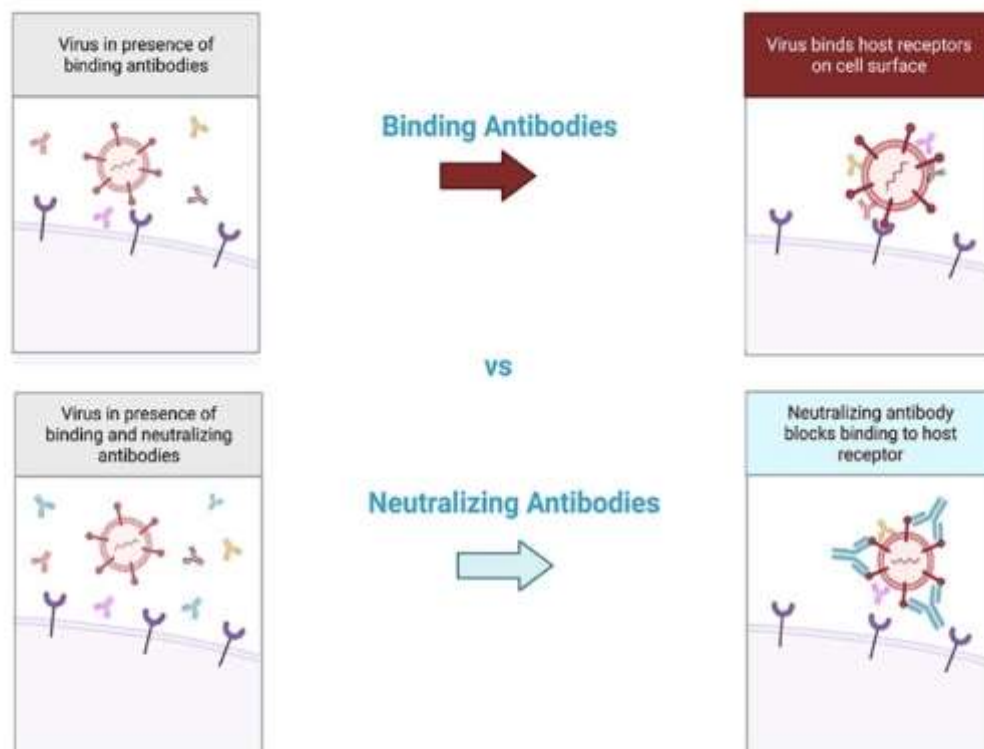
Neutralization tests can be applied:

in vitro = (Lab tests) e.g inoculation in cell culture , Haemolysis (inhibition tests (ASOT Anti Streptolysine O test

in vivo = (Living body /Protection tests) e.g inoculation in lab animals , egg inoculation , Schick test

*The protection tests

Measure the Antibodies neutralization ability toward toxins or viruses and results are measured by intensity of damage on cells or the body of the lab animals which may die in the doses where the Ab can not tolerate the effects of the Ag (Virus or Toxins)



Uses of the neutralization test

1. Recognition of the pathogenic causative agents (Toxins / Viruses) and differentiation between their pathogenicity.
2. Study the antigenic relation for various toxins and viruses
3. Detection the biological protection ability of the neutralizing antitoxins and antiviruses against toxins and Viruses .
4. Measure the potency of vaccines and the ability to induce immunity .

1. In Vivo Neutralization

Schick test:

- Schick test - used to determine whether or not a person is susceptible to diphtheria (*Corynebacterium diphtheriae*).

- It is simple procedure.: A small amount (0.1 ml) of diluted (1/50 MLD) diphtheria toxin is injected intra dermally into the arm of the person.
- the skin around the injection will become red and swollen, indicating a positive result

Results can be interpreted as

- Positive: when the test results in a red necrotic area of 5-10 mm diameter
- Pseudo-positive: when there is only a red colored inflammation and it disappears rapidly
- Negative reaction: No Wheel and erythema

* Neutralization test (Haemolysine)

Methodology

- Ab Serial dilution
- 0.5 ml Haemolysine + 0.5 ml diluted SERUM --- Incubation at 37 C for 15 Minutes
- Addition of O- RBC ---Incubation at 37 oC for 45 Minutes
- Centrifuge 3000 RBM for one minute