WIDAL & WEIL-FELIX TEST

Here starts the lesson!

WAN ZAFIRAH BT ABDUL RAHMAN (102528)

01

WIDAL TEST

Introduction

Widal test is used to diagnose Typhoid fever which caused by Salmonella.

Diseases caused by **Salmonella** are divided into two groups:

Typhoidal infection by the S.typhi and S.paratyphi:

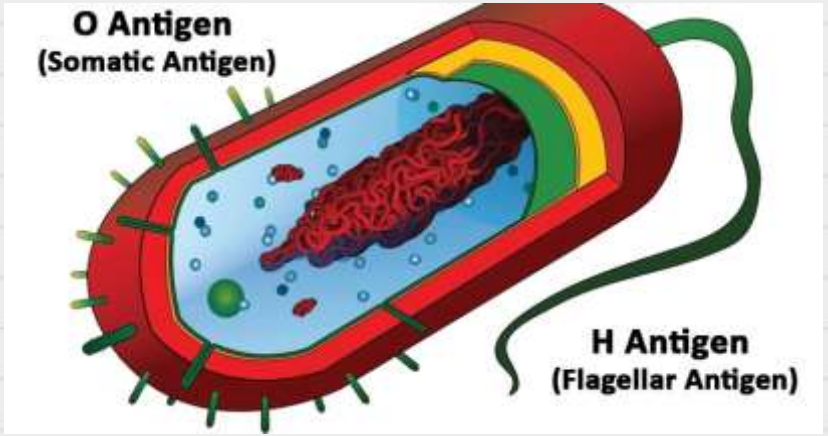
- Humans are the only host and spread is person-to-person or via contaminated foods and water.

Non-typhoidal infection from all other organisms:

- The most common non-typhoidal organisms are S.typhimurium, S.enteriditis.
- These infections 95% are food born.

- In 1896 Widal test was discovered by George-Fernand Widal.
- This test utilizes antigen-antibody interactions to detect specific antibodies in the serum sample of typhoid patients.
- Usually this test is done after 2- 3 weeks of infection or after 10 days of fever.

- Both typhi and paratyphi have two types of antigens : Somatic (O) antigen and Flagellar (H) antigens



- Salmonella Typhi possesses O antigen on the cell wall and H antigen on flagella. Similarly, S.Paratyphi A and S.Paratyphi B also possess O antigen on their cell wall and but have AH and BH antigen on their flagella respectively.

- On infection, these antigens stimulate the body to produce specific antibodies which can be detected in the serum.

Positive: Agglutination within a minute.

Negative: No agglutination indicative of absence of clinically significant levels of the corresponding antibody in the patient serum.

Principle

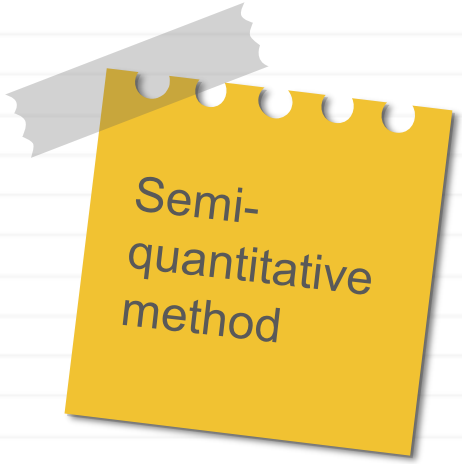
Individual infected with S.Typhi or *S. paratyphi* produce antibodies against either somatic (O) antigens and/or flagellar antigens (H).

These produced antibodies in serum, if exposed to bacterial suspension carrying homologous antigens, result in agglutination.

The agglutination reaction can be seen as visible clumping.

In the test, the patient's serum is mixed with killed bacterial suspension of Salmonella carrying specific 'O', 'OA', 'OB', 'H', 'AH' and 'BH' antigens and observed for agglutination reaction.

PROCEDURE OF WIDAL TEST



1. Pipette 5, 10, 20, 40, 80 ul of the patient sample onto the reaction circles.
2. Add to each reaction circle, a drop of the antigen(‘O’, ‘AO‘, ‘BO‘, ‘H’, ‘AH’ and ‘BH’ antigens)
3. Using separate mixing sticks, mix the contents of each circle uniformly over the reaction circles.
4. Rock the slide gently back and forth and observe for agglutination macroscopically within one minute.

Interpretation of the widal test:

1. The highest dilution of the serum is noted where there is agglutination.

2. If it ends at 1:320, then that is the titer.

3. The Widal test is positive if “O” antigen titer is >1:160 and it means active infection.

4. If the “H” antigen titer is >1:160, it indicates past infection or in immunized persons.

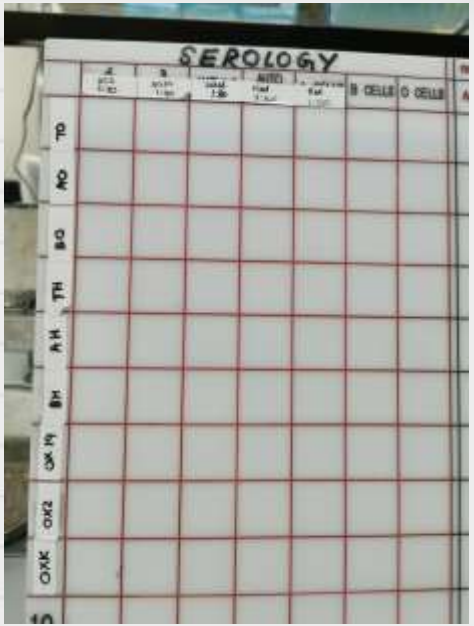
5. A fourfold increase in the titer (e.g., from 1:40 to 1:160) is diagnostic.

Antigen suspension

Salmonella Typhi H
Salmonella Typhi AH
Salmonella Typhi BH

Salmonella Parathypi O
Salmonella Parathypi AO
Salmonella Parathypi BO

Slide with reaction circles



02

WEIL-FELIX TEST

Introduction

First described in 1916 by Edmund Weil and Arthur Felix, the Weil-Felix reaction is a test used in the diagnosis of rickettsia infections.

The basis of the test is the presence of antigenic cross-reactivity between *Ricketsia* spp. and certain serotypes of non-motile *Proteus* spp.

Sera from patients infected with Rickettsia will therefore produce agglutination with Proteus antigen suspensions.

The known pathogenic rickettsia species are gram-negative, obligate intracellular bacteria that belong to seven genera (*Rickettsia*, *Orientia*, *Ehrlichia*, *Anaplasma*, *Neorickettsia*, *Candidatus, Neoehrlichia*, and *Coxiella*).

They are separated into 3 groups: the epidemic and endemic typhus group, scrub typhus group, and the spotted fever group.

P. vulgaris OX19 antigen reacts with antibodies to typhus-group.

P. mirabilis OXK antigen reacts with antibodies to the scrub typhus group.

P. vulgaris OX2 and OX19 antigens react with antibodies to the spotted fever group.

Procedure

Slide method:

- ✓ Pipette 5, 10, 20, 40, 80 ul of the patient sample onto the reaction circles.
- ✓ Add a drop of Proteus OX19, OX2 and OXK antigen suspension
- ✓ Mix the suspension by rotating the slide for 1 minutes

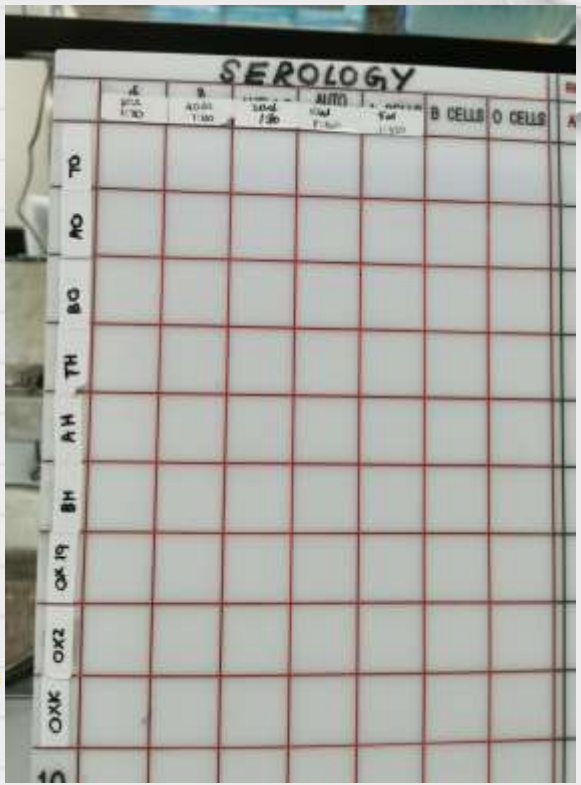
- ✓ Visible agglutination means positive.

- ✓ Generally, a titer of **≥1:320** is considered diagnostic.

Antigen suspension

Proteus OXK
Proteus OX19
Proteus OX2

Slide with reaction circles



Thank you

CREDITS: This presentation template was created by Slidesgo, including icons by Flaticon, and infographics & images by Freepik.

Please keep this slide for attribution.