

bacillus

Bacillus anthracis

Intro

- 1) large (8/4/11)
- 2) single or paired
- 3) +ve rod
- 4) serpentine chains (or)
- 5) spores not in clinical specimens
- 6) acquired by 3 routes:
 - A) inoculation (skin)
 - B) ingestion
 - C) inhalation
- 7) spores germinate at the site of entry
- 8) growth of vegetative organ
→ formation of gelatinous edema + congestion

virulence factor

- A) capsule & poly-D-glutamic acid
→ inhibit phagocytosis of replicating cells
- B) edema toxin:
→ fluid accumulation observed in anthrax
- C) lethal toxin:
→ cytotoxic + stimulate macrophages to release proinflammatory cytokines

diseases

anthrax

- 1) pri. disease of herbivores
- 2) humans infected through exposure to contaminated animals or animal products
- 3) exposure can be → biological warfare
- 4) widened mediastinum (x-ray)
- 5) almost all cases → shock + death within 3 days of initial symptoms unless it was treated immediately

cutaneous anthrax

- 1) painless papule at the site of inoculation
- 2) progress to an ulcer which is surrounded by vesicles
- 3) then necrotic eschar

inhalation

- 1) prolonged latent period
- 2) asymptomatic
- 3) spores phagocytosed in lung
- 4) transported by lymphatic drainage
- 5) mediastinal lymph node → germination
- 6) hemorrhage necrosis + edema
- 7) sepsis → spread to GI ulcers or meningitis take place

spore forming

Bacillus cereus

intro.

- 1) ubiquitous → in all environment
- 2) responsible for food poisoning
 - A) vomiting disease (emetic)
 - B) diarrheal disease (diarrheal)
- 3) spores retain the green malachite green dye in this special spore stain
- 4) vegetative cells are gray or colorless

infections

emetic form

- 1) through consumption of contaminated rice
- 2) intoxication caused by ingestion of enterotoxin
- 3) incubation period is short
- 4) Duration of is also short

diarrheal form

- 1) ingestion of contaminated meat vegetable or sauce
- 2) longer incubation period
- 3) true infection

ocular infection

- 1) traumatic
- 2) penetrating injury
- 3) in eye
- 4) with contaminated soil



spore forming

clostridium difficile

intro.

- 1) Gram +ve, anaerobic
- 2) spore, bacillus
- 3) found in intestinal tract of human + animal + in environment
- 4) to detect infection, test present of its toxin
- 5) treated with fecal transplants

toxin

- 1) toxin A
- 2) toxin B
- 3) EIA test can detect them
- 4) ↑ of toxin lead to damage the lining of colon → diarrhea

pseudomembranous colitis

- 1) inflammatory condition of colon
- 2) ↑ yellow-white plaque which form pseudomembrane on the mucosa
- 3) develop in ppl that take antibiotic bcz the drugs alter the normal enteric flora, either permit overgrowth of resistant organism or making patient more susceptible to exogenous acquisition of *cl. difficile*
- 4) treated with oral vancomycin or metronidazole



Spore forming

Clostridium perfringens

intro-

- 1) large, Gram +ve rod
- 2) rectangular
- 3) spores rarely observed
in vivo or after in vitro cultivation
→ differentiate this species from most other clostridium
- 4) colonies → distinctive + rapid + spread growth.
- 5) spore forming bacteria are ubiquitous in nature +
- 6) can easily contaminate sharp
→ infection in wounds

types

- 1) type A %
A) in intestinal tract of human + animal
B) widely found nature
C) Soil + water contaminated with feces
- 2) type (B-E) %
A) don't survive in soil
B) colonize the intestinal tract of animals + occasionally humans

toxin

- 1) theta toxin %
complete hemolysis
- 2) alpha toxin %
A) partial hemolysis
B) gas gangrene
C) insert into PM →
produce gas → disrupt
normal cellular function
- 3) enterotoxin %
A) produced during phase of transition from vegetative cell to spore
B) released in alkaline environment of SI in terminal stage of sporulation

diseases

- 1) cellulitis
- 2) fasciitis
- 3) suppurative Myositis
with gas formation
- 4) // Myonecrosis
- 5) food poisoning %
A) short incubation
B) abdominal cramp
C) clinical course last less than 24 hours

treatment

- 1) debridement + excision
- 2) water-soluble Antibiotic
(penicillin) alone aren't effective
bcz they don't penetrate
ischaemic muscle sufficiently



spore forming

Clostridium tetani

intro

- 1) large, motile
- 2) spore → round + terminal
- 3) ubiquitous
- 4) found in fertile soil
- 5) transiently colonize the GI of animal + human
- 6) treated with tetanus vaccine or tetanus Ig

toxin

- A) oxygen-labile hemolysin (tetanolysin)
- B) plasmid encoded, heat labile NT (tetanospasmin)

spastic paralysis

- 1) Tetanospasmin (inactive protein that regulate release of inhibitory NT glycine + GABA)
- 2) which lead to unregulated excitatory synaptic activity in the motor neurons
- 3) generalized tetanus is the most common form
- 4) involvement of masseter muscles (trismus or lockjaw) is a sign
- 5) sardonic smile bcz of sustained contraction of facial muscle



spore forming

Clostridium Botulinum

Intro

- 1) heterogeneous
- 2) fastidious, spore
- 3) anaerobic rods
- 4) isolated in soil + water

foodborne botulism

- 1) from home canned food
- 2) became patient weak + dizzy
- 3) Bilateral descending weakness of peripheral muscle develops in ppl
progressive disease (flaccid paralysis)
- 4) death is most commonly attributed to respiratory paralysis
- 5) treated with botulinum antitoxin

infant botulism

- 1) consumption of foods
honey, infant milk powder
which is contaminated with spores
- 2) ingestion of spore-contaminated soil + dust
- 3) caused by neurotoxin in vivo

toxins

- 1) 7 AG (A-G)
- 2) human disease caused by A, B, E, F
- 3) neurotoxin remains at the neuromuscular junction
- 4) endopeptidase → inactivate protein that regulate release of ACh → block neurotransmission at peripheral cholinergic synapse → flaccid paralysis

