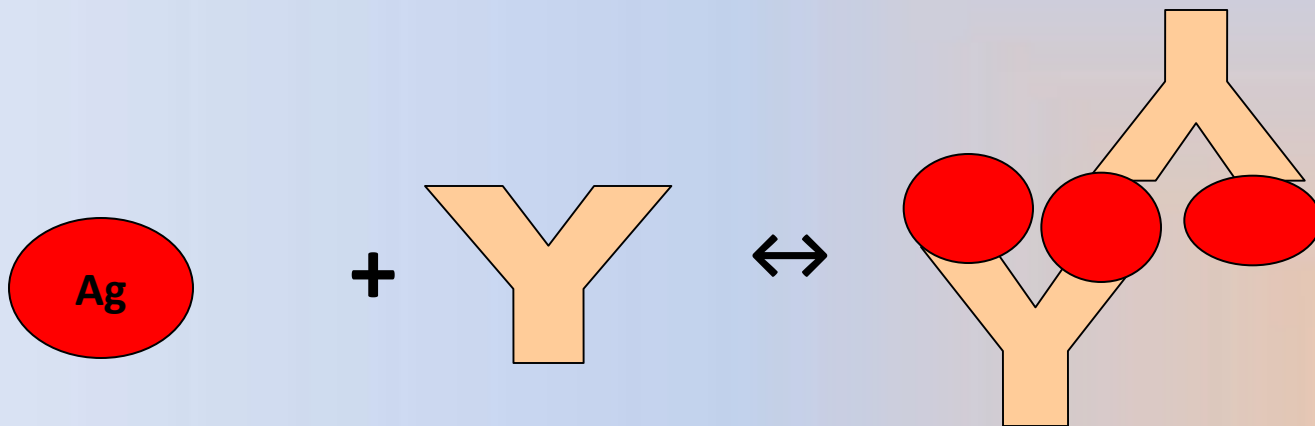


# Serological tests

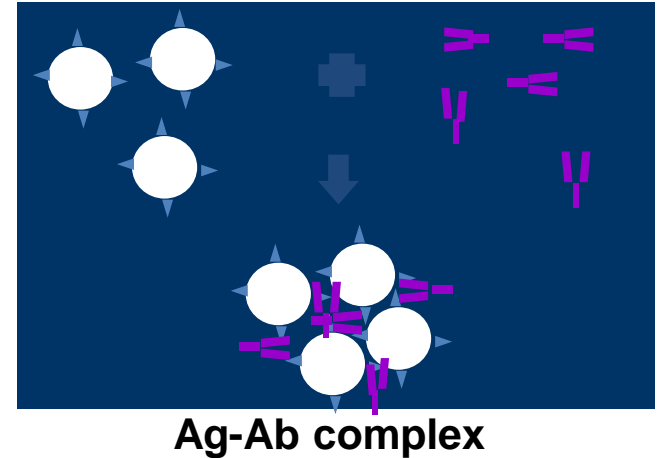
**Serology:** is the science dealing with the study of antigen–antibody reaction



# agglutination

## Principle

- combination of an **insoluble** particulate antigen with its soluble antibody
- forms antigen-antibody complex
- particles clump/agglutinate
- used for antigen detection









































































































## Examples

- bacterial agglutination tests for diagnosis of *Salmonella spp.* and *Brucella* infection.



Positive

Negative

Patient	1/20	1/40	1/80	1/160	1/320	1/640	1/1280	1/2560	1/5120	1/10240	Pos.	Neg.	Titer	
1													640	
2													80	
3														5120
4														<20
5														320
6														1280
7														320
8														40

## Antibody Titer

- Is the concentration of antibodies against a particular antigen

# Precipitation

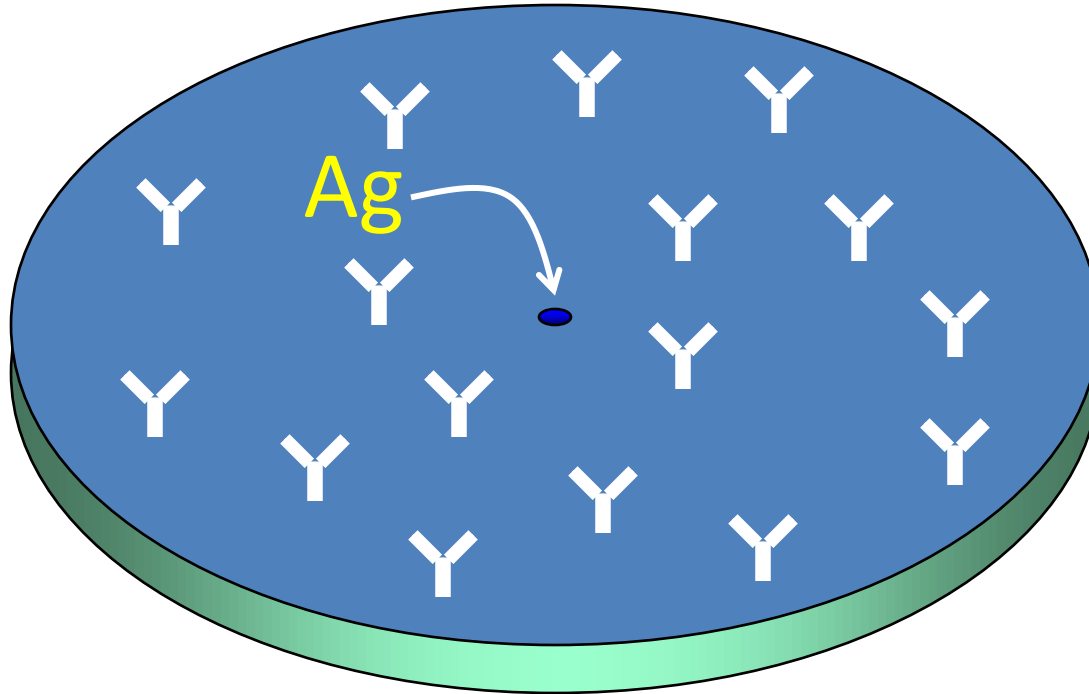
\*soluble antigen combines with its specific antibody

\*antigen-antibody complex is too large to stay in solution and precipitates

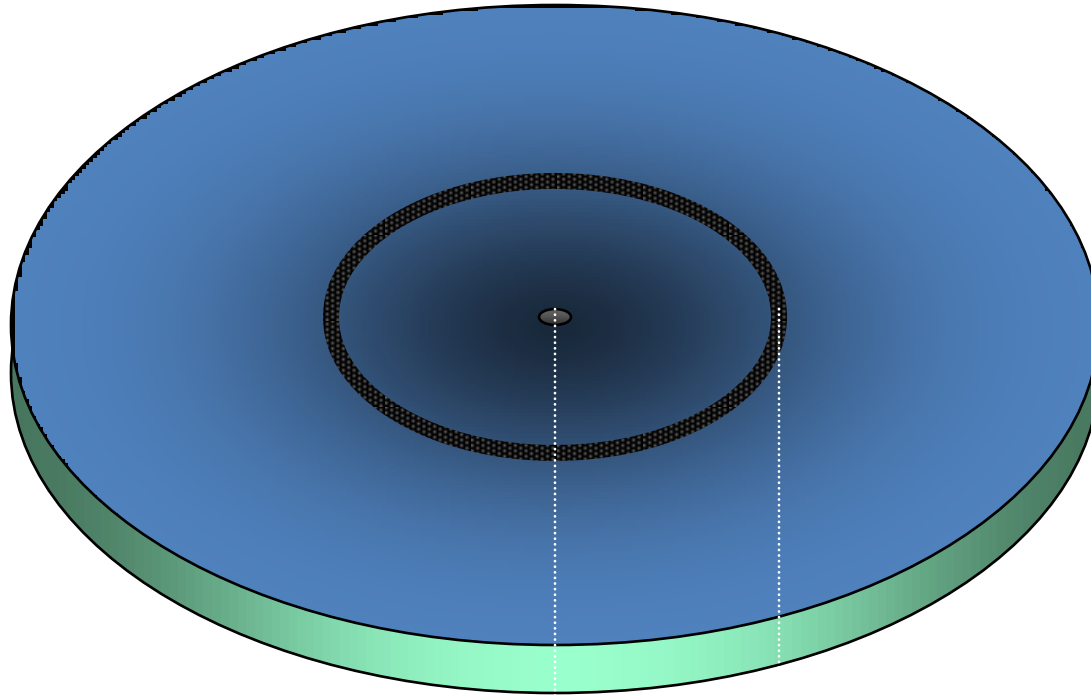
Single radial immunodiffusion

Double Radial Immunodiffusion

# Single radial immunodiffusion



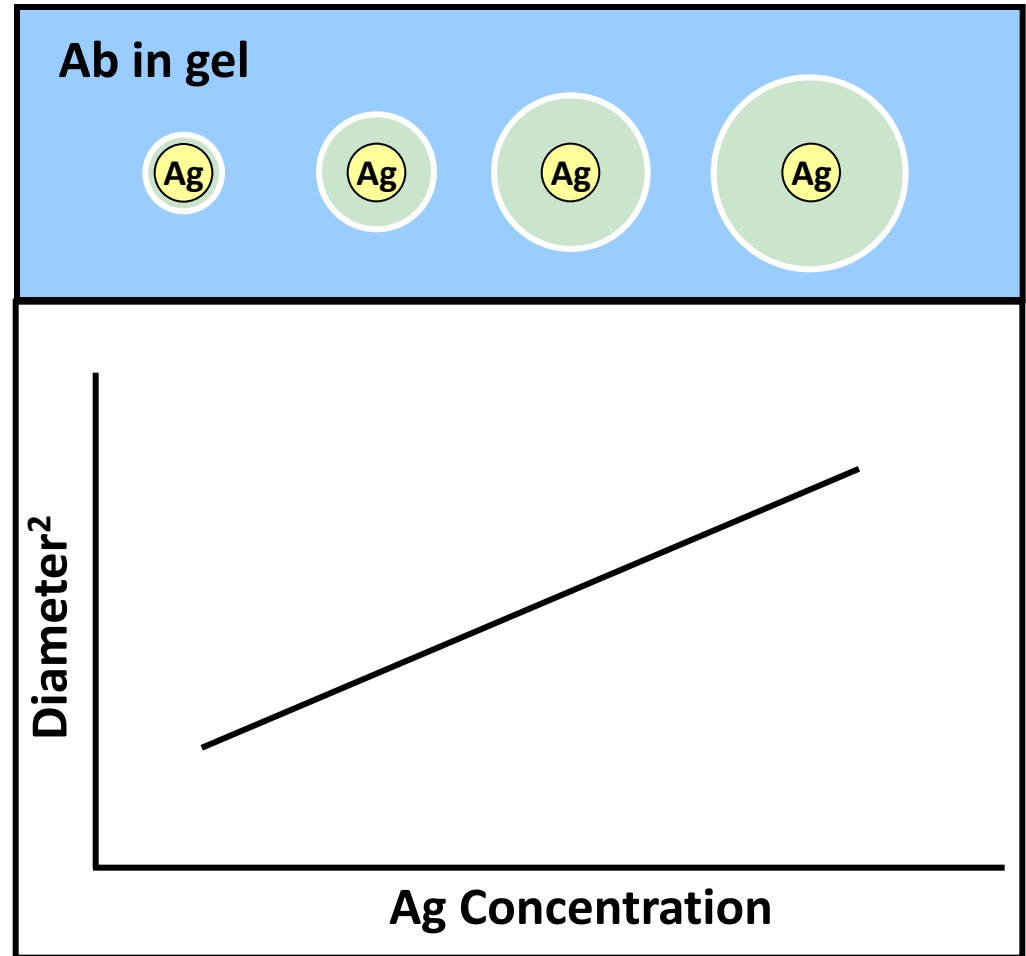
# Single radial immunodiffusion

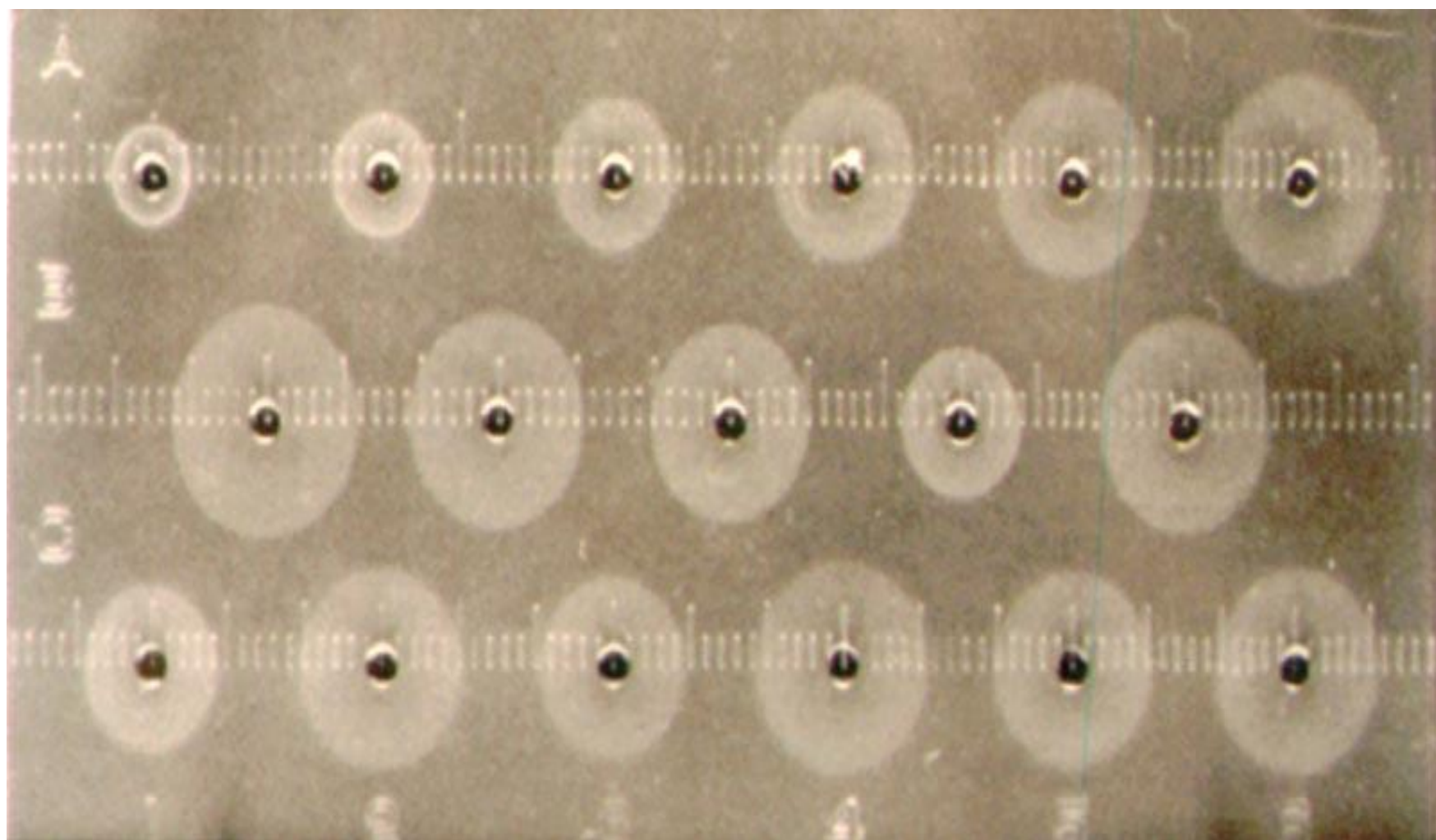


**$r \propto \text{Ag conc.}$**

# single Radial Immunodiffusion

- Method
  - Ab in gel
  - Ag in a well
- Interpretation
  - Diameter of ring is proportional to the concentration
- Quantitative
  - Ig levels

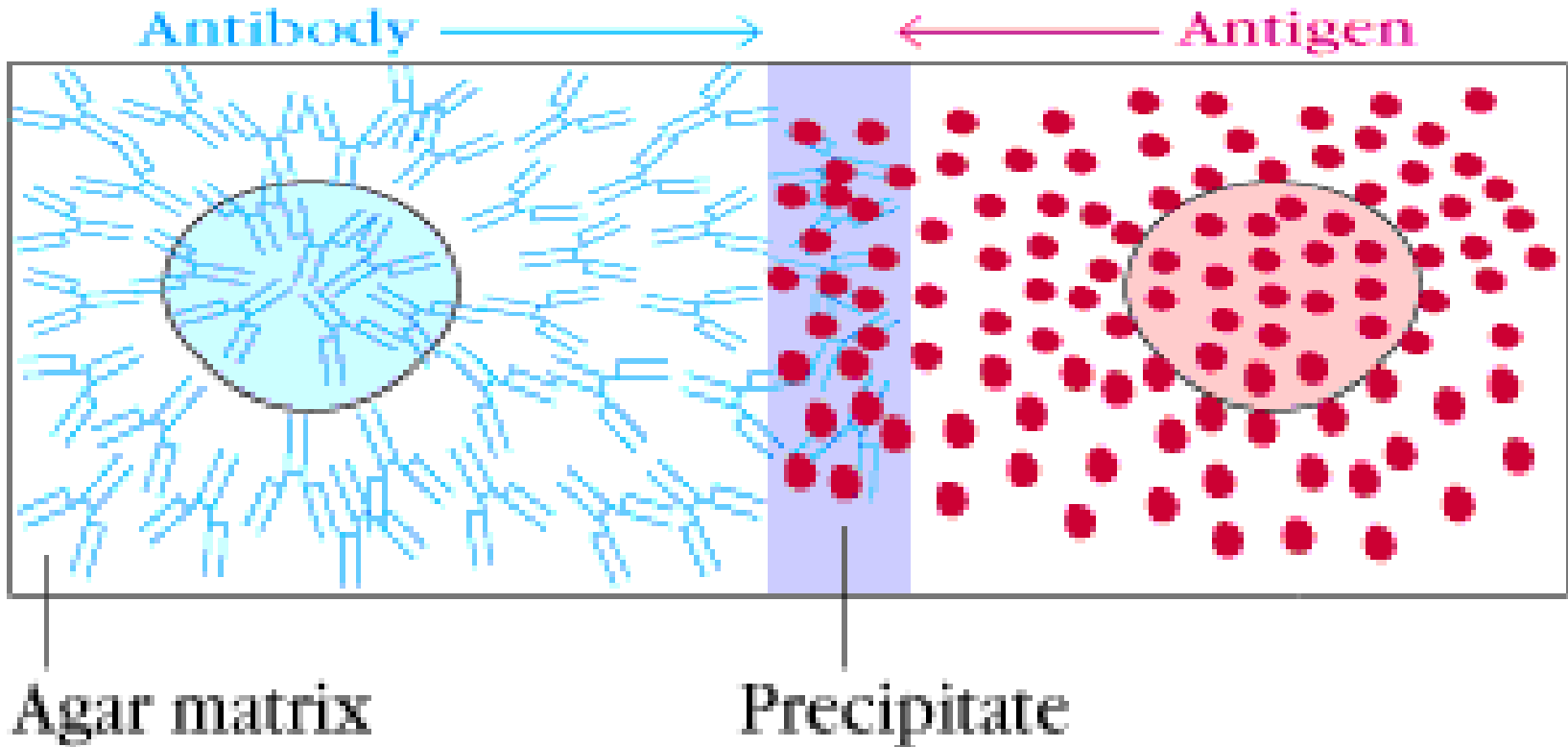




# Double Immunodiffusion

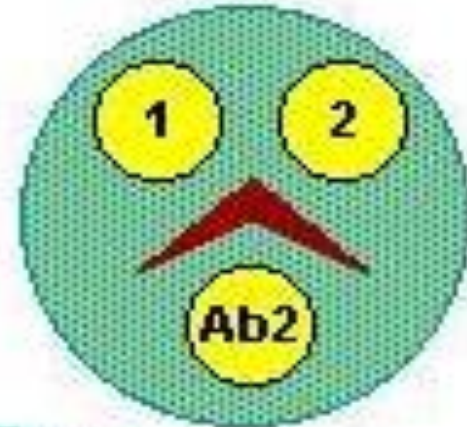
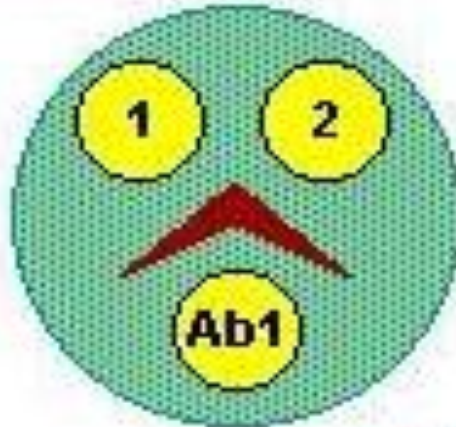
Diffusion of antibody and antigen towards each other in an agarose gel. A line of precipitate will form if the antibody binds to antigen. Used to determine if an antigen or antibody is present.

## DOUBLE IMMUNODIFFUSION

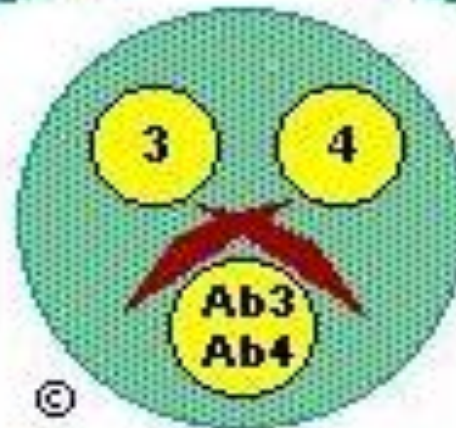


# Double Radial Immunodiffusion

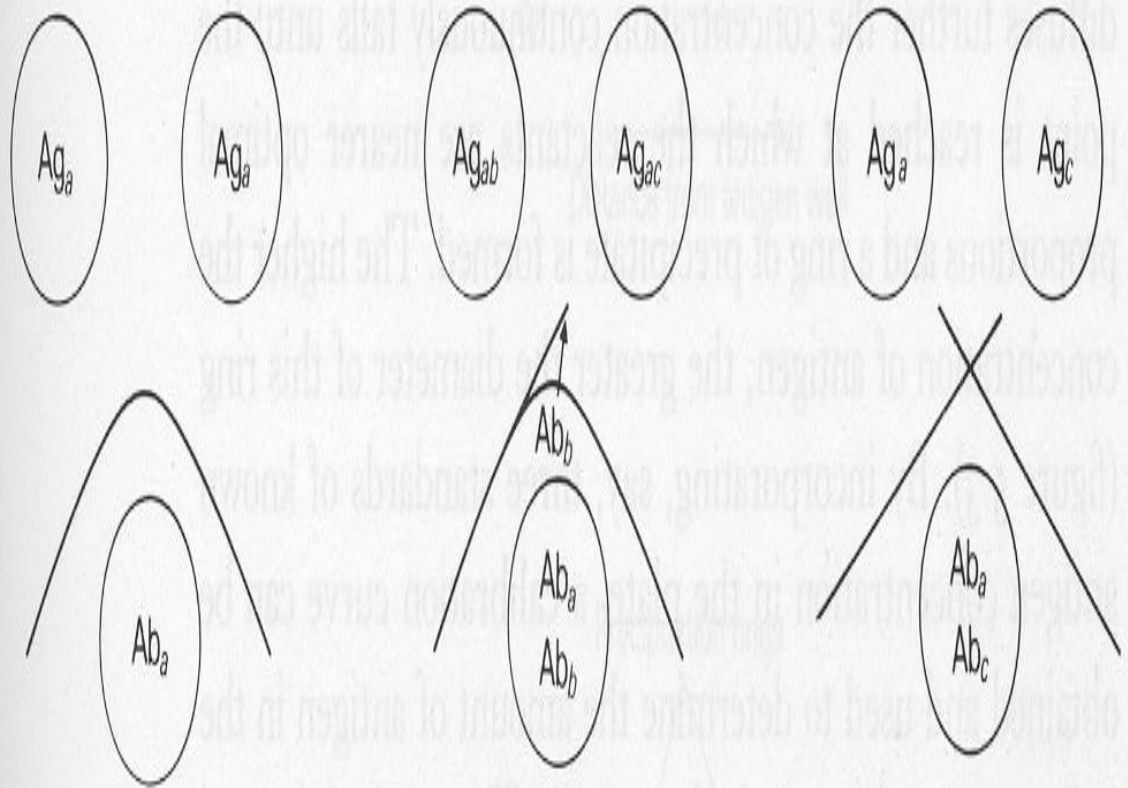
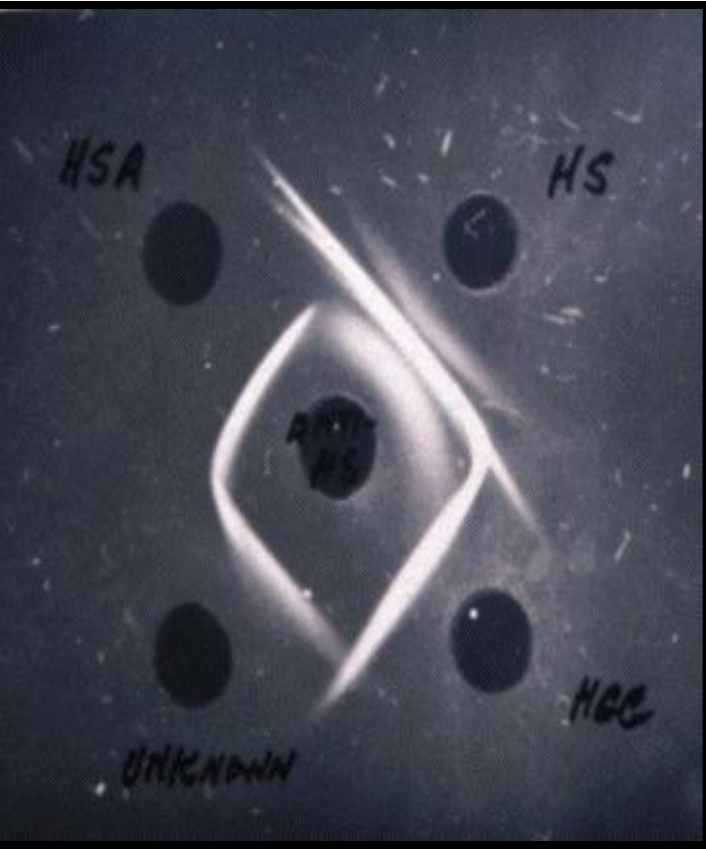
**Identity  
between  
antigens**



**Nonidentity  
between  
antigens**



©



(a) 'Identity'

(b) Partial identity

(c) Non-identity

**Similar  
precipitin lines**

**Precipitin lines  
do not form  
a complete cross**

**Precipitin lines  
completely  
cross**

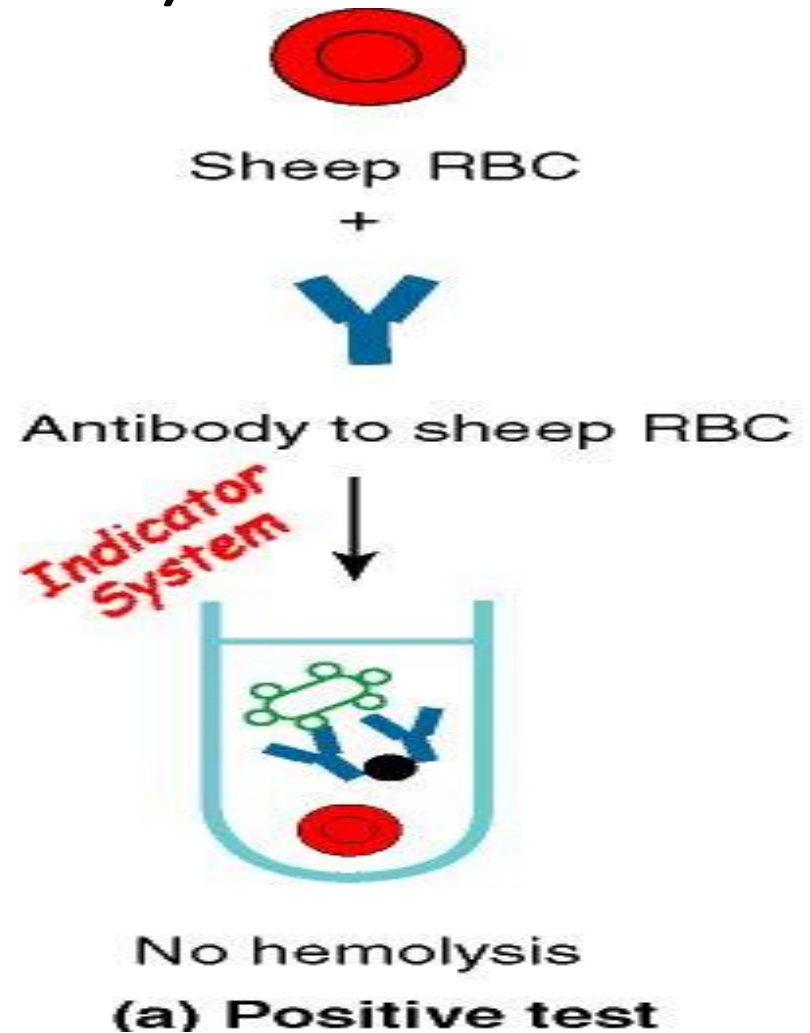
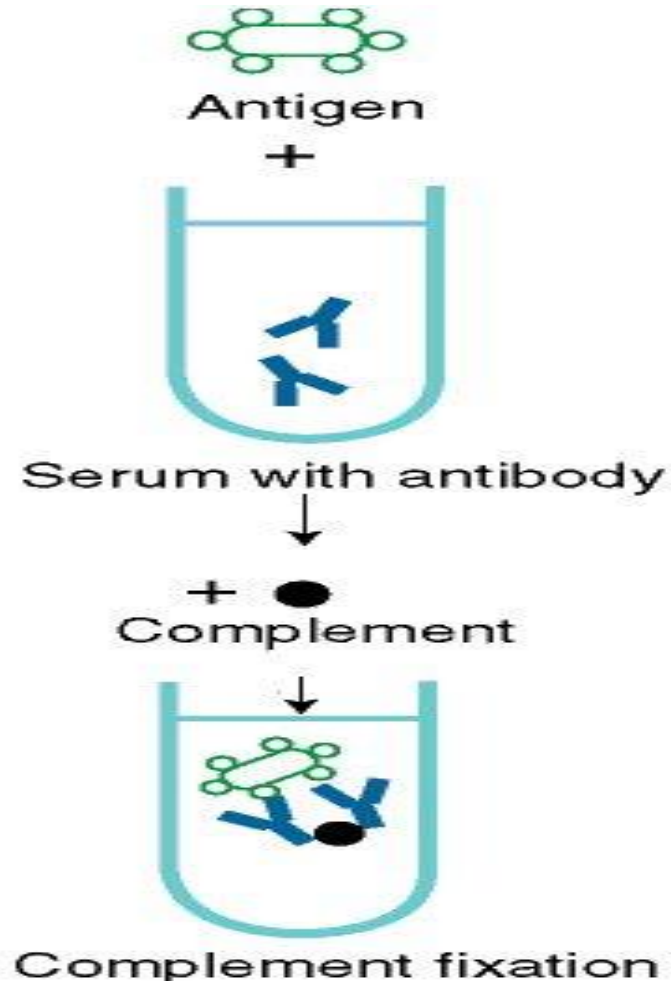
## Complement fixation test

It tests for the presence of either specific *antibody* or specific *antigen* in a patient's serum.

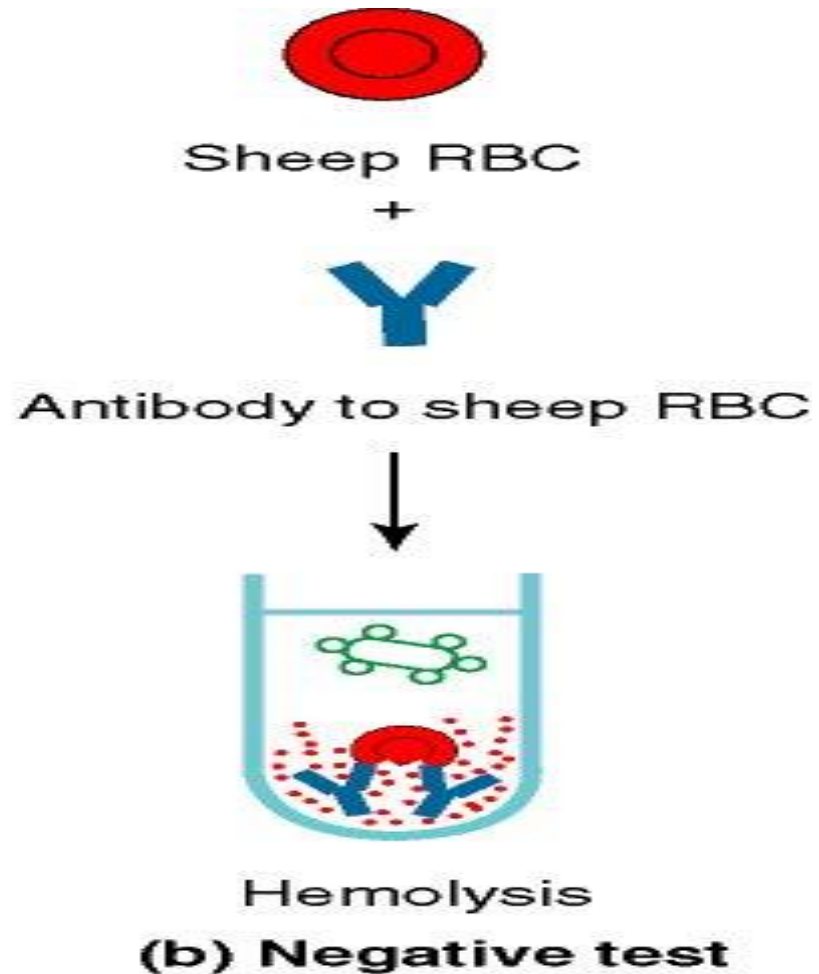
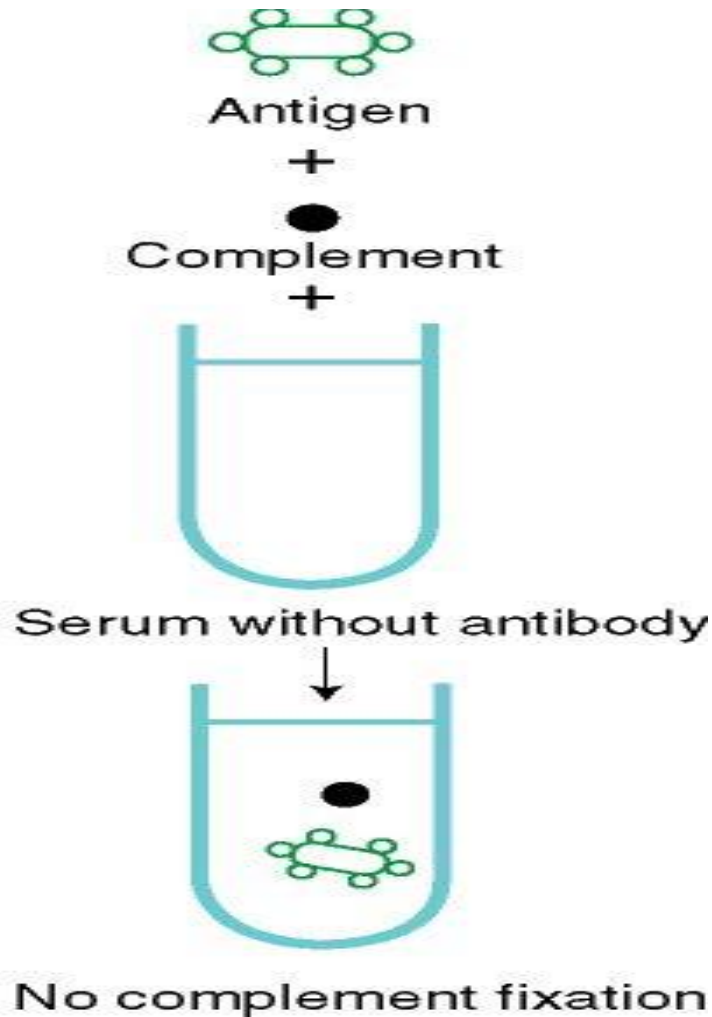
**Test system:** It uses specific antigen (if looking for antibody in serum) or specific antibody (if looking for antigen in serum)

**Indicator system:** It uses sheep red blood cells (sRBC), anti-sRBC antibody and complement.

# Complement Fixation Assay (positive test)

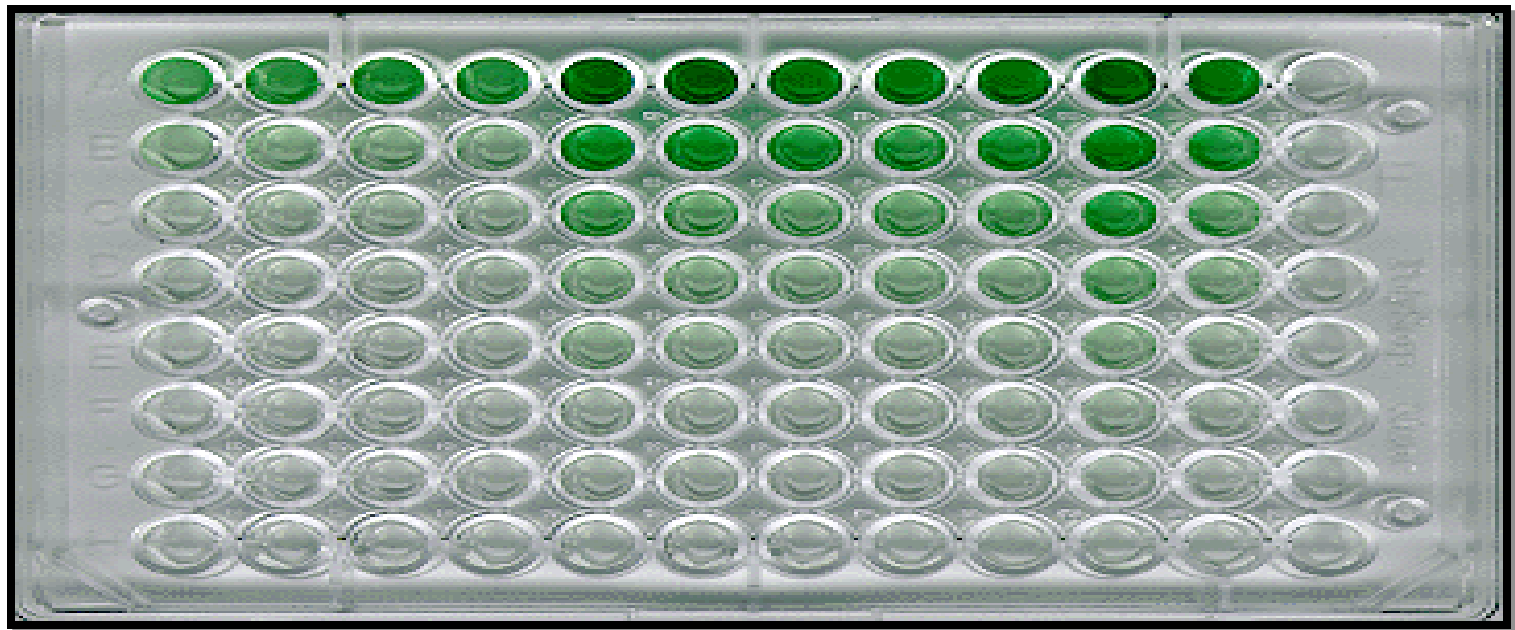


# Complement Fixation Assay (negative test)



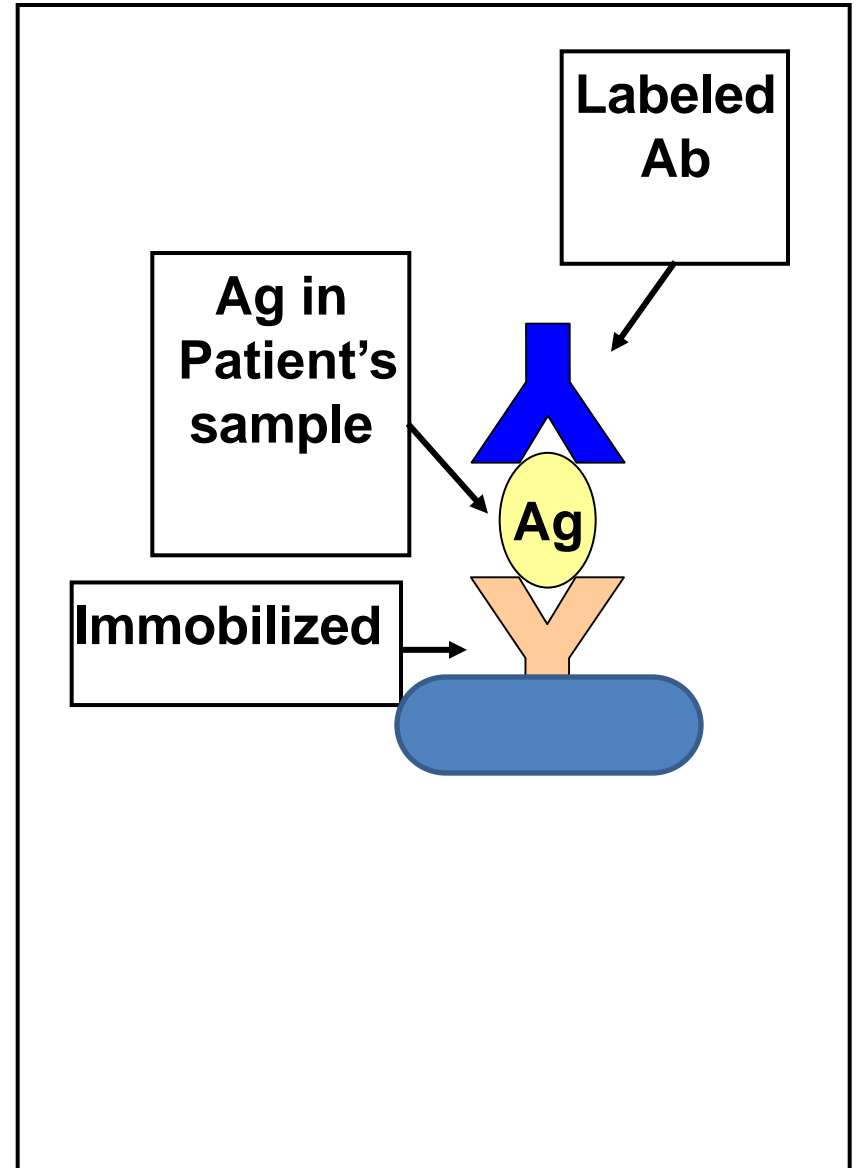
# ELISA

**Enzyme-Linked ImmunoSorbent Assay**, or **ELISA**, is a biochemical technique used mainly in immunology to detect the presence of an antibody or an antigen in a sample .



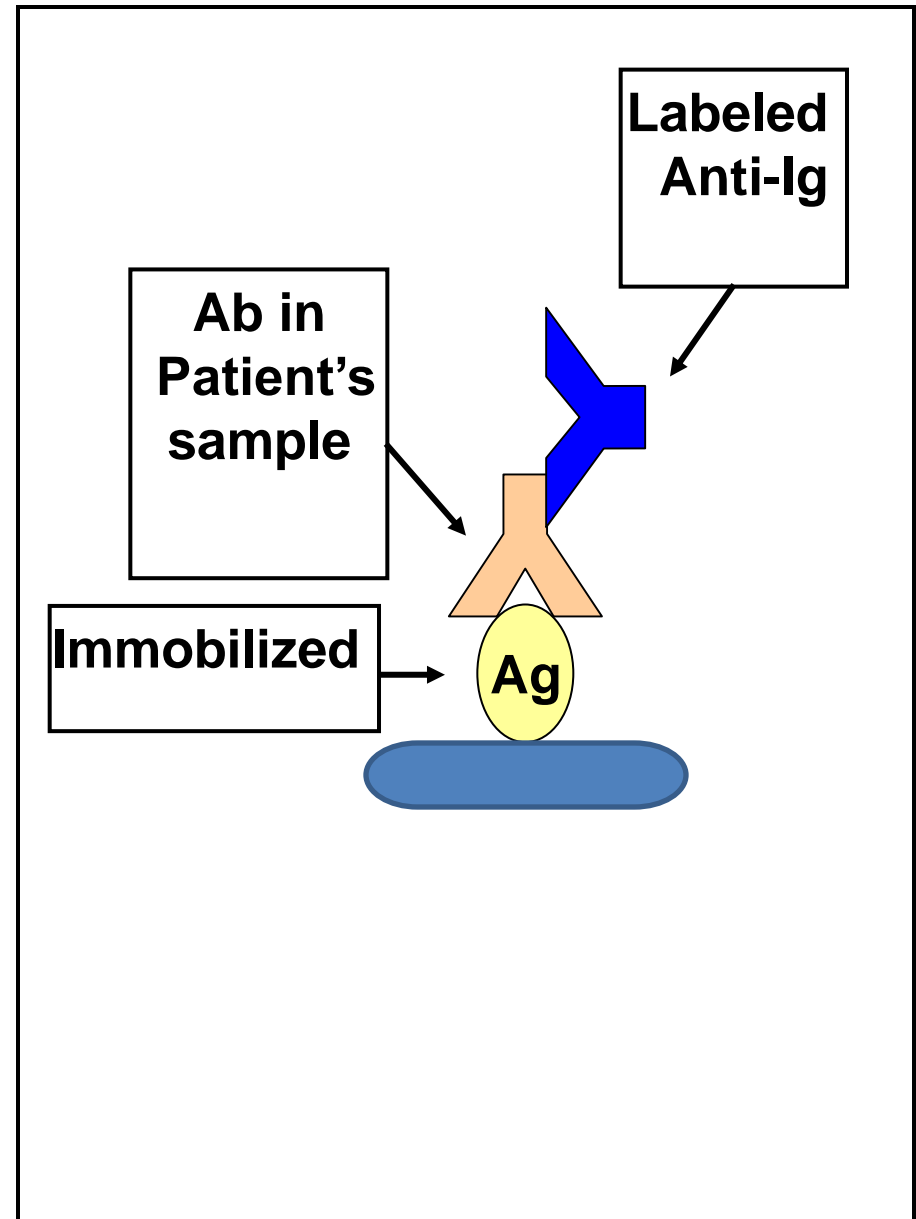
- **Ag detection**

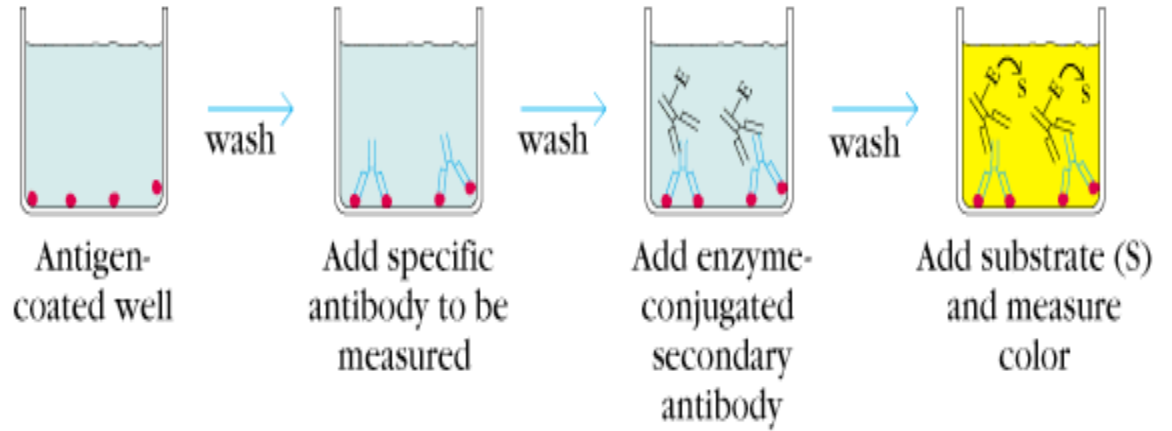
- Immobilize Ab
- Incubate with sample
- Add labeled antibody
- Amount of labeled Ab bound is proportional to the amount of Ag in the sample



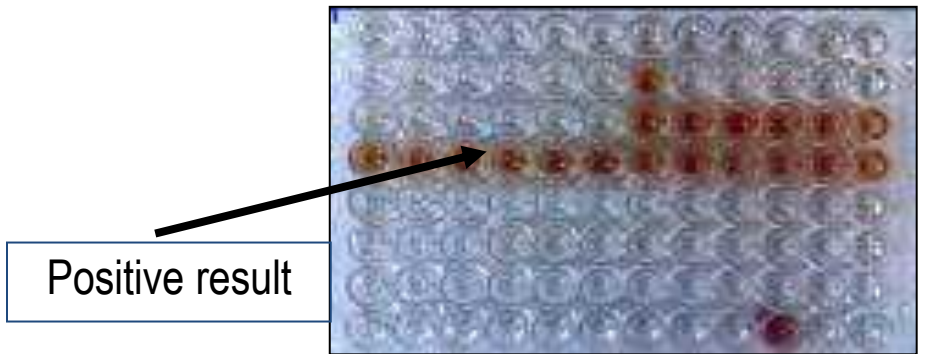
- **Ab detection**

- Immobilize Ag
- Incubate with sample
- Add labeled anti-Ig
- Amount of labeled Ab bound is proportional to amount of Ab in the sample





Micro-plate reader

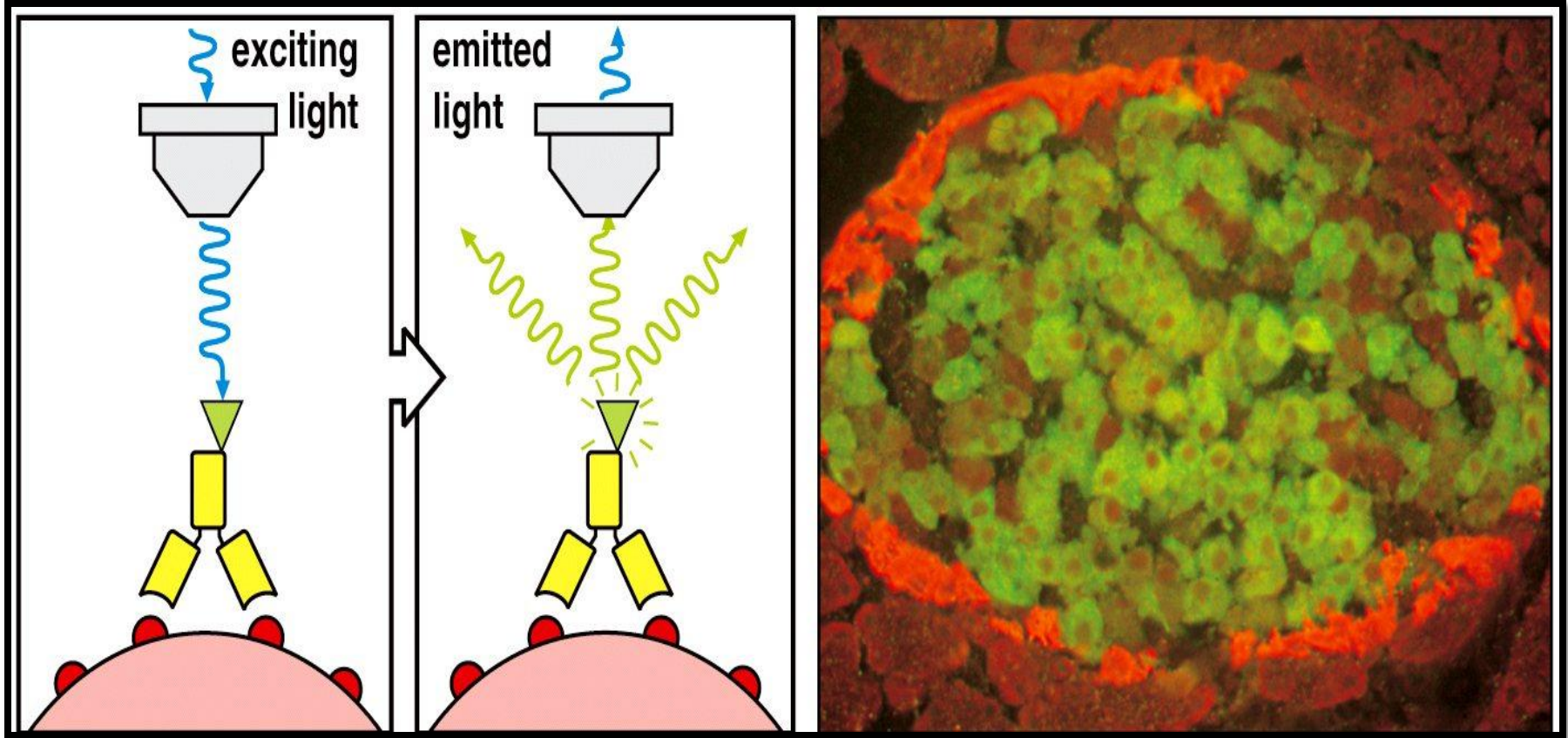


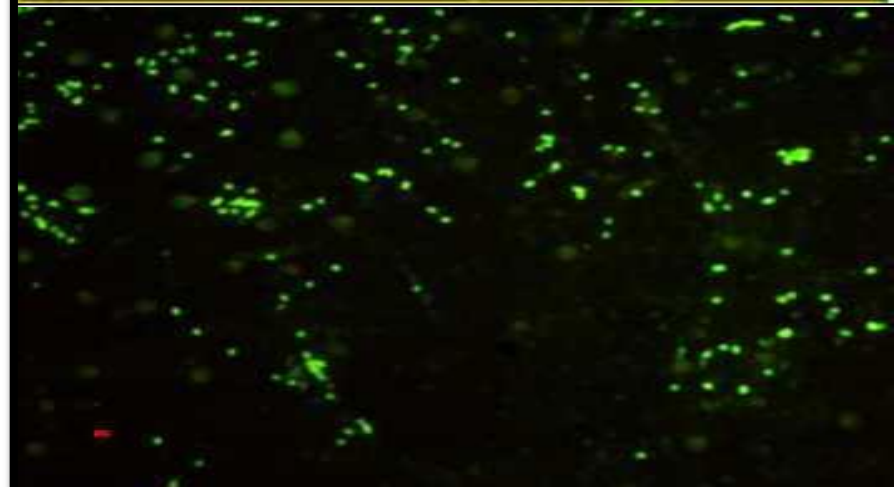
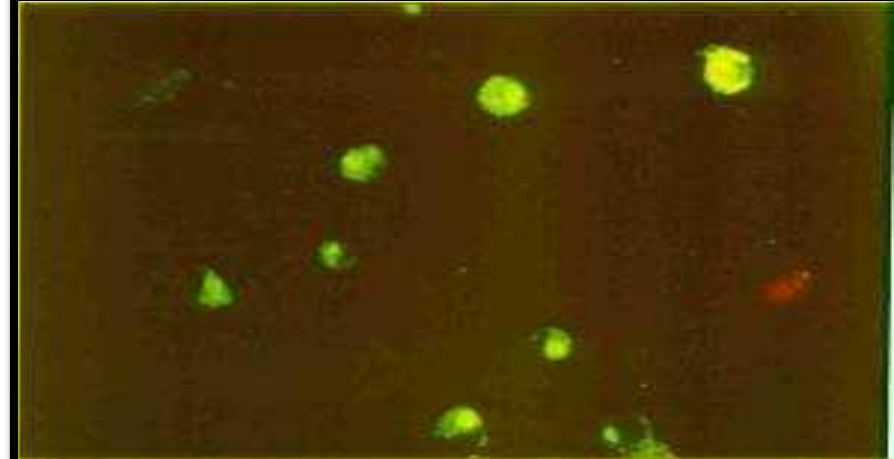
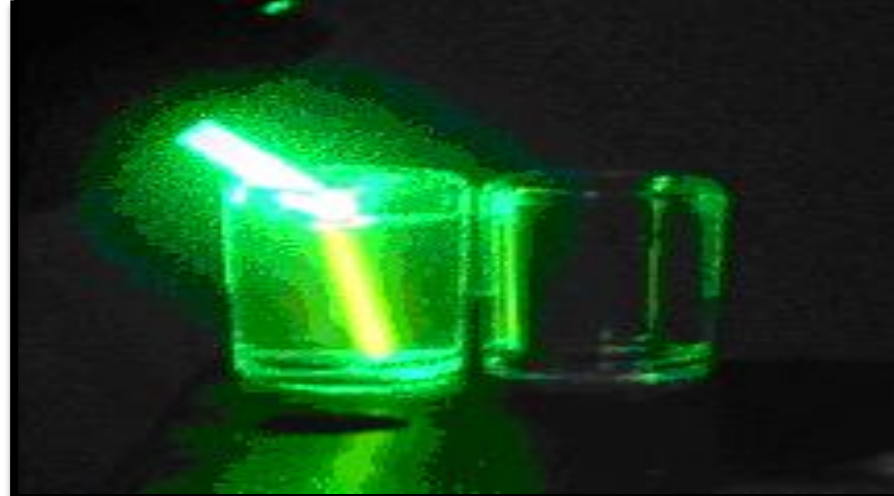
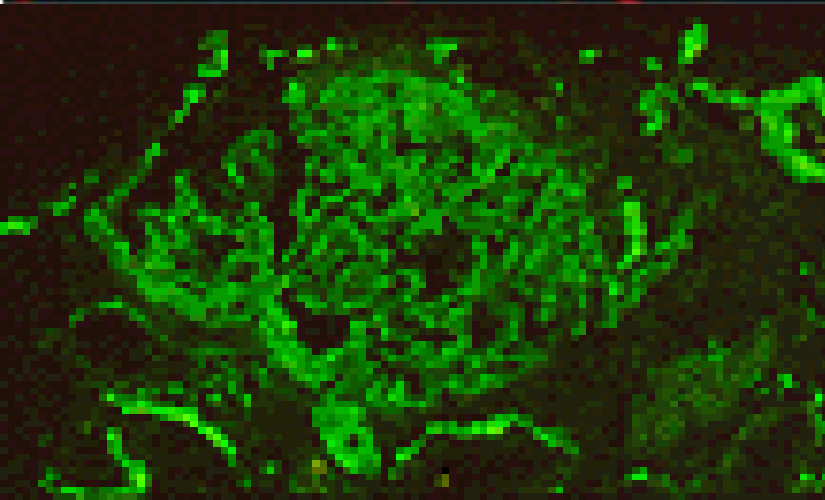
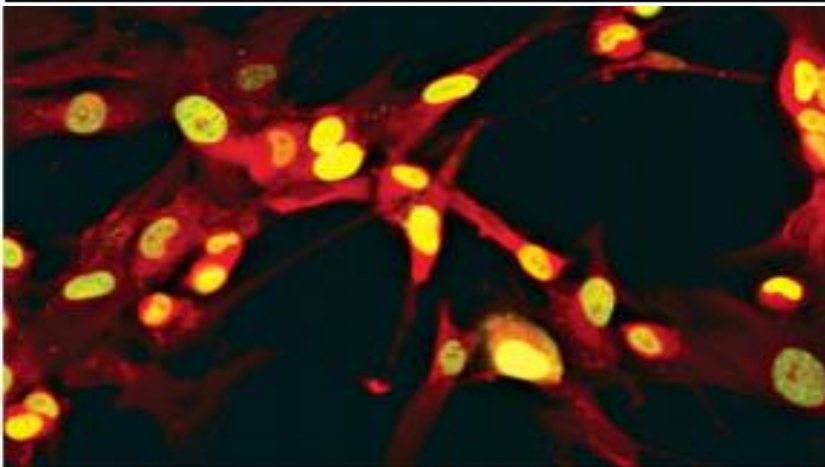
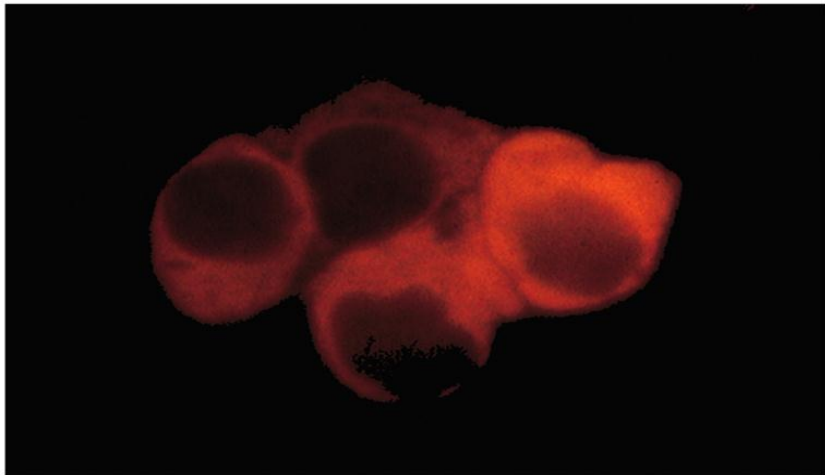
96-well micro-plate



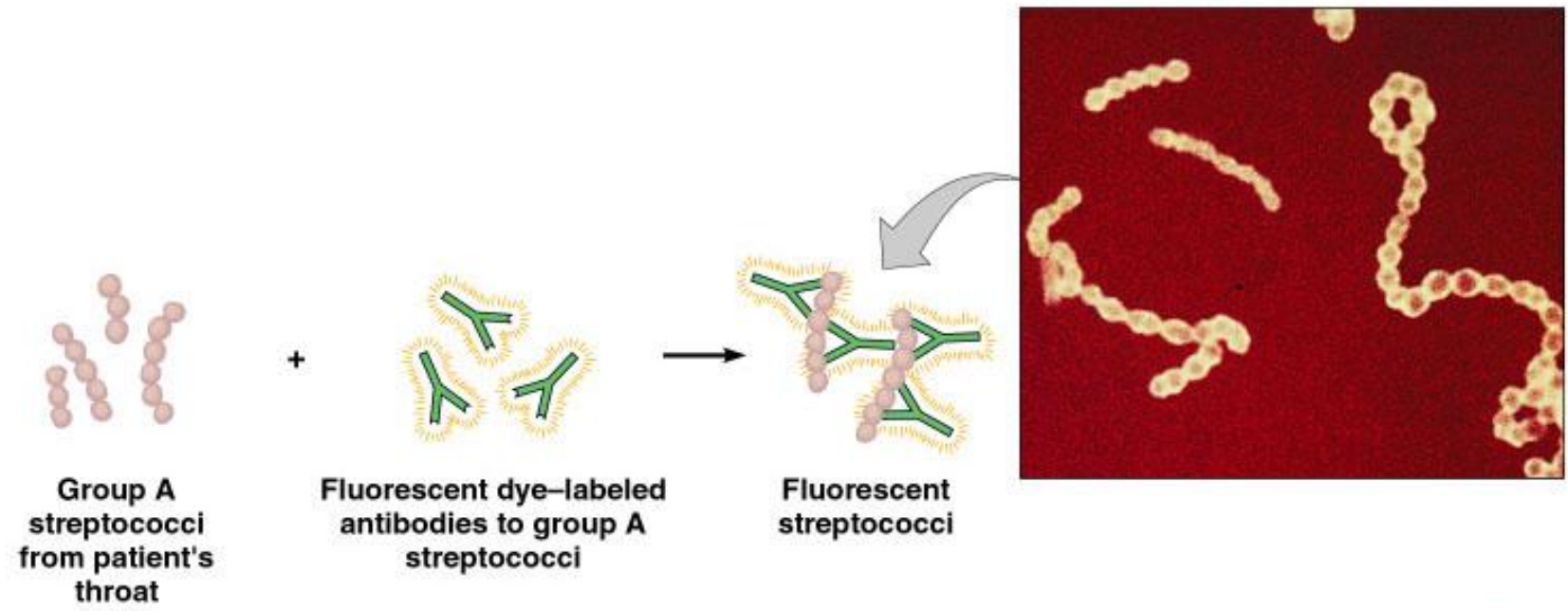


# Immunofluorescence



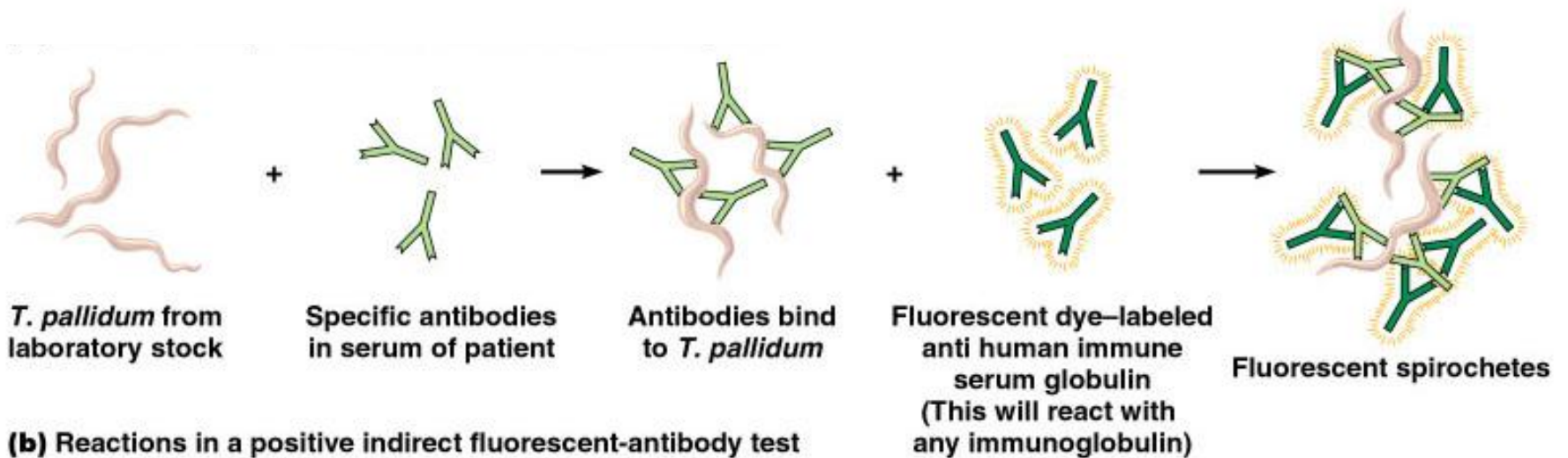


# Fluorescent Antibody Techniques (Direct)



**(a)** Reactions in a positive direct fluorescent-antibody test

# Fluorescent Antibody Techniques (Indirect)



contact dermatitis diagnosed by patch test .

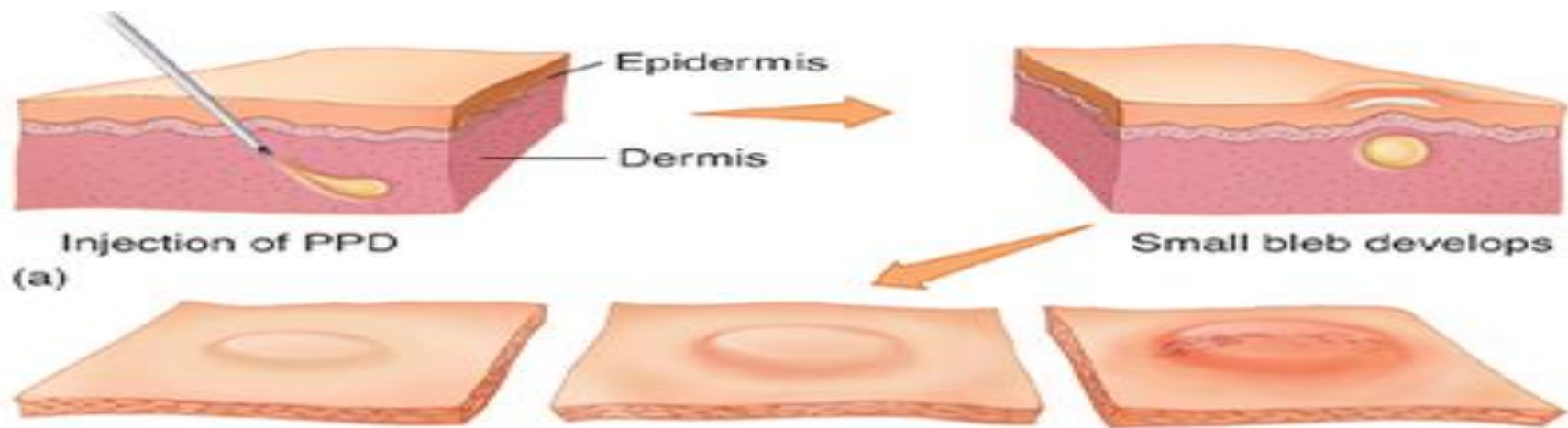


Patch test for contact dermatitis .



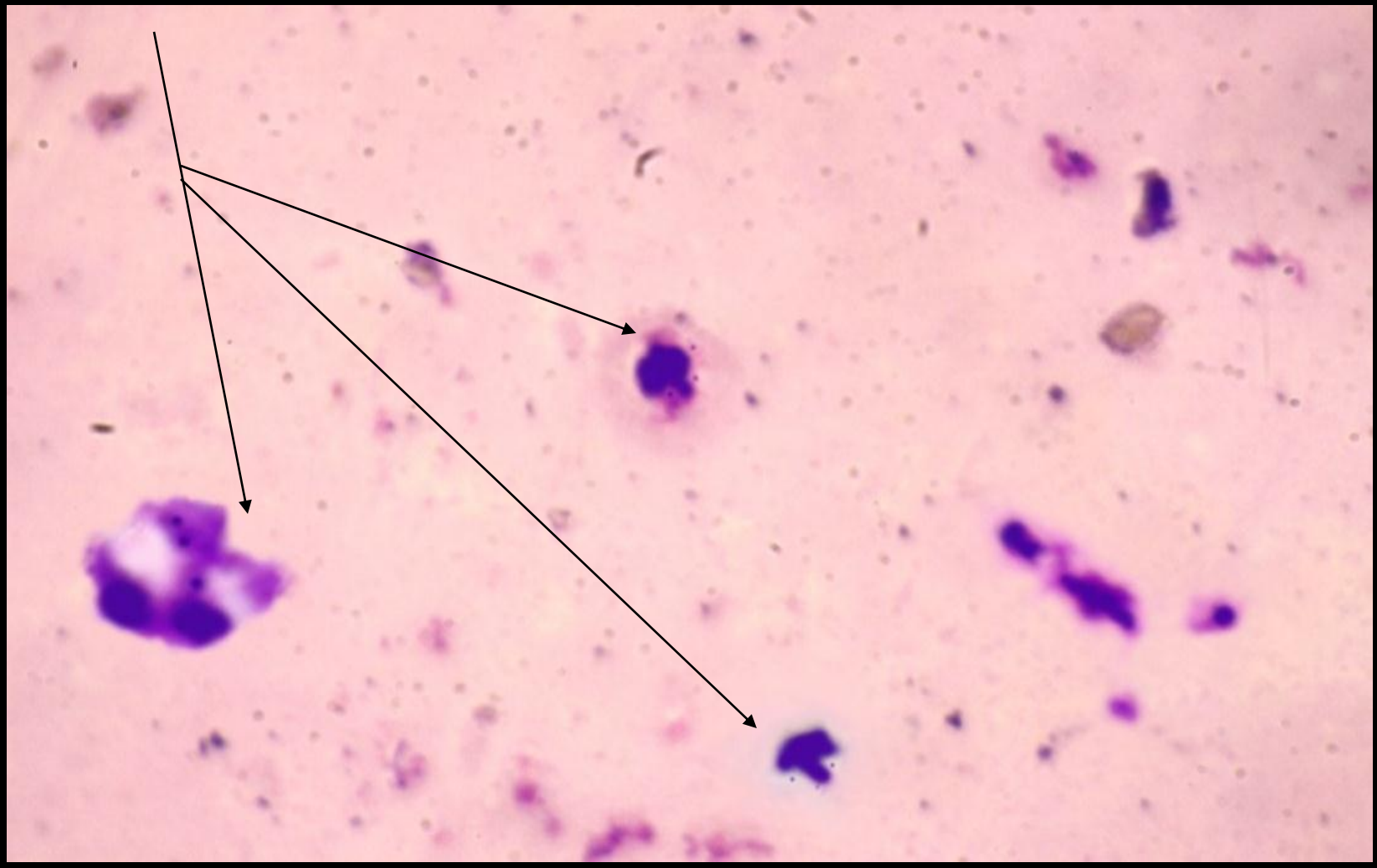
Type 1 allergy diagnosed by skin prick test .







**ActivePMNs**



**Geimsa-stained blood film showing PMN-leukocytes with engulfed intracellular enterococci**





Good Luck

*Celestial Exploring*  
art by KAGAYA

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