Group A Streptococcus
(Streptococci pyogenes)
Most common pathogen of the Streptococci. All Group A are sensitive and the rest are resistant to Bacitracin. It may be capsulated.

**Extracellular products:**

1) Streptokinase:
2) DNase
4 Main DNases: ABCD

- Antibodies produced against DNase B (anti-DNase B) is useful for diagnosing recent Group A streptococcal infections especially skin infection.
3) Erythrogenic exotoxin:
   - Produced only by Group A Streptococci lysogenised by a β-bacteriophage. It is also called *Streptococcal pyrogenic* exotoxin (SPE) as ABC and the one associated with most diseases is type A. It causes the reddened skin rash in scarlet fever.

4) Streptolysin (haemolysin) – Lyses all types of cells, not only RBC 2 types
   a) Streptolysin O – Oxygen labile
   b) Streptolysin S-Oxygen stable and is responsible for the β haemolysis on blood agars.
5) Leucocidin – destroys WBC and platelets.
6) Hyaluronidase breaks hyaluronic acid cement.

Pathogenesis:
Causes suppurative infections and non-suppurative complications.

A- Suppurative Infections
a) Virulence factors
   (i) Principal virulence factor is the M protein.
   (ii) Lipotechoic acid (LTA)

b) Diseases:
1) Tonsillitis/Pharyngitis

- Most common bacterial infection of throat.
- May spread to adjacent tissues and cause: Peritonsillar abscess (Quinzy), sinusitis, otitis media, brain abscess and may even spread to the blood - septicaemia.

2) Impetigo (pyoderma) –

- An infection of the epidermis presenting as pustules.
3) Erysipelas – serious infection often complicating surgical wounds. It is a spreading infection of the dermis.

4) Cellulitis – A spreading infection of the subcutaneous tissue.

5) Scarlet fever – this is a combination of tonsillitis and a red skin rash (erythematous rash) caused by group A streptococci lysogenised by β-bacteriophage which produce the streptococcal pyrogenic exotoxin (SPE).

6) Puerperal sepsis – acute infection of the female genital tract and adnexa during the puerperium especially in the first week after birth.
7) Severe necrotising fasciitis and other soft tissues

Epidemiology of Streptococcal Infections:
1) Acquisition
2) Sources of Infection
   a) Those with active disease or convalescent carriers in throat.
   b) Asymptomatic carriers – the most common source. Up to 20% of school going children may carry Group A streptococci in their throats.
3- Age group: Prevalent in children especially between 3-8 years.

B-Non-suppurative complications of Group A Streptococcal infections.

a) Acute Rheumatic fever
   Considered to be an autoimmune disease involving the myocardium and its valves, connective tissues and the big joints.

b) Acute glomerulonephritis
   Due to antigen-antibody complexes deposited on the basal membrane of glomeruli.
Diagnosis of suppurative infections:

1) Specimen

Swabs: wounds
     throat

Blood

Aspirates

2) Culture – B.A at 37ºC

   Aerobic; 18-24 hrs. incubation period

3) Bacitracin Test

4) Lancefield grouping
Treatment:

1) Penicillin: **All group A are sensitive to Penicillin**
   (Antibiotic of first choice)

Other antibiotics:

- Eryhromycin/other macrolides inpatient allergic to penicillin
- Cefuroxime & the 3rd generation in severe cases
- Cephalosporins e.g. Ceftriaxone
Group B Streptococci
(Streptococci agalactiae)
A member of the normal flora of the female genital tract – the rectum being the principal reservoir of the organism.

**Diseases caused by Group B Streptococci:**

Important in neonatal infections:

a) Early on-set disease: Severe disease develops within 24-48 hrs after birth. Infection acquired either in-utero or during passage through birth canal.
Associated with:

- Ruptured membranes >18 hrs before birth.
- Multiple birth (twins etc)
- Premature rupture of membranes
- Premature delivery
- Maternal fever
- Maternal age <20 yrs.

Disease presents as Respiratory Distress Syndrome or Septicaemia or Meningitis.
b) Late – Onset Disease:

- Often occurs in full term neonates without any underlying disease.
- Infection occurs in the 2nd week after birth up to 3 months.
- Prognosis better than early onset: Mortality rate about 10%.
- Usually presents as meningitis.

Treatment:

- Penicillin / Ampicillin for 10-14 days.
- Sometimes may be combined with Gentamicin.
Prevention:

- Screen all pregnant women at 35-37 weeks by taking both rectal and high vaginal swabs.
- Give I.V. penicillin as early as possible after onset of labour. Continue with oral penicillin, after labour, for an extra 5-7 days. (Alternatives to penicillin: Erythromycin or Clindamycin)