gram positive bacilli

Diphtheriae

Highly Pathogenic / infectious

Spreads by:
Droplets
Carriers

Causes an intense inflam.:
WBC accumulate
Damage mucosa
⇒ grey pseudomembrane colitis on throat

- Throat, larynx, Pharynx
- in < 48h → replicate → toxins:
  - absorbed by lymph, blood
  - → rest of body
  - → lead to:
    - Liver Necrosis
    - Heart Necrosis
    - Myocarditis
    - Death < 3 days if not treated

* Toxin gene is carried by:
- a bacteriophage (lysogenic strain)

* Prevention:
- Vaccine: DTP (2, 4, 6 months old)
- contains diph. toxoid (inactivated)

* Treatment:
- Antimicrobial Drugs (Pen, erythromycin)
- anti deph. toxins

* Diagnosis:
- toxigenicity test
- Throat culture: Albert Smear / Tellurite medium

Aerobic

Cereus

- Found in easily contaminated food:
  - Rice - Heat
  - Fish - Dairy
- Heat Stable Enterotoxins produced → if eaten 24hrs after cooking
  ⇒ Food Poisoning
- Incubation Period: 1-24 hrs
- Symptoms:
  - Vomiting
  - Diarrhea
  - NO fever.
- Rarely invasive
- No antibiotic given
  ⇒ no vaccine since we are dealing with the toxin, not organism (no infection, only toxicity)

Subtilis

- Opportunistic Pathogen
- Found in:
  - Skin
  - intestines
- In certain conditions leads to:
  - wound infections
  - sepsis (becomes invasive)
- Conditions:
  - low immunity
  - infants

Anthracis

- Could be fatal
- Has a polypeptide capsule
- Has potent virulence factors
- Found in intestines of large animals (horses, cattle ..)
- Patterns of infection:

a. Injury present in animal's intestine
- during grazing
- bacilli reach blood → internal organs → fatal
- Liver, gallbladder necrosis
- become black

b. People - animal contact
- injury in hand / abrasion
- → bacilli may lodge → produce cut. lesions in skin (Anthrax - Chronic)
- → granuloma
- → surgery to remove lesion + antibiotic

c. Inhalation
- reach lung → exotoxins / enzymes
- → hemorrhagic pneumoniae + sepsis → death (bio weapon)

* Diagnosis:
- Culture sample: skin ulcer / blood / sputum → Blood / chocolate Agar

Anaerobic

Tetani

- Highly Fatal
- Usually in SC tissue
- Localized infection
- Following
  - surface
  - deep tissue injury
  - → wound contaminated
- Produces potent neurotoxins:
- Tetanospasmin
  - tetanus / spasm
  - diffuses → lymph / blood
  - → CNS → fixed there
  - → spasm
  - → resp. failure, heart failure
  - → death
  - produced by veg. cells growing in necrotic tissues under anaerobic cond.
- Treatment:
  - Surgical Debridement
  - Antibiotics / Antiserum
- Prevention: DTP
- Diagnosis:
  - Specimen
  - → gram Stain
  - Tellurite blood / Chocolate agar

Perfingens

- Toxigenic
- Invasive (endo / exo)
- Releases:

a. Collagenase
b. Hyaluronidase
c. Toxins
→ digest CT and muscles → easier spreading

- Infection due to contamination of deep wounds
  → multiply in damaged tissue
  → cause:
  - gas gangrene
  - myonecrosis
  - cellulitis
  - → indications:
    - bad smell
    - muscle damage

* Treatment:
- Surgical Deb. / Amputation (to spare death)
- Antibiotics
- No vaccine, No antiserum

* Causes Food Poisoning
- enterotoxin production (6-24 hr in wb.)
- watery diarrhea + cramps, no fever, no vomit

* Diagnosis:
- Clinical features mainly
- Draw fluid → gram → PCR

Botulinum

- Food Borne
- Intoxicating
- few in humans
  - in intestines
  - more in children (harmless)
- Ingested foods contain preformed toxins:
  - Heat Stable Exotoxins
  - Require 20 min heating at 100°
- Contaminate Canned
  - Food: Meat, Fish, Beans
  - Signs: black surface, vinegar smell, bulging (fermentation)

* Symptoms: 8 - 36 hrs
- Weakness → Dizzyness
  → Dry mouth → Nausea
  → CNS → Neuro. Effects:
  - blurred vision
  - unable to swallow / talk
  - muscle weakness
  - resp. paralysis (Ach release inhibited)
  - NO fever
- Treatment: no antiserum / vaccine / anti-biotic → 100% fatal

* Diagnosis:
- Clinical features
- support therapy
- difficult to detect toxin

Difficile

- In intestines (flora)
- 20% of pop. Healthy carriers → inc. to 50% in hosp. patients
- Antibiotic usage for long periods lead to changes in intestinal flora (Amo, Lin, Clin, Ceph)
  → C. Difficile inc. in no.
  → Produces Toxins:
  - Toxin A: enterotoxin (fluid accum. in intestine)
  - Toxin B: Cytotoxin (extremely lethal)

* Pseudomembranous Colitis
- damage of large intestines → Blood loss
- Bloody diarrhea (faint red stool)
- Collapse of patient
- Treatment:
  - Stop using antimicrobials
  - ⇒ Replace by
  - Metronidazole
  - or Vancomycin

* Diagnosis:
- Antitoxin test (stool specimen → immun. test)
- Slide agglutination test (for A, B toxins)
- Other agents must be excluded sometimes