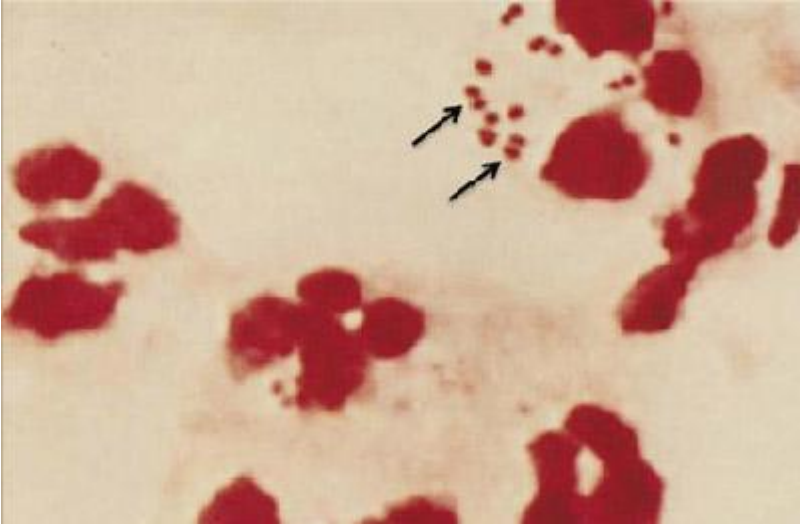

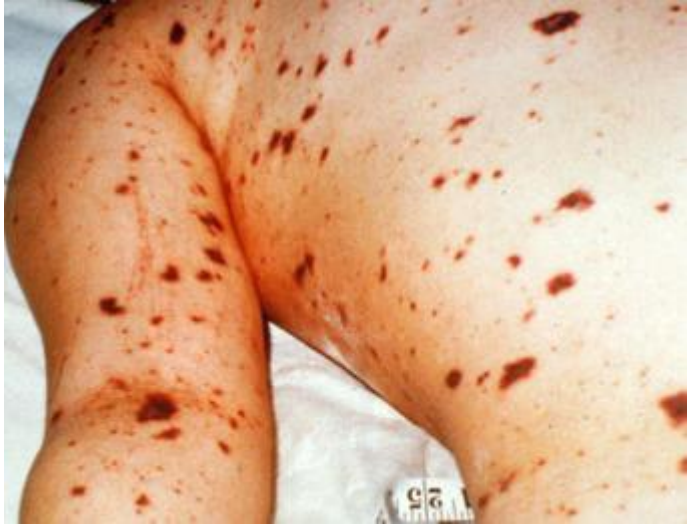

Neisseria meningitidis

30. 4. 2025

2. LF UK

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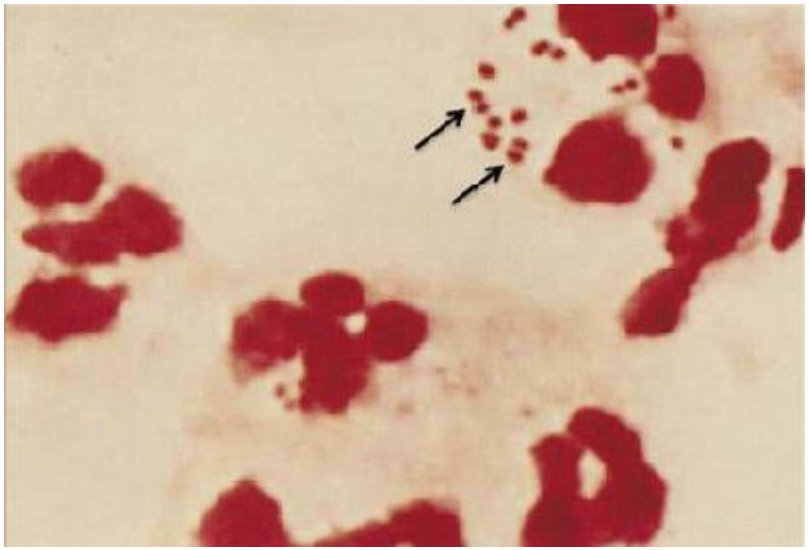
Neisseria meningitidis

Opportunistic pathogen

Encapsulated hypervirulent strains cause meningitis and sepsis (infants, adolescents and young adults)

Nonencapsulated strains are upper repiratory tract colonizers without pathogenic potential



Invasive meningococcal disease – pathogenesis

Infection via droplets or direct contact

Usually short incubation period

Encapsulated strains are protected from complemet activity and phagocytosis (polysaccharide capsule) and invade the bloodstream shortly after infection

Porins enable meningococci to **intracellular (intraphagocytic) survival, replication and dissemination** via bloodstream

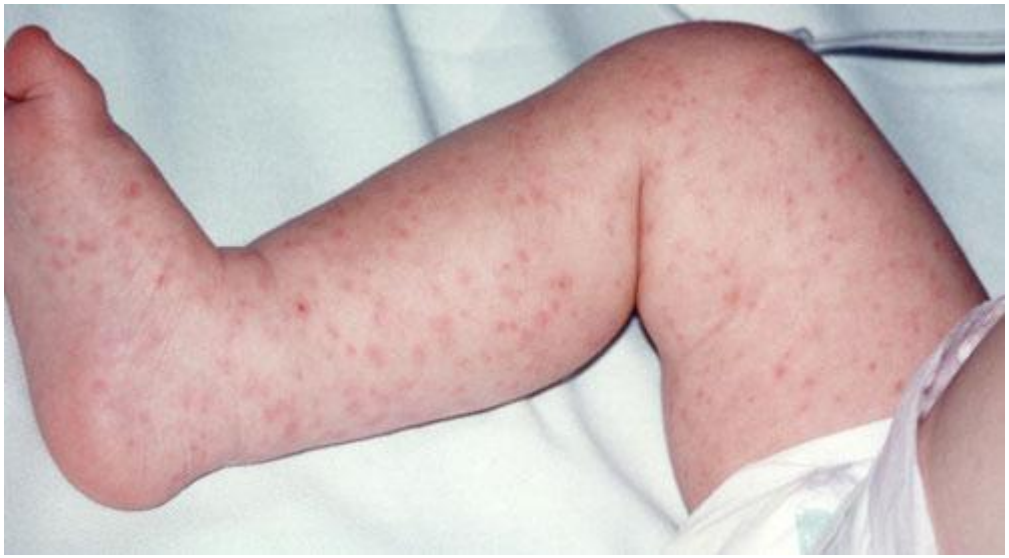
Endotoxin activity of lipooligosaccharide

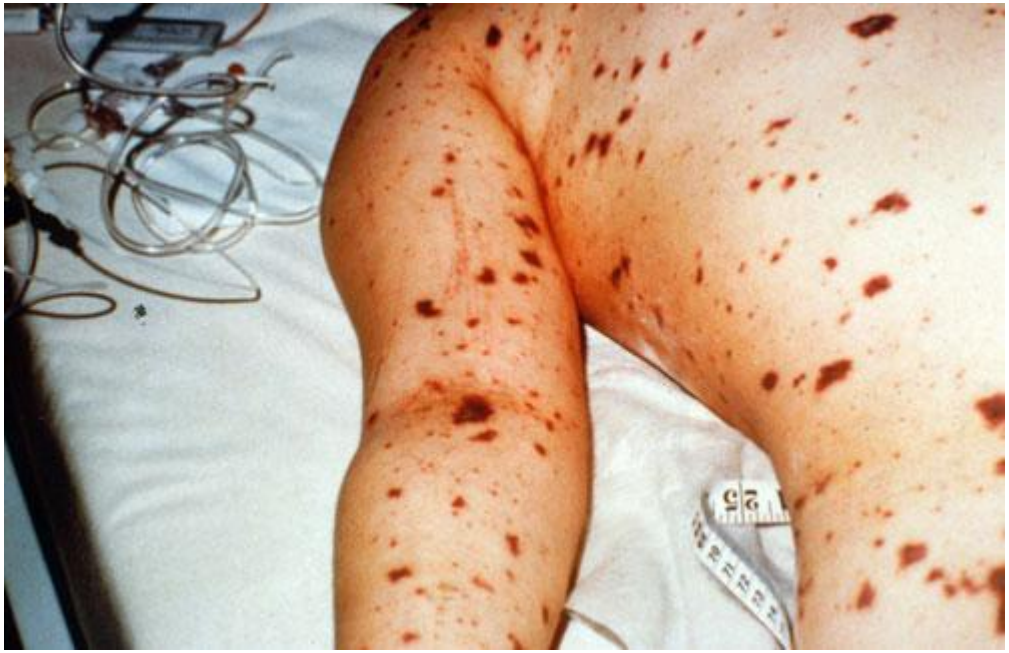
Recognized by Toll-like receptor 4 on macrophage, monocyte and B cell surface

Polyclonal B cell activation, proliferation and non-specific antibody secretion leads to vascular occlusion, tissue necrosis, uncontrolled generalised haemorrhage, shock and multiorgan failure

Invasive meningococcal disease

Diffuse vascular (endothelial) damage



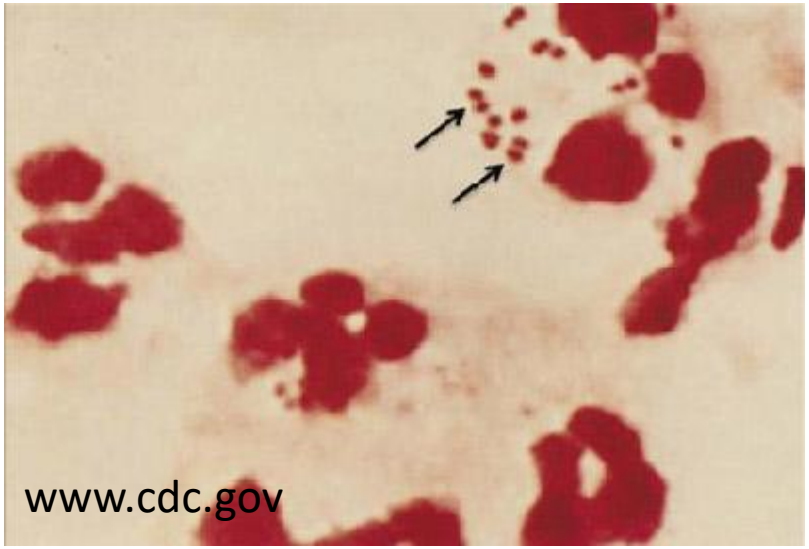


http://www.mrfpaediatricguide.info

Neisseria meningitidis – microbiological diagnosis

Acute diseases – direct detection
Specimen transport as fast as possible, ambient temperature – blood culture, cerebrospinal fluid (CSF)

Microscopy (Gram stain) – possibility of early preliminary diagnosis (CSF, necrotic tissue), **immediate report to clinical staff (telephone) – gram-negative diplococci**



PCR

Real-time PCR detection and in some assays serotyping, primarily sterile specimens (**CSF, blood, serum, tissue**)

Multiplex PCR meningitis assays – one of the targets

Neisseria meningitidis – culture

Culture – grows on **Columbia blood agar, chocolate agar 5 % CO2, 35 – 37 °C, 24 hours**

Identification – biochemical, MALDI-TOF not reliable

Strain serotyping – capsule polysaccharide (A, B, C, X, Y, W135)

- **CSF, blood, tissue specimens – N. meningitidis always clinically significant, report immediately to clinical staff**

- **Throat or nasopharyngeal swab** – **encapsulated** strains epidemiologically significant in **contacts** with invasive meningococcal disease – prophylactic ATB administration (ciprofloxacin, rifampicin)

Antibiotic susceptibility testing – MIC, gradient diffusion method (E-test), enriched MH agar

ATB treatment – third generation cephalosporin (initial), crystallic penicillin – after susceptibility confirmation

Invasive meningococcal disease – treatment and prevention

ATB treatment – third generation cephalosporin (initial), **crystallic penicillin (G)** – after susceptibility confirmation

Vaccination

Conjugate vaccines, ACYW serotypes, separate vaccine B serotype
On demand

Recommended to:
•Infants
•Adolescents and young adults
•Patients with antibody and complement dysfunction
•Patients with asplenia