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Lecture title: Neutralization Test

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Summary:

1- Learning the Neutralization Test

Neutralization Test

Neutralization means the reduction of the effect of any component. Neutralization is one of the Ag-Ab reactions which aids in reducing the effects of viral antigens or viruses

There are some specific antibodies involved in neutralization and these antibodies are called neutralizing antibodies. Not all antibodies produced in our body can block the effects of antigens. Only neutralizing antibodies can block the uptake of viral particles or antigens by the cells and neutralize their activity. It belongs to both invitro and in-vivo types of Ag-Ab reactions.

Neutralization Principle

It is based on the principle that some specific antitoxins or antibodies can reduce or neutralize various biological effects occurring due to different enzymes, toxins, and viruses.

Applications of Neutralization Test

- the determination of pathogenic components such as toxins and viruses, and the differentiation between their pathogenicity.
- study of antigenic relations of different viruses.

Advantages of Neutralization Test

- It has higher sensitivity.
- It has higher specificity.
- The neutralizing antibodies used in virus neutralization tests can detect the virus along with its various strains.

The Virus Neutralization Test

is a type of neutralization test used for virus detection. it is used for the neutralization of the biological activities of the virus.

Viruses can be grown by egg inoculation, animal inoculation, and cell culture. If the antibodies specific for the respective virus are inoculated in these mediums, it can halt the growth and replication of viruses.

The virus contains certain antigenic determinants to which the antibodies initiate the
neutralization of the effects of the virus.

Cytopathic Effect

Cytopathic Effect(CPE) is the change that occurs in the structure of the cells of the host invaded by the virus. It can result in the death of the cells. Eg. Poliovirus produces cytopathic effects.

Requirements

Serum sample, Known viral suspension, Cell culture suitable for the virus, Diluting solution

Procedure

The general procedure is as follows:

1. The patient's serum is taken and diluted.
2. It is then mixed with the known viral suspension in equal volume and incubated.
3. Then the mixture is inoculated in a cell culture.
4. Incubated and observed for cytopathic effects.
5. A control is also prepared to compare the results.

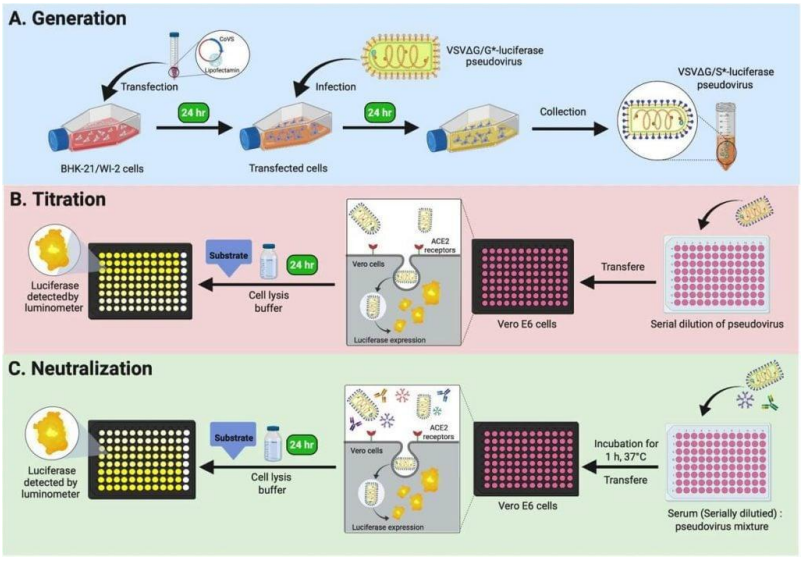
Result Interpretation

If the sample contains neutralizing antibodies, then the viral components will be neutralized by it and cytopathic effects will not be observed after the test. It will be considered a positive test. The occurrence of cytopathic effects will suggest a negative result.

Applications

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- Newcastle virus neutralizing antibodies test is used to detect the respective infection in an individual and its severity.
- It can be used to detect various viral infections such as measles, mumps, influenza, etc



Limitations of Neutralization Test

- The neutralizing antibodies take time to generate in the body after an infection.
- These tests require professionally skilled individuals to perform.
- These tests require highly protective lab conditions and care as working with the virus can be hazardous.