Group B *Streptococci* (GBS)

Leprosy

2022-2023

Mathhar Ahmad Abu Morad MD

Mutah university

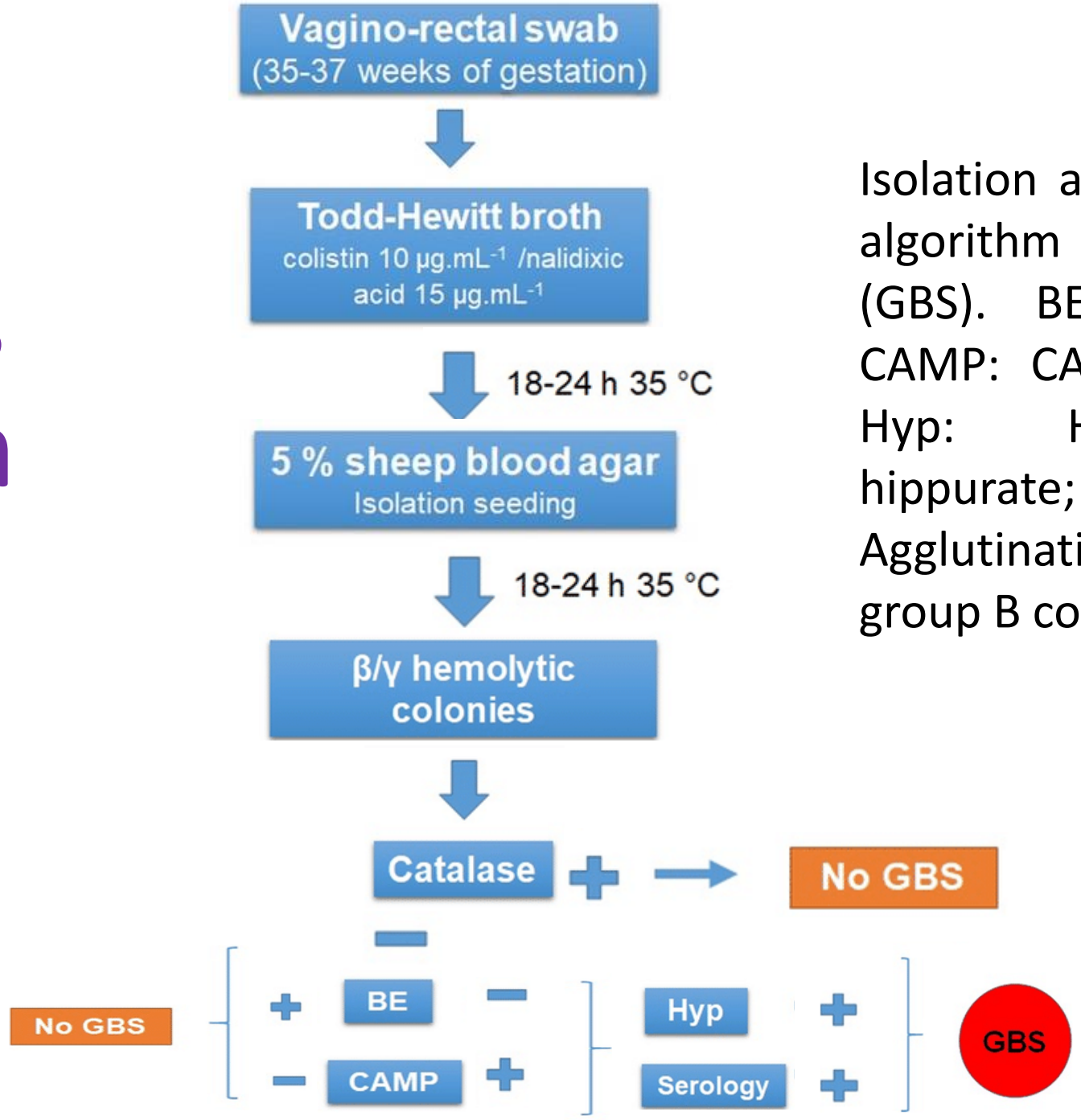
Faculty of Medicine

Group B *Streptococci* (GBS)

Laboratory tests

- Laboratory tests performed for a babies or adults suspected GBS infection may include the following:
  - Gram stain.
  - Isolation of GBS from blood, cerebrospinal fluid, and/or a site of local suppuration: the only method for diagnosing invasive GBS infection.
  - GBS antigen detection in blood, cerebrospinal fluid, and/or urine

GBS diagnosis algorithm



Isolation and identification algorithm of S. agalactiae (GBS). BE: Bile Esculin; CAMP: CAMP factor test; Hyp: Hydrolysis of hippurate; Serology: Agglutination test for group B confirmation.

Group B *Streptococci*

Todd Hewitt broth

Culture methods

Media

- Swab should be inoculated into a selective enrichment broth, (Todd Hewitt broth with selective antibiotics, enrichment culture). This involves growing the samples in an enriched medium to improve the viability of the GBS and simultaneously impairing the growth of other naturally occurring bacteria.
- After incubation (18-24h, 35-37 °C), the enrichment broth is subcultured to blood agar plates and GBS-like colonies are identified by the CAMP test or using latex agglutination with GBS antisera.

Blood Agar Plate/Beta hemolysis

Group B *Streptococci*

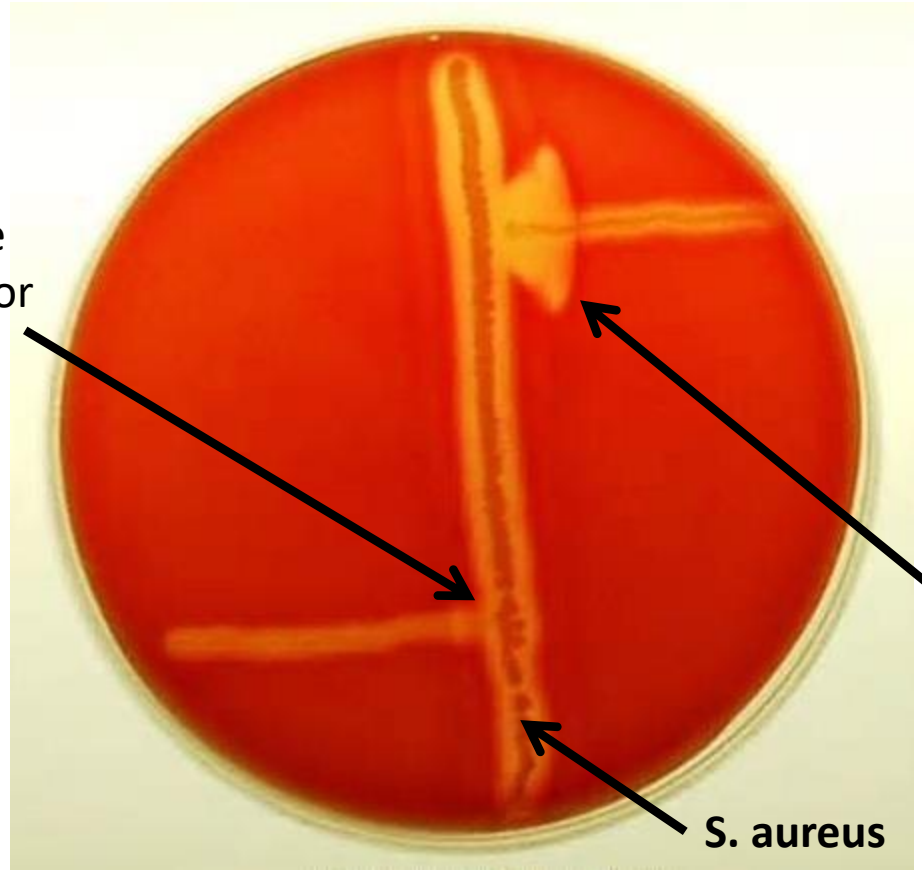
CAMP test

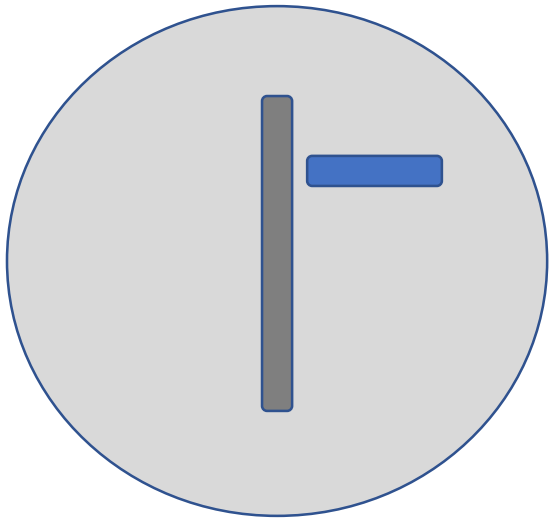
- CAMP test is used for the presumptive identification of Group B Beta-hemolytic streptococci.
- The hemolytic phenomenon was first described in 1944 by **C**hristie, **A**tkins, and **M**unch-**P**etersen, and CAMP test is an acronym of their names.
- The hemolytic activity of the Beta-hemolysin produced by most strains of *Staphylococcus aureus* is enhanced by extracellular protein produced by GBS. Interaction of the Beta-hemolysin with this factor causes “synergistic hemolysis,” which is easily observed on a blood agar plate.

Group B *Streptococci*

Results and interpretations:

- The area of increased hemolysis occurs where the Beta hemolysin secreted by the staphylococcus and the CAMP factor secreted by the group B streptococcus intersect

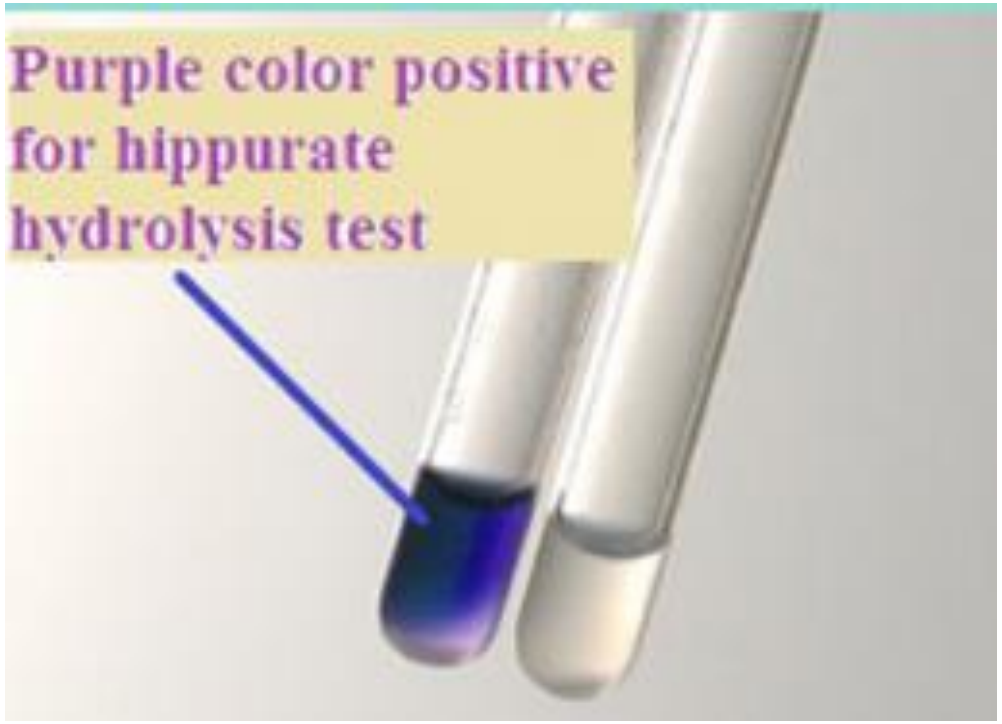




Group B *Streptococci* (GBS)

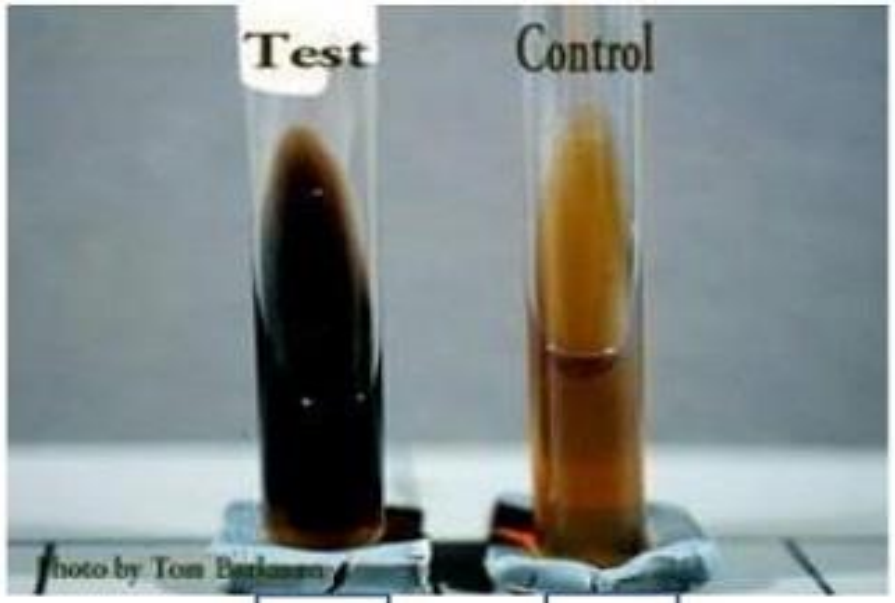
Hippurate test

- Hippurate hydrolysis test is used to detect the ability of bacteria to hydrolyse hippurate into glycine and benzoic acid by action of hippuricase enzyme present in bacteria.
- an oxidizing agent ninhydrin is used as an indicator. Ninhydrin reacts with glycine to form a deep blue or purple color (purple).



Group B *Streptococci* (GBS)

Bile Esculin test



Name of the test: Bile Esculin test
Example A: Positive - Group D streptococcus (Enterococcus species)
Example B: Negative - Group B streptococcus
Principle: The selective agent **bile**, inhibits most gram positive bacteria.
Esculin in the medium is hydrolyzed to esculetin and dextrose.
The esculetin reacts with ferric chloride in the media to form a black-brown color.

Leprosy

Diagnosis of Leprosy

HISTORY

- Leprosy or Hansen's disease.
- Discovered in 1873 by G. Hansen.

Lab Diagnosis Overview:

1. Specimens.
2. Acid fast staining.
3. Skin and nerve biopsy.
4. Animal inoculation.
5. Lepromin test.
6. PCR
7. Serodiagnosis.

Diagnosis of leprosy

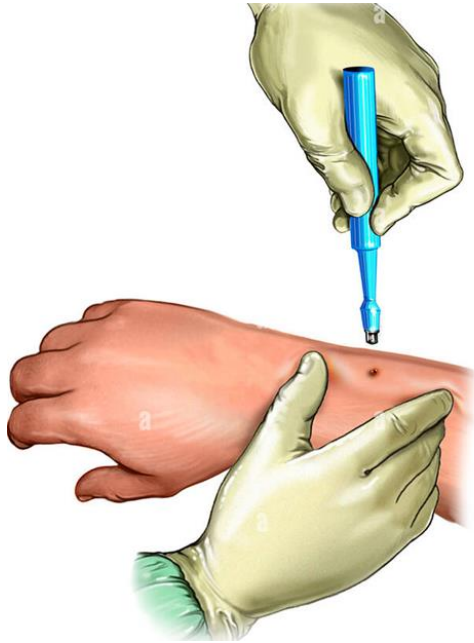
Diagnosis of leprosy

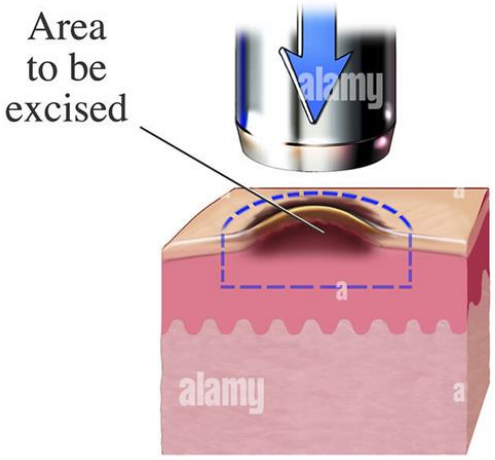
1. Diagnosis of leprosy is most commonly based on the clinical signs and symptoms.
2. Only in rare instances there is a need to use laboratory and other investigations to confirm a diagnosis of leprosy.
3. An individual should be regarded as having leprosy if he or she shows ONE of the following basic signs:
   A. positive skin smears
   B. Skin lesion consistent with leprosy and with definite sensory loss, with or without thickened nerves

Diagnosis of Leprosy

SPECIMENS:

1. Nasal mucosa.
2. Skin: active edges of the patches
3. Nerve biopsy: from thickened nerves

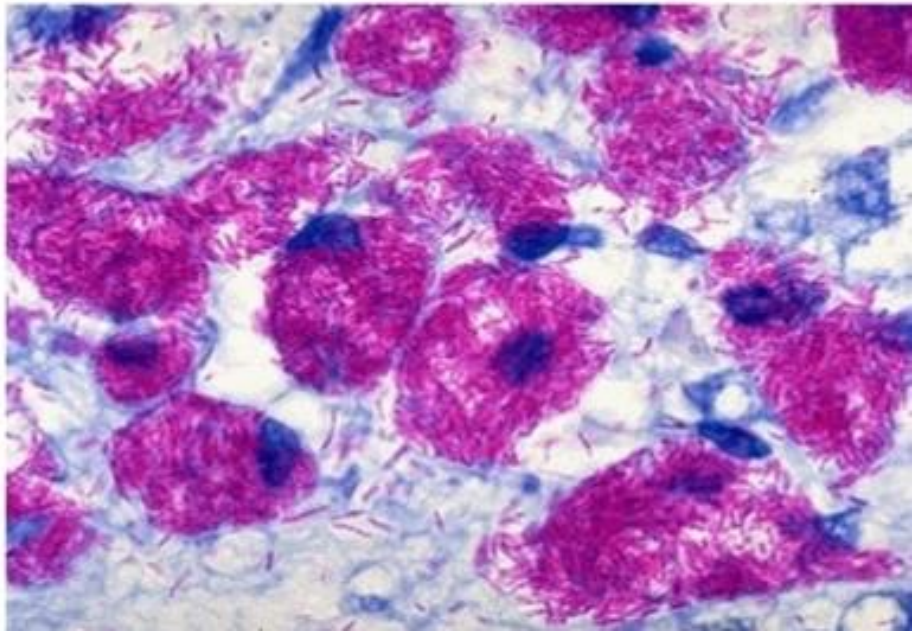




Cut-section through skin

Acid Fast Staining

- Ziehl-Neelson method: confirm the diagnosis of lepromatous leprosy.



The bacilli are present inside the foamy macrophages called Virchow's lepra cells or foamy cells.

Diagnosis of Leprosy

Lepromin test

- The lepromin test is used to study host immunity to *M. leprae*.
- The test is an intradermal skin test performed by using lepromin antigen, which is a suspension of killed *M. leprae* obtained from infected human or armadillo tissue.
- The lepromin test is not used to confirm the diagnosis of leprosy.
- It is not useful to indicate prior contact of the person with leprae bacilli.

Diagnosis of Leprosy

Lepromin test

Lepromin antigen elicit two types of reaction:

1- The Fernandez reaction is analogous to tuberculin reactivity and appears in sensitized subjects 48 hours after skin testing.

- Positive reaction is characterized by the appearance of a localized area of inflammation with congestion and edema measuring 10 mm and more in diameter during 24–48 hours of injection.
- These lesions disappear within 3–4 days.
- Positive reaction suggests that the patient has been infected by leprae bacilli during sometime in the past.

Diagnosis of Leprosy

Lepromin test

lepromin antigen elicit two types of reaction:

2- The Mitsuda reaction:

- is characterized by development of a nodule at the site of inoculation after 3–4 weeks after testing with lepromin.
- The nodule subsequently may undergo necrosis followed by ulceration. This reaction is indicative of the host's ability to give a granulomatous response to antigens of *M. leprae*.

Diagnosis of Leprosy

Serodiagnosis

- Serodiagnosis of leprosy is based on demonstration of antibodies to *M. leprae*, specific Phenolic glycolipid - **1** (PGL-1) antigens.
- Enzyme linked immunosorbent assay (ELISA) and latex agglutination test are used to detect serum antibodies.
- The serology is useful primarily in patients with untreated lepromatous leprosy, as most of patients have higher levels of serum antibodies.