



Advanced laboratory technique

Lab/4

Counter immunoelectrophoresis (CIE)

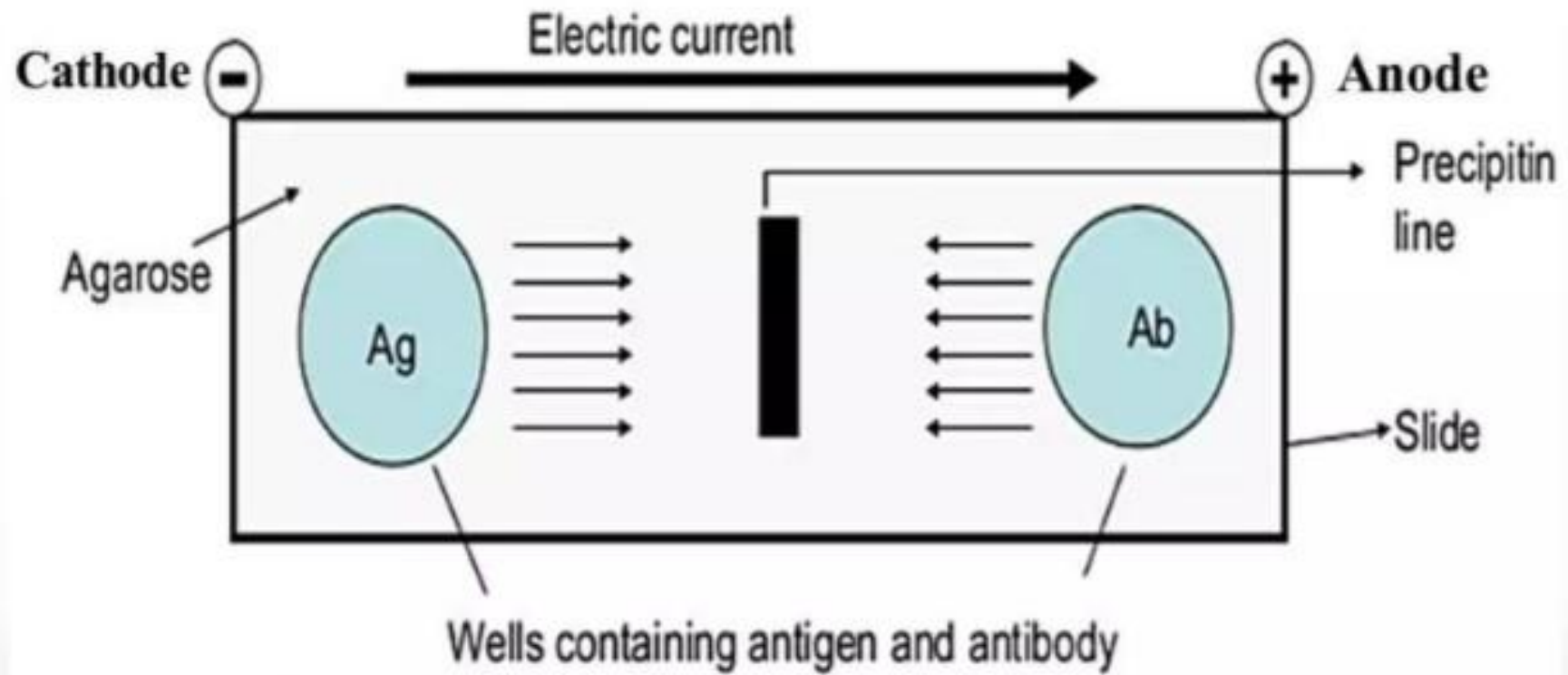
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INTRODUCTION

- ❑ Counter immunoelectrophoresis (CIE) is a laboratory technique used to detect the binding of an antibody to its specific antigen.
- ❑ Where an electric field is applied to speed up the migration of antigens and antibodies in a gel medium, usually agar.
- ❑ The effect is rapid migration of the antibody and antigen out of their wells towards one another to form a line of precipitation.

PRINCIPLE OF CIE

- I. **CIEP** depends on the movement of strongly negatively charged antigen towards the anode and of antibody towards the cathode through the agar under the electric field.
- II. The test is performed on a glass slide/plate in agarose gel, a pair of wells is punched out where one well is filled with antigen and the other with the antibody.
- III. Electric current is then passed through the gel, the migration of antigen and antibody is greatly facilitated under the electric field, and the line of precipitation as precipitin arcs (or lines) is made visible in 30-60 minutes, which indicates a positive reaction.



Counter immunoelectrophoresis principle

INTERPRETATION OF RESULTS

- ❖ Precipitin line between the antigen and antisera wells indicate positive reaction or specific antigen-antibody reaction due to the presence of antibody specific to the antigen in the test sera (Indicates specificity).
- ❖ The absence of the precipitin line indicates no reaction or the absence of any antibody for the antigen in the test sera (Indicates non-specificity).
- ❖ The presence of more than one precipitin line indicates the heterogeneity of the antibody for the antigen.

ADVANTAGES AND LIMITATIONS

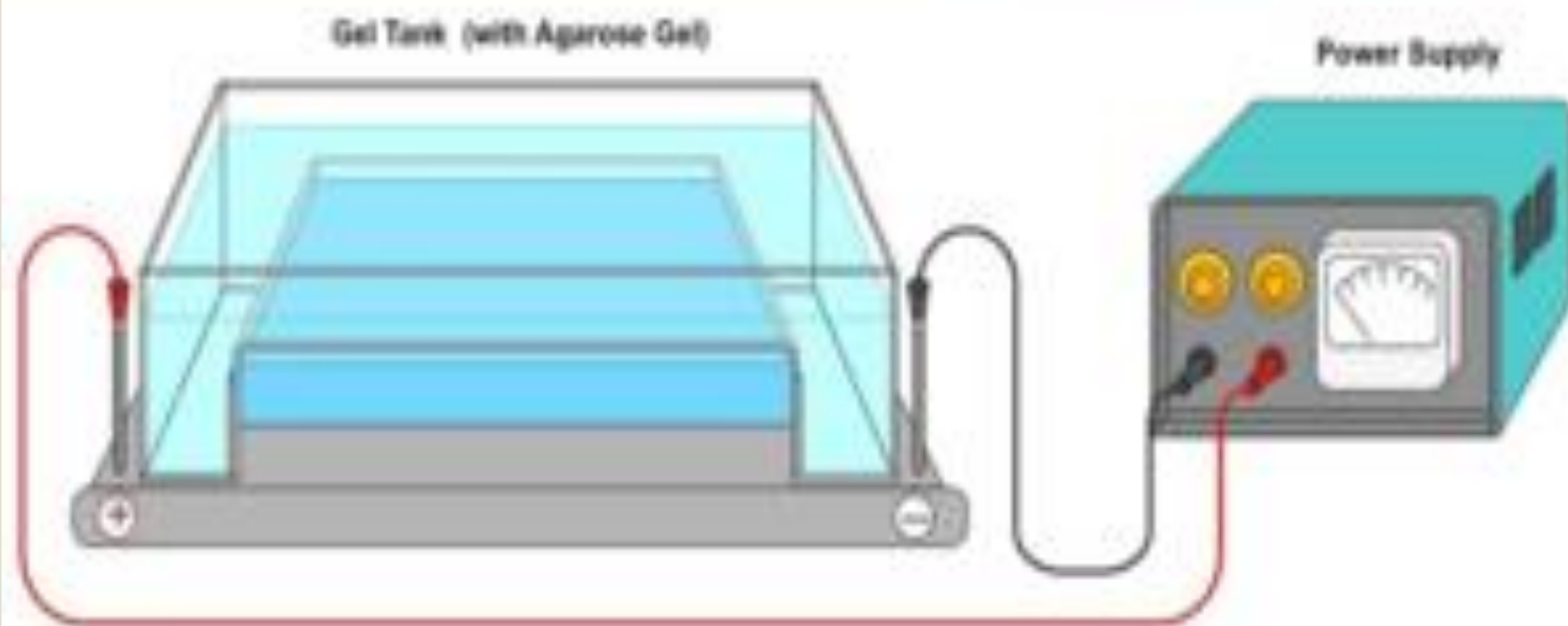
Advantage

- The method is much faster and more sensitive than double immunodiffusion. (takes 30 minutes).

Limitations

- It is more expensive than agglutination based tests.
- It is believed to have decreased sensitivity, speed, and simplicity, than latex agglutination tests.
- Need of large quantity of Ag and Ab.

Immuno-electrophoresis



CIE HAS MANY USES:

- 1) It is a rapid and a highly specific method for detection of both antigen and antibodies in the serum, cerebrospinal fluid, and other body fluids in the diagnosis of many infectious diseases including bacterial, viral, fungal, and parasitic.
- 2) Still today, it is commonly used for Hepatitis B surface antigen (HBsAg), fetoprotein, hydatid and amoebic antigens in the serum.
- 3) It is a rapid sensitive method for detecting pneumococcal capsular antigens in sputum.



Thank you

