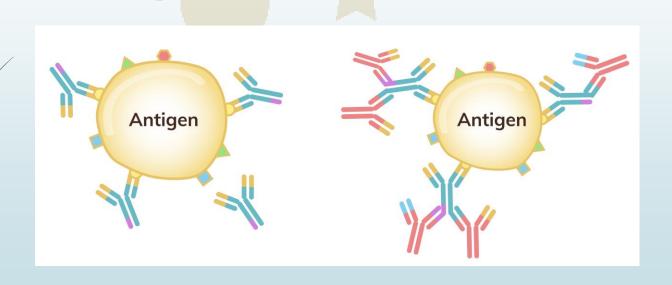
Document 8



Diagnostic Applications of Antibody Properties

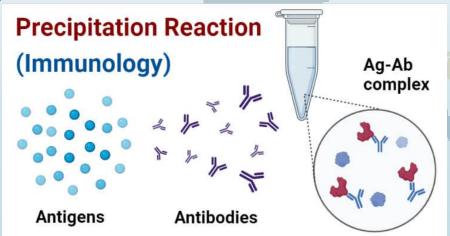


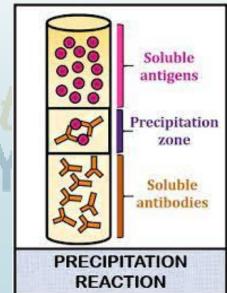


- The specificity of antibodies makes it possible to detect particular antibodies in an individual's serum, by using its corresponding antigens.

- The antigen-antibody reactions are used in different

techniques of medical analysis.







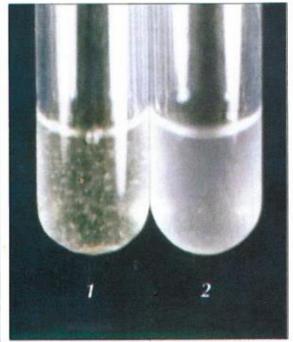
• Techniques of Medical Analysis:

I. Serological Test: where serum is collected from a patient to determine if the serum contains antibodies for a disease or not.



1. Agglutination reaction: Doc.a, p.152.

- Agglutination= binding of an antibody to its specific antigen and thus formation of Ag-Ab complex.
- Typhoid is a disease caused by salmonella.
- The infected individual has anti- salmonella antibodies in his blood (serum) against salmonella Ag.



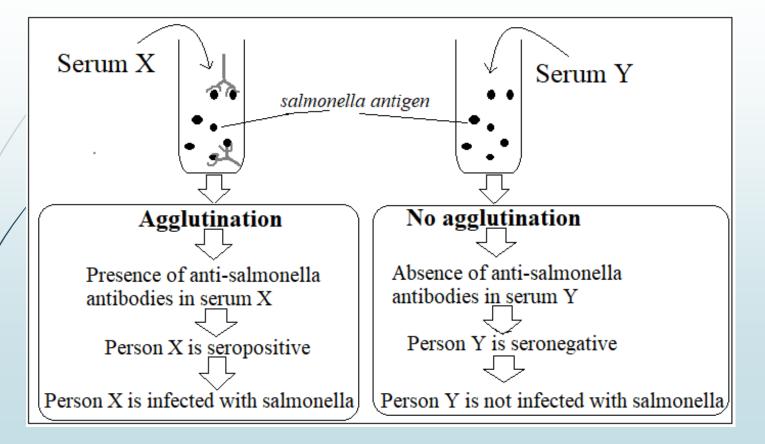
Doc.a salmonella agglutination tests: positive test (1), negative test (2)

Add serum of a patient into a tube containing salmonella Ag,

and check for agglutination.



*Title: A schematic diagram illustrating agglutination reaction.

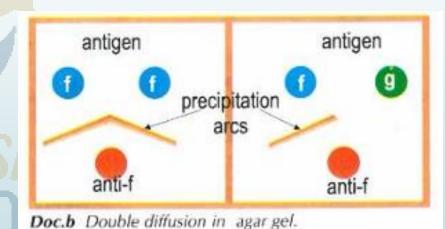




2. Immunodiffusion in gel:



- A serum is obtained from a patient and placed in a well in an agar gel in the presence of specific antigens. Doc,b p.152.
- If a precipitation arc is formed:
- \Rightarrow presence of Ag-Ab complex.
- ⇒ presence of Ab in the patient's serum specific for the Ag.
 - /the patient is seropositive.



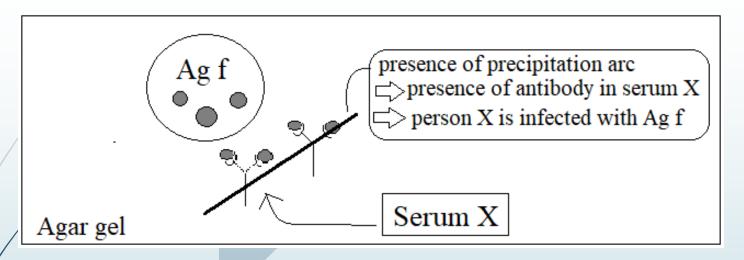
:_

The patient is infected with this specific

Alg.

*Title: A schematic diagram illustrating immunodiffusion in gel.





If no precipitation arc is formed:

- \Rightarrow Individual is **seronegative**
- \Rightarrow not infected

II. Immunomarking Test:

Be SmartACADEMY

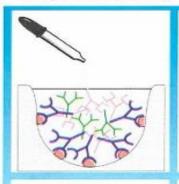
ELISA technique used for detection of anti- HIV antibodies.

In the ELISA technique (enzyme-linked immuno sorbent assay), the investigated molecule is detected by the sequential addition of two reagents:

- a specific antibody for this molecule,

which is coupled to an enzyme;

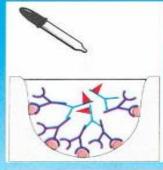
 a colorless substrate that is transformed into a colored product upon contact with the enzyme (Doc. c).



1- Human test serum is incubated in a plastic plate "well" that has been covered with HIV antigens. If anti-HIV antibodies are present in the serum, they bind to the antigens. Other antibodies remain free.



2- The plate is washed abundantly. Only specifically bound antibodies remain attached. The other antibodies are eliminated.



3- An antibody that is specific for human Ig, and coupled to an enzyme, is added in all the wells.

After incubation, the plate is washed again.

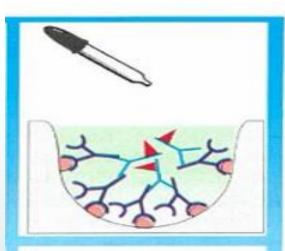


4- The enzyme substrate is added. Its transformation into a colored product indicates the presence of enzyme bound to the well, and subsequently that of anti-HIV antibodies in the serum. The infection by the HIV is tested by adding anti-HIV antibodies to the serum. The above test is a seropositive one.

Doc.c ELISA test for the detection of anti-HIV antibodies.

• In step 4:

- If the color changes inside the well →
 +ve result → individual is seropositive having anti- HIV antibodies → infected with HIV
- If no change in color→ no Ab→
 person is seronegative and not /infected.

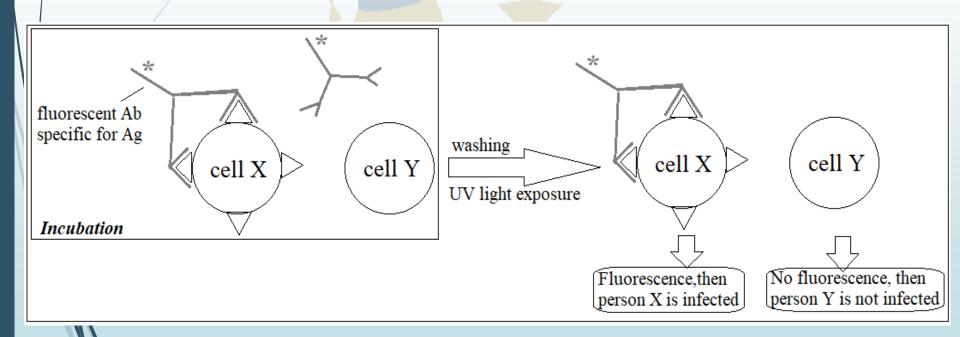


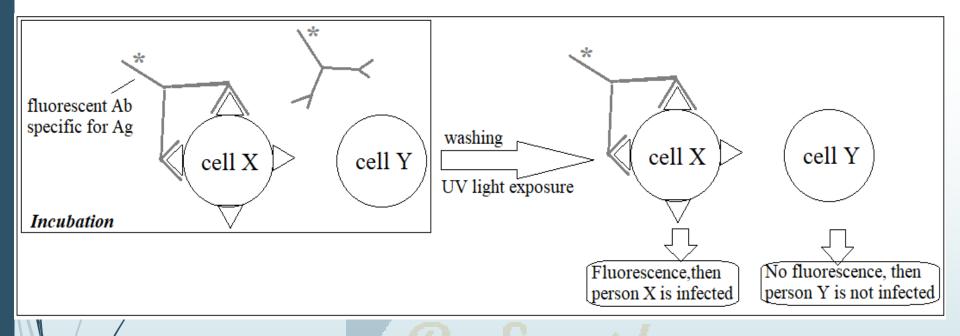
4- The enzyme substrate is added. Its transformation into a colored product indicates the presence of enzyme bound to the well, and subsequently that of anti-HIV antibodies in the serum. The infection by the HIV is tested by adding anti-HIV antibodies to the serum. The above test is a seropositive one.

III. Immunofluorescence:



- It is used to <u>detect cellular antigens</u> by <u>using antibodies of known</u> <u>specificity that are coupled to a fluorescent substance.</u>





For cell X:

- emission of colored light
 - \Rightarrow +ve result.
 - \Rightarrow person is infected.

no emission of colore

- no emission of colored light.
 - \Rightarrow -ve result(absence of specific antigen).
 - \Rightarrow person is not infected.

