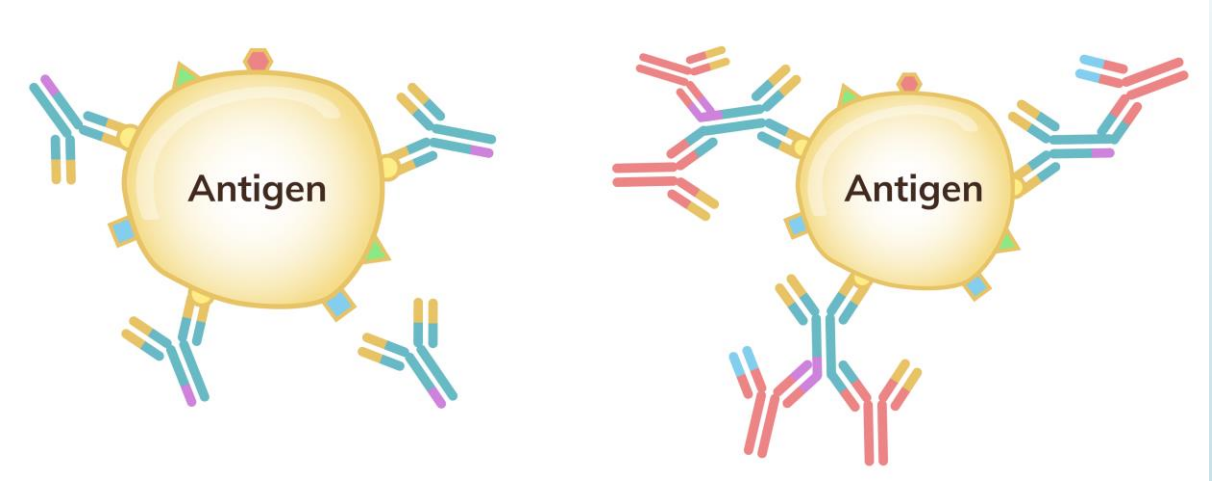
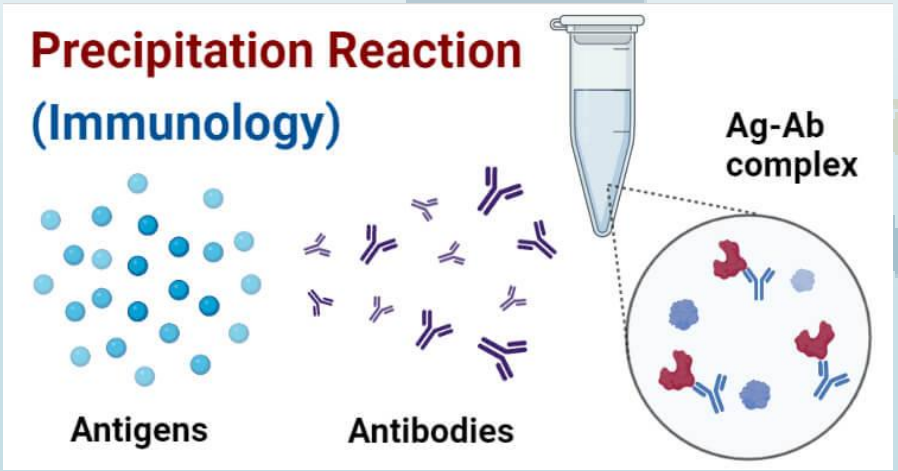
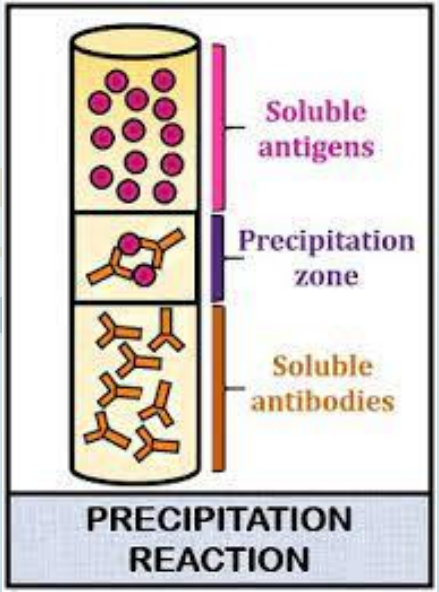
Document 8

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.



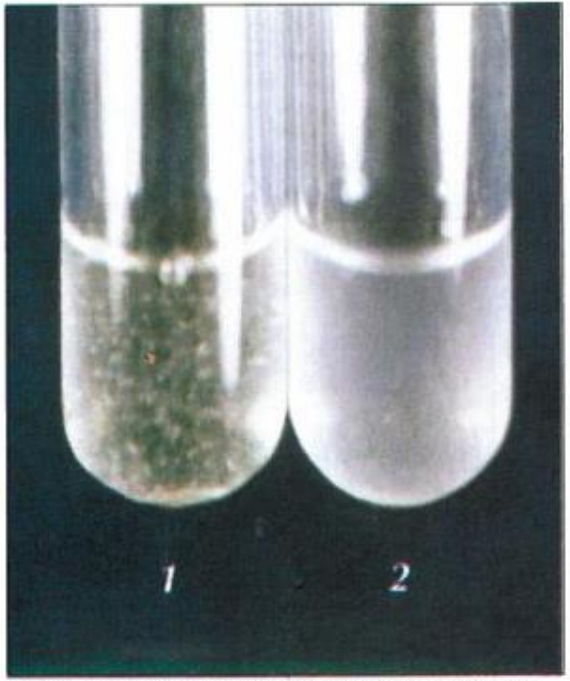


- **Techniques of Medical Analysis:**

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.

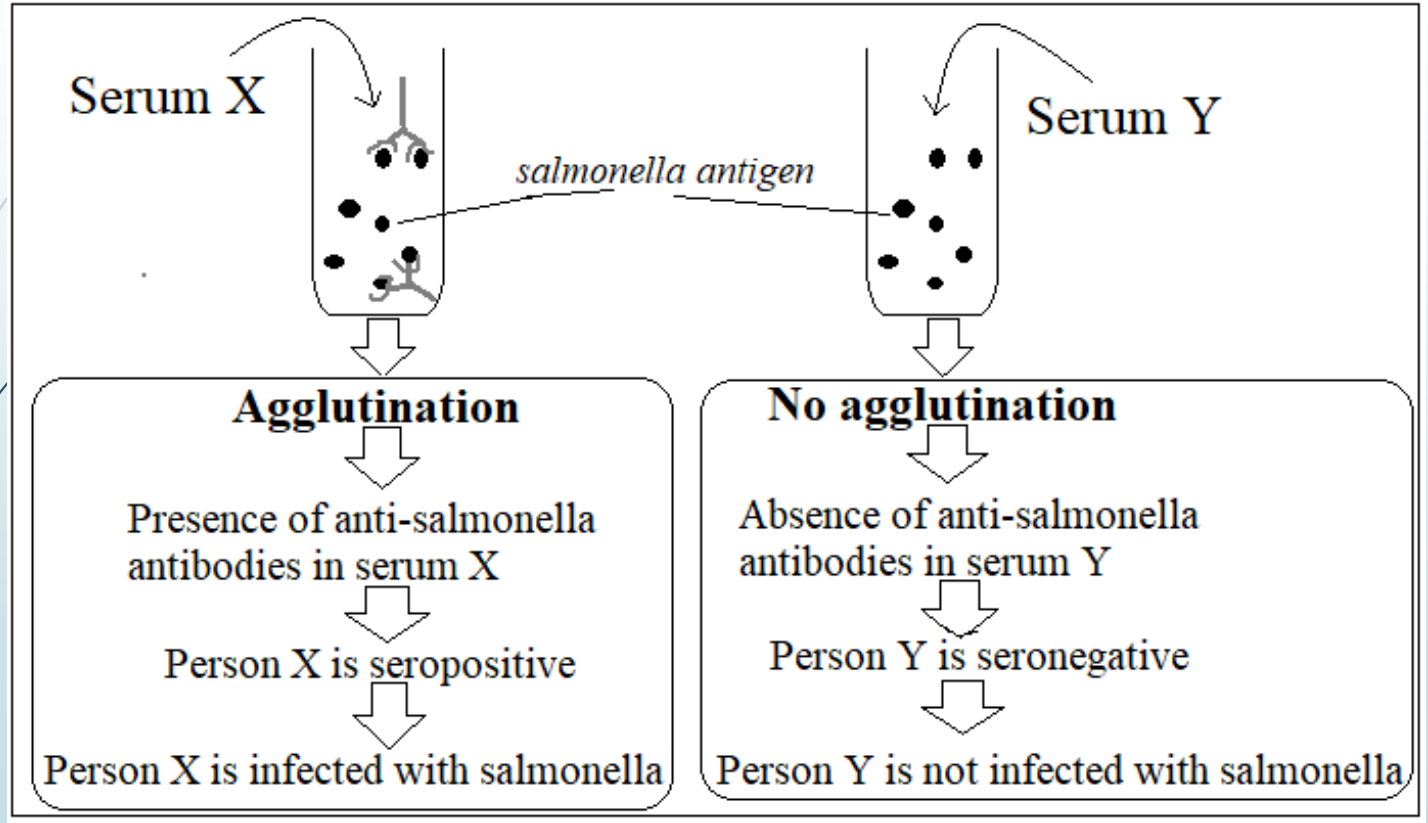
- Agglutination= binding of an antibody to its specific antigen and thus formation of Ag-Ab complex.
- Typhoid is a disease caused by salmonella.
- The infected individual has anti- salmonella antibodies in his blood (serum) against salmonella Ag.



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.

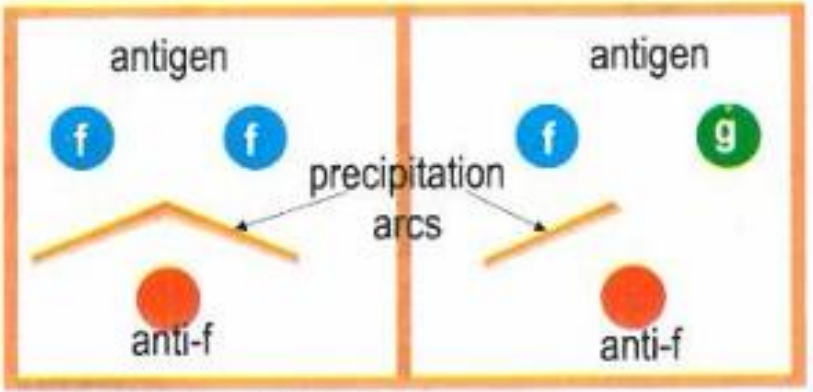
- **If a precipitation arc is formed:**

⇒ presence of Ag-Ab complex.

⇒ presence of Ab in the patient's serum specific for the Ag .

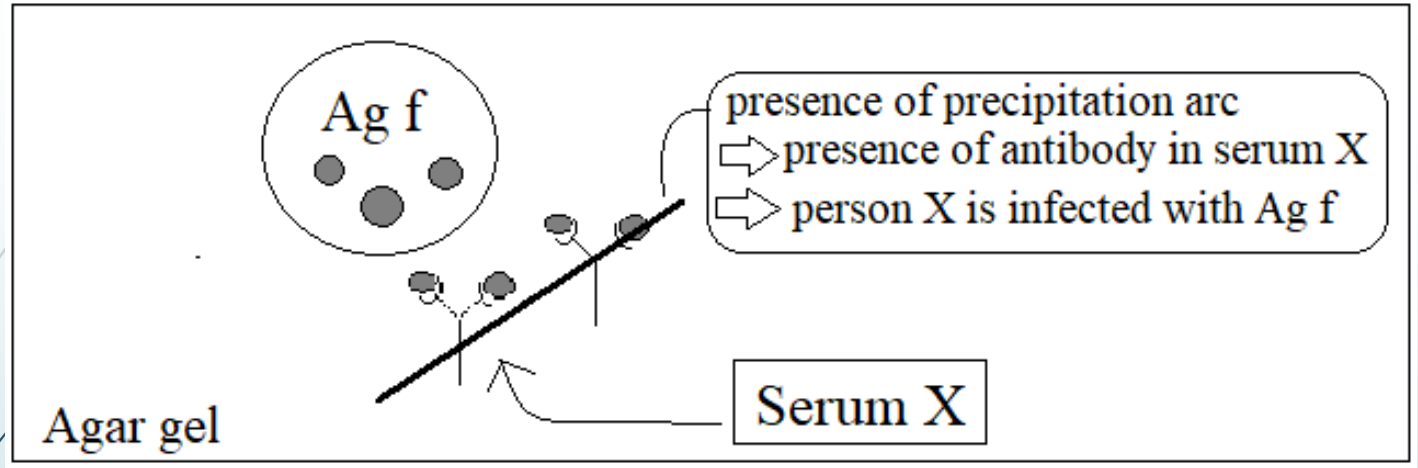
⇒ the patient is seropositive.

⇒ The patient is infected with this specific Ag.



Doc.b *Double diffusion in agar gel.*

***Title: A schematic diagram illustrating immunodiffusion in gel.**



- **If no precipitation arc is formed :**

⇒ Individual is **seronegative**

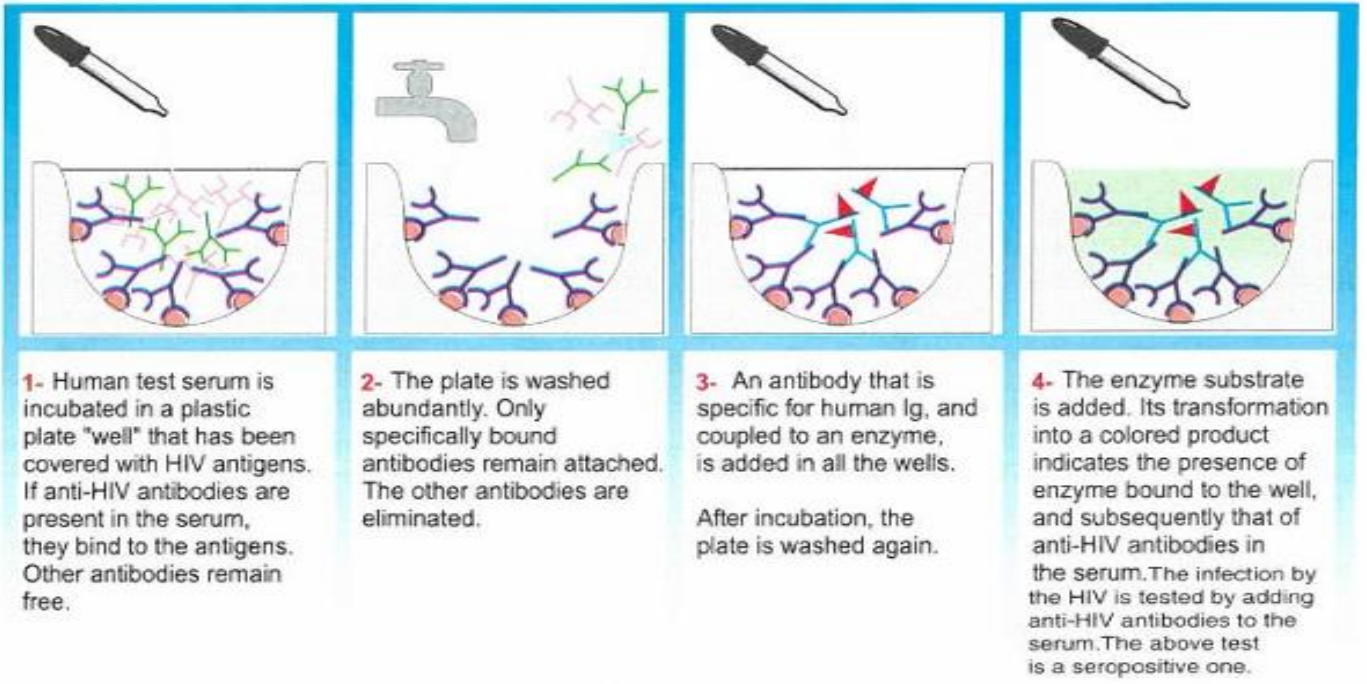
⇒ not infected

II. Immunomarking Test:

- **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:

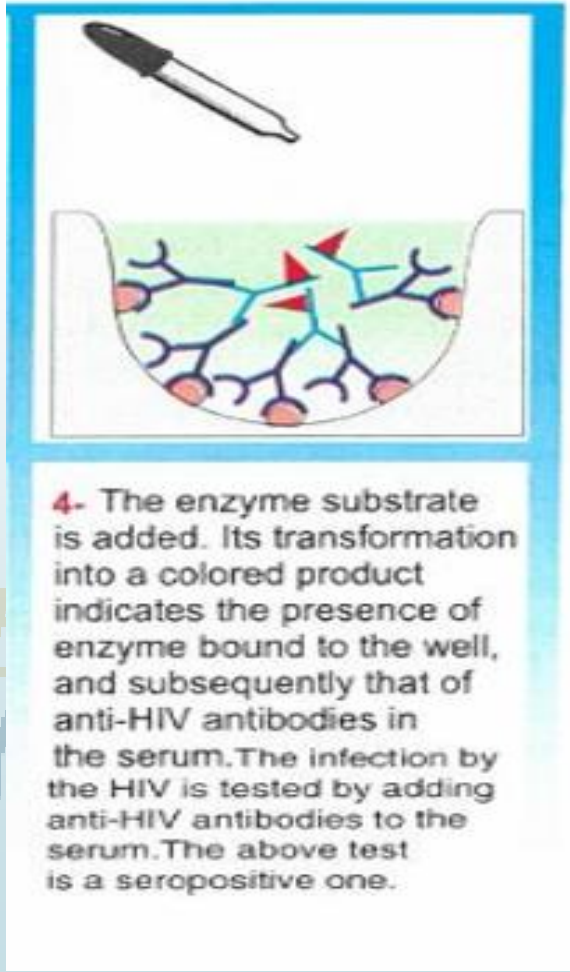
- a specific antibody for this molecule, which is coupled to an enzyme;
- a colorless substrate that is transformed into a colored product upon contact with the enzyme *(Doc. c)*.



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

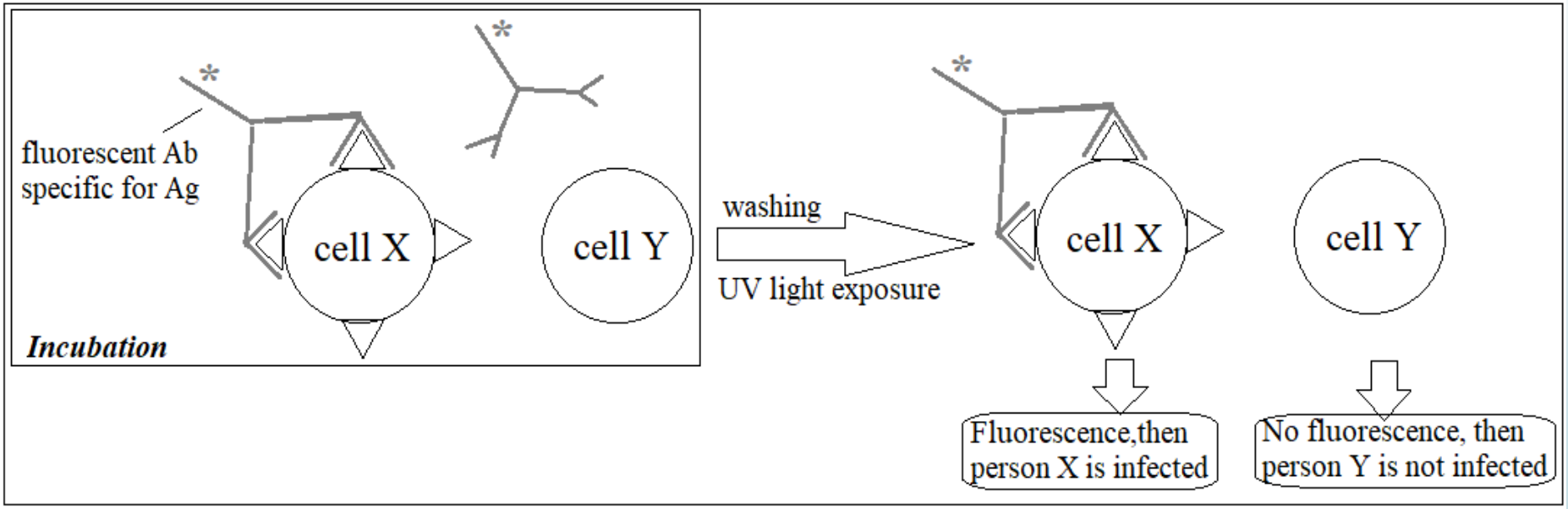
- **In step 4:**

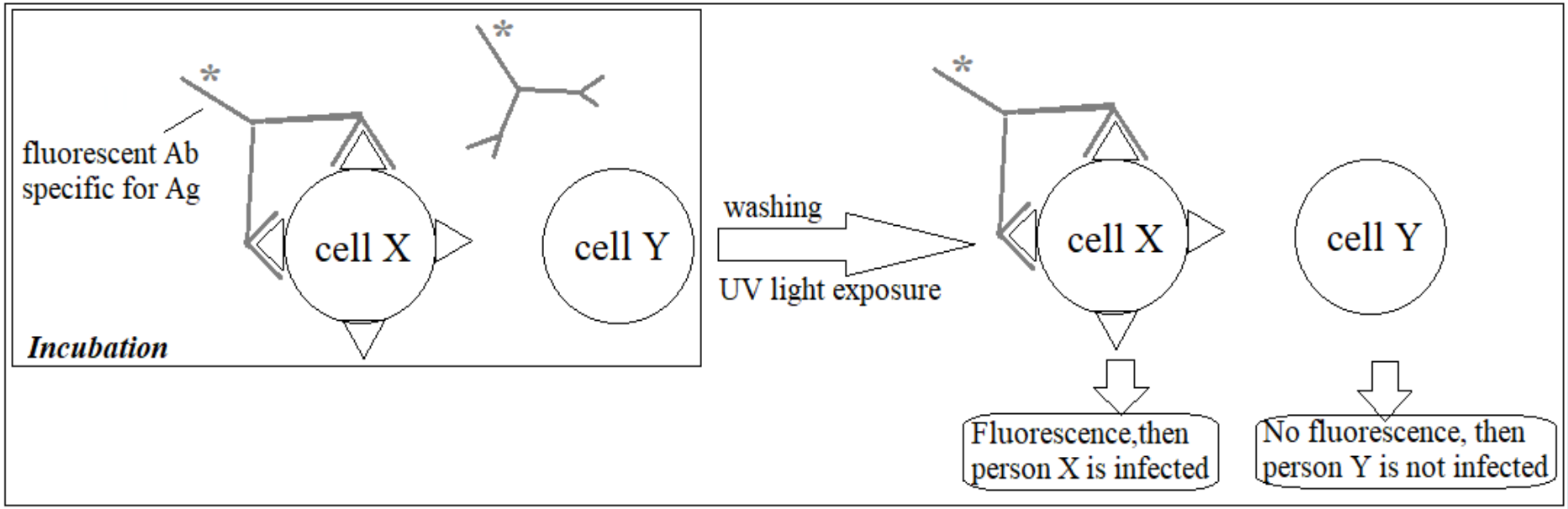
- If the color changes inside the well→ +ve result → individual is seropositive having anti- HIV antibodies→ infected with HIV
- If no change in color→ no Ab→ person is seronegative and not infected.



III. Immunofluorescence:

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





- **For cell X:**
  - emission of colored light
  - ⇒ +ve result.
  - ⇒ person is infected .

- **For cell Y:**
  - no emission of colored light.
  - ⇒ -ve result(absence of specific antigen).
  - ⇒person is not infected .