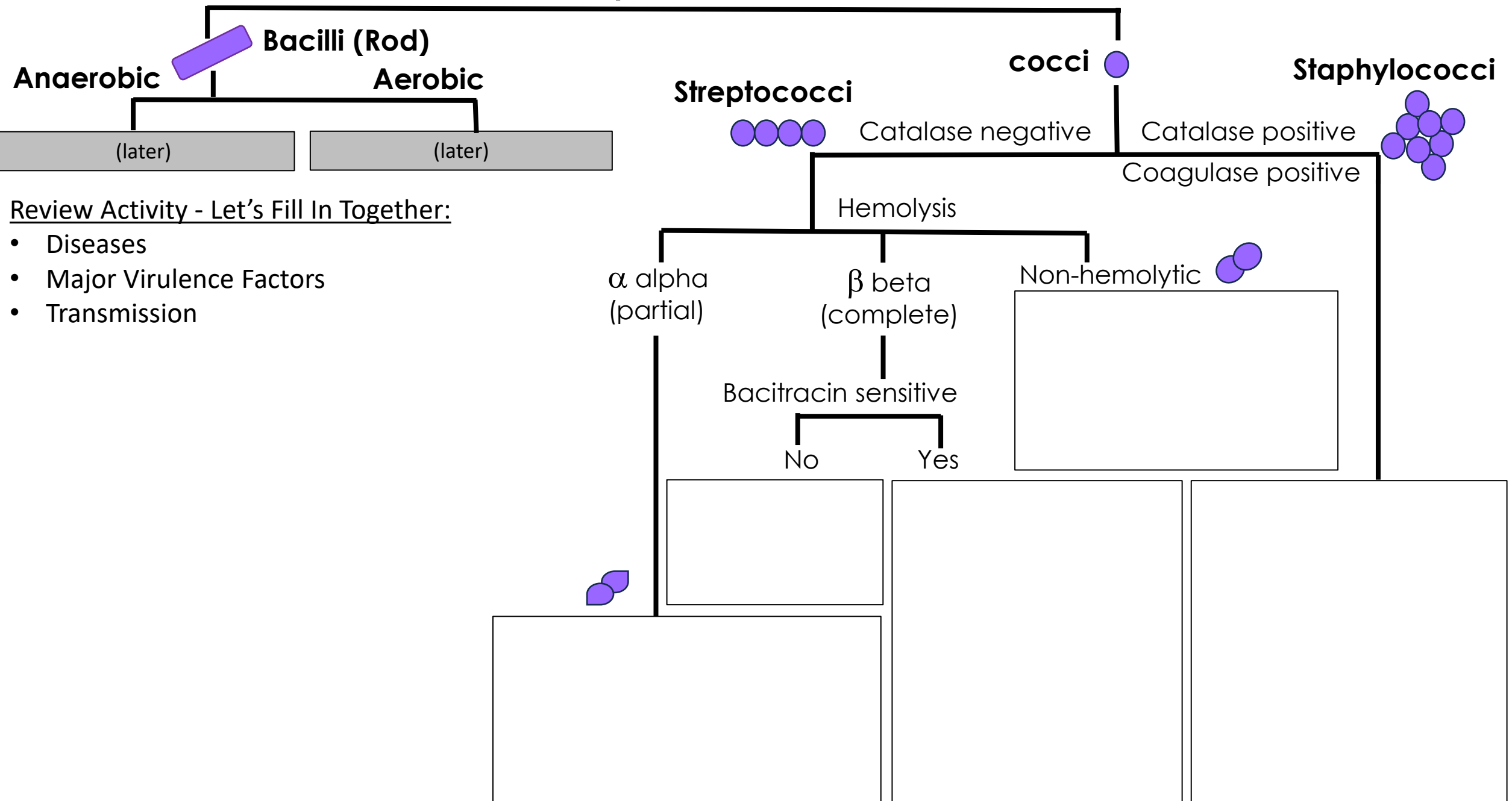


Gram-positive Bacteria



Review Activity - Let's Fill In Together:

- Diseases
- Major Virulence Factors
- Transmission

Gram-negative Bacteria

Coccobacilli

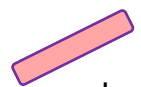


(later)

Diplococci



(later)



Bacilli (Rod)

Lactose fermentation

No

Yes

Oxidase

No

Yes

(later)

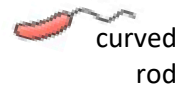
H₂S producing
(Hydrogen sulfide)

No

Yes

Pleomorphic Rod

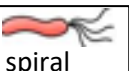
(later)



curved
rod



spiral



spiral

Review Activity - Let's Fill In Together:

- Diseases
- Major Virulence Factors
- Transmission

Atypicals



Spirochetes

Obligate Intracellular

(later)



Acid-Fast Bacilli (AFB)

(later)

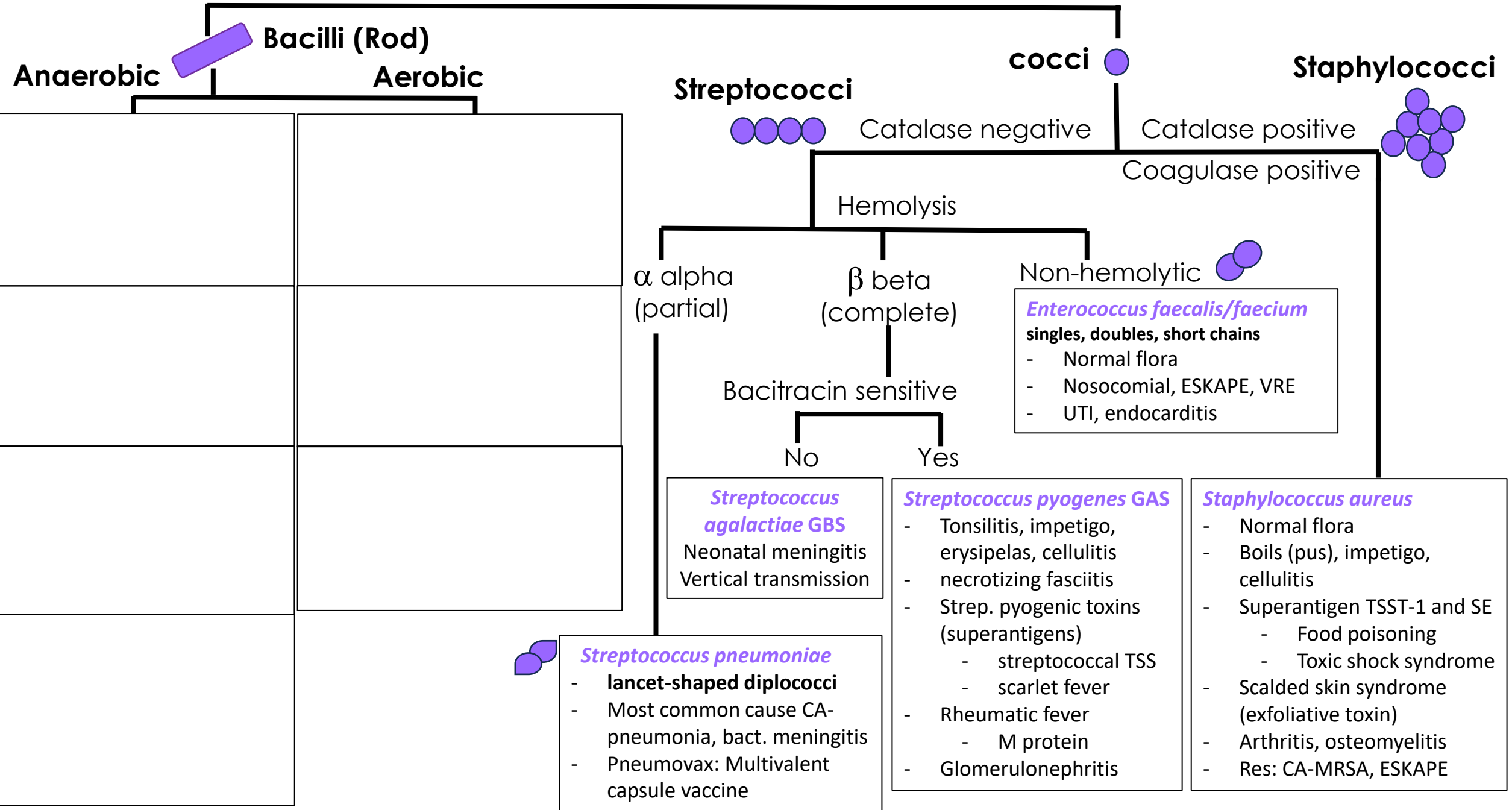
No Cell Wall, Pleomorphic

(later)

Review Activity - Let's Fill In Together:

- Diseases
- Major Virulence Factors
- Transmission

Gram-positive Bacteria



Gram-negative Bacteria

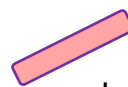
Coccobacilli



Diplococci



Bacilli (Rod)



Pleomorphic Rod

Lactose fermentation

No Yes

Oxidase

No

Yes

H₂S producing
(Hydrogen sulfide)

No

Yes

ETEC (*E. coli*)

- Fecal-oral, human
- Traveler's diarrhea
- Secretory diarrhea
- (plasmid) LT & ST toxins – LT ADP ribosylates → cAMP → Cl- secretion

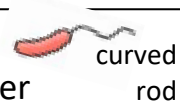
EPEC (*E. coli*)

- Fecal-oral, human
- Weanling diarrhea
- Secretory diarrhea
- (LEE) T3SS – Pedestal

EHEC (*E. coli*)

- Zoonosis: food and petting zoo
- Secretory diarrhea
- (LEE) T3SS - Pedestal
- (phage) STx – targets ribosome in blood vessels = bloody diarrhea + HUS

Vibrio cholerae



- Fecal-oral, water
- Secretory diarrhea (rice water stool)
- Cholera toxin: ADP ribosylation → cAMP → Cl- secretion

Campylobacter jejuni



- Zoonosis, food
- Inflammatory diarrhea
- Cdt – cytotoxic, bloody diarrhea
- Guillain-Barré Syndrome
- Reactive arthritis

Helicobacter pylori



- Commensal
- Fecal-oral, saliva
- Ulcers, cancer
- Urease – neutralize pH
- Cag pathogenicity island (T4SS & CagA) + VacA

Shigella

- Fecal-oral, human
- Inflammatory diarrhea
- (plasmid) T3SS – invade (intracellular)
- (phage) STx – targets ribosome in blood vessels = bloody diarrhea + HUS

Salmonella (non-typhoidal)

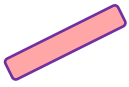
- Zoonosis – food, reptiles
- Inflammatory diarrhea (neutrophil influx, TLRs)
- (SPI1) T3SS-1 invasion
- (SPI2) T3SS-2 intracellular survival (SCV)
- Reactive arthritis

Salmonella Typhi

- Typhoid fever
- asymptomatic carriers
- T3SS-1&2, Vi capsule

Anaerobic

Bacilli (Rod)



Atypicals



Spirochetes

Borrelia burgdorferi

Deer tick, lyme disease,
arthritis

Treponema pallidum

Syphilis: chancre, gummas

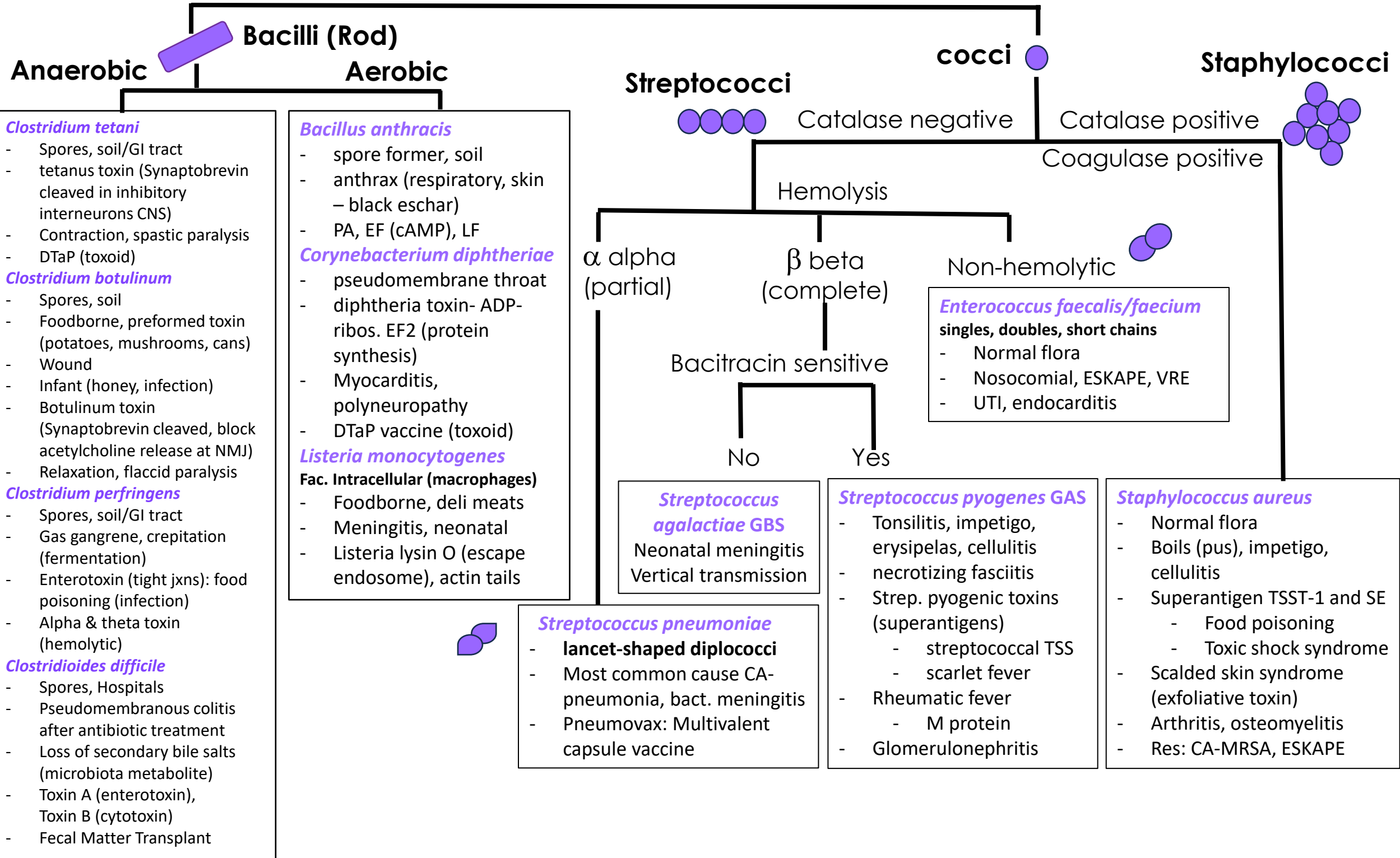
Obligate Intracellular



Acid-Fast Bacilli (AFB)

No Cell Wall, Pleomorphic

Gram-positive Bacteria



Gram-negative Bacteria

Coccobacilli

Haemophilus influenzae

- type b (Hib) meningitis (PRP capsule, conjugate vaccine)
- NTHi pneumonia (biofilm, NO capsule)

Bordetella pertussis

- whooping cough
- Fimbriae attach, cytotoxin, PT (ADP-ribos Gi) & adenylate cyclase => cAMP
- DTaP (toxoid + FHA, PRN, FIM adhesins)

Diplococci

Neisseria meningitis

- Capsule, LOS
- Epithelial cells
- Meningitis, petechial rash, endotoxic shock
- Vaccine (capsule)

Neisseria gonorrhea

- Epithelial cells
- Gonorrhea (STI) purulent discharge, PID, septic arthritis, ophthalmia neonatorum

Bacilli (Rod)

Lactose fermentation

No

Yes

Oxidase

No

Yes

Pseudomonas aeruginosa

- Green pigments
- Water/soil, ESKAPE
- Wound, DFU, Pneumonia (cystic fibrosis)
- Chronic biofilm, alginate capsule
- Elastase, Exotoxin A (ADP-ribos. EF2, protein synthesis)

Pleomorphic Rod

Bartonella hensalae

- Vascular endo, RBCs
- Induce proliferation
- Cat scratch disease
- Bacillary angiomatosis (angioproliferative)

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Helicobacter pylori

- Commensal
- Fecal-oral, saliva
- Ulcers, cancer
- Urease – neutralize pH
- Cag pathogenicity island (T4SS & CagA) + VacA

Anaerobic Bacilli (Rod)

Bacteroides fragilis

- Normal GI flora, opportunistic
- Polymicrobial, wound, GI abscesses, bacteremia
- Polysaccharide A capsule (Treg)

Shigella

- Fecal-oral, human
- Inflammatory diarrhea (plasmid) T3SS – invade (intracellular)
- (phage) STx – targets ribosome in blood vessels = bloody diarrhea + HUS

Salmonella (non-typhoidal)

- Zoonosis – food, reptiles
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- Typhoid fever
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H₂S producing (Hydrogen sulfide)

No

Yes

Atypicals



Spirochetes

Borrelia burgdorferi

Deer tick, lyme disease, arthritis

Treponema pallidum

Syphilis: chancre, gummas

(Gram-negative but stain poorly)

Obligate Intracellular

Chlamydia

- Target: epithelium
- EB & RB, inclusion (inhibit phagolysosome)
- ...*trachomatis* Urethritis/cervicitis (STI), PID, Trachoma, LGV
- Most common bact. cause Reactive Arthritis
- ...*pneumoniae* Atypical pneumonia

Rickettsia

- Target: vascular endothelium
- Replicate in cytoplasm
- ...*rickettsii*
- Tickborne
- Rocky Mt Spotted Fever (maculopapular rash extremities → trunk)
- ...*prowazekii*
- Body lice
- Epidemic Typhus Fever (maculopapular rash trunk → extremities)

Ehrlichia & Anaplasma

- Human monocytic ehrlichiosis (HME)
- Human granulocytic anaplasmosis (HGA)
- Morulae (inclusion), inhibit phagolysosomal fusion
- Tickborne



Acid-Fast Bacilli (AFB)

Mycobacterium tuberculosis, bovis

- primary, miliary, latent, reactivation TB
- Intracellular (macrophages)
- Tuberculin → delayed-type hypersensitivity, granuloma
- HIV+/vulnerable patients
- BCG vaccine

Mycobacterium leprae

- Hansen's (leprosy): tuberculoid/PB, Lepromatous (MB), borderline/dimorphous
- Contact, armadillos in US

Mycobacterium avium-intracellulare complex (MAC)

- Opportunistic, ubiquitous, GI
- Lung disease
- HIV+/vulnerable patients

Mycobacterium abscessus

- Ubiquitous, rapid growing!
- Opportunistic, efflux pumps, Multi-drug resistant

Mycobacterium marinum

- fresh/saltwater + abrasion
- Granulomatous lesions → ulcers

No Cell Wall, Pleomorphic

Mycoplasma pneumoniae

- aerobe, atypical pneumonia
- ADP-ribosylating toxin
- IgM (Cold hemagglutinin)

Mycoplasma genitalium

- STI Mgen, urethritis/cervicitis, PID, preterm birth, infertility

Mycoplasma hominis

- Urogenital microbiota, opportunist, intracellular (epithelial cells)
- PID, vaginosis, male infertility, preterm birth & neonatal meningitis

Ureaplasma urealyticum & parvum

- urease, urogenital, STI
- Male infertility, cervicitis, vaginosis, PID