

Orientation to Gram Negative Bacteria of Medical Importance

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Gram-positive

Cocci



Rods



- Clostridium*
- Corynebacterium*
- Listeria*
- Bacillus*
- Mycobacterium*

Catalase test

-



Streptococci

+



Staphylococci

Coagulase test

-

- S. saprophyticus*
- S. epidermidis*

+

S. aureus

Growth on sheep's blood agar



None

γ -hemolytic

Enterococcus



β -hemolytic

Group A

S. pyogenes

Group B

S. agalactiae



α -hemolytic

Capsule

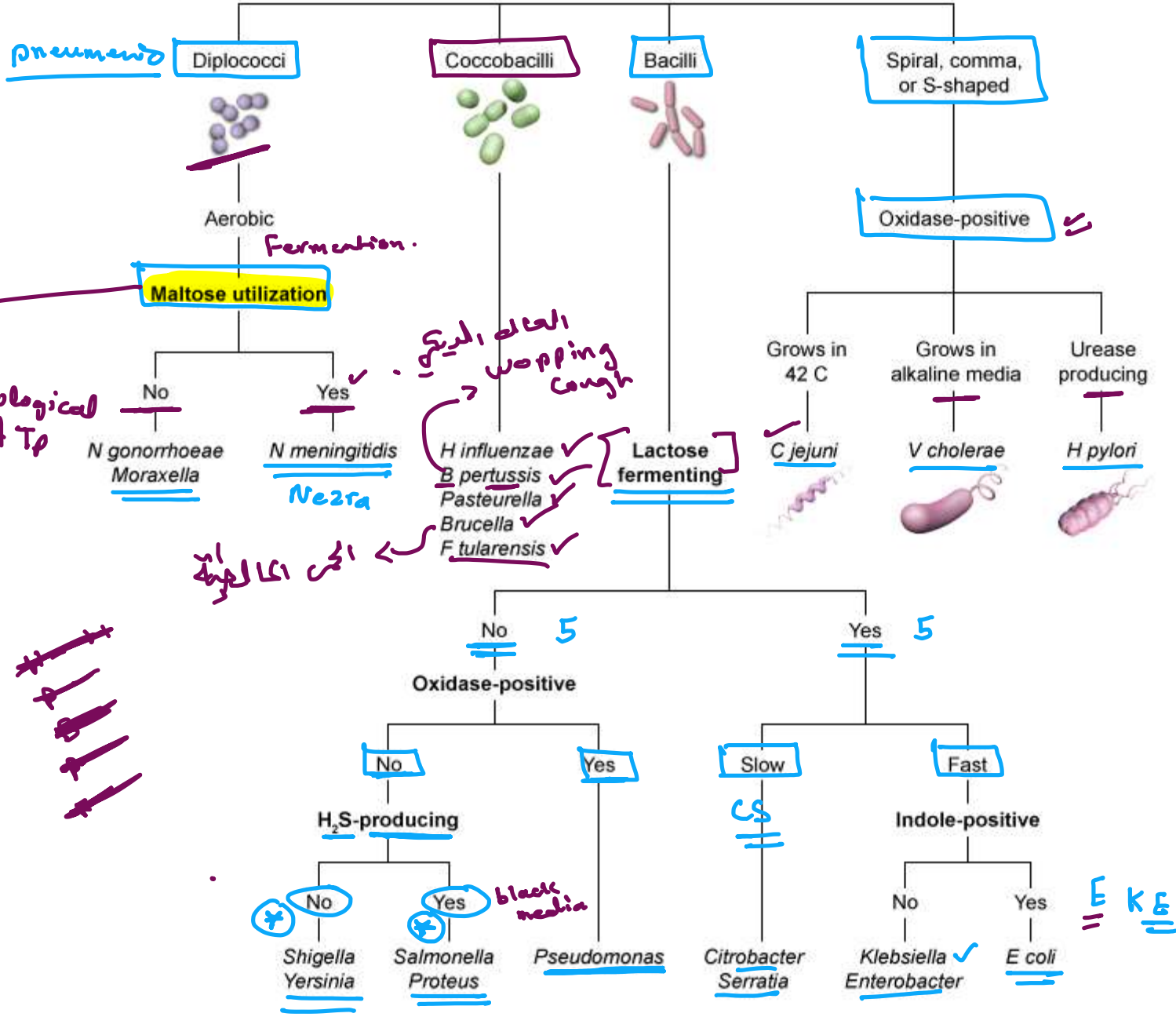
S. pneumoniae

No Capsule

Viridans streptococci



Gram-negative bacteria



→ it's the biological molecule as ATP production

Fermentation.

العلاج اليربسي
Whooping cough

الحصبة الكاذبة



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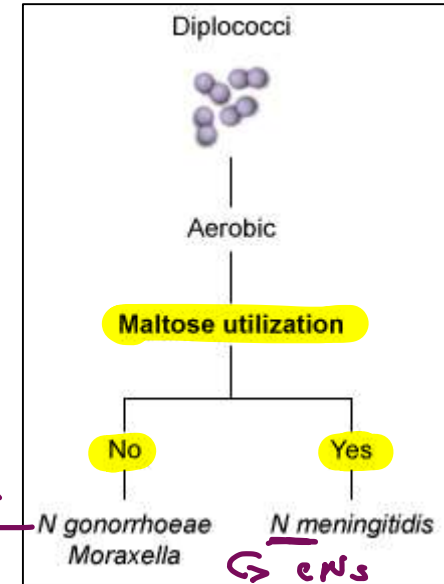
1-what's the feature of it? 2-what are major types? what does they associated with?

Medically Important Gram-negative diplococci

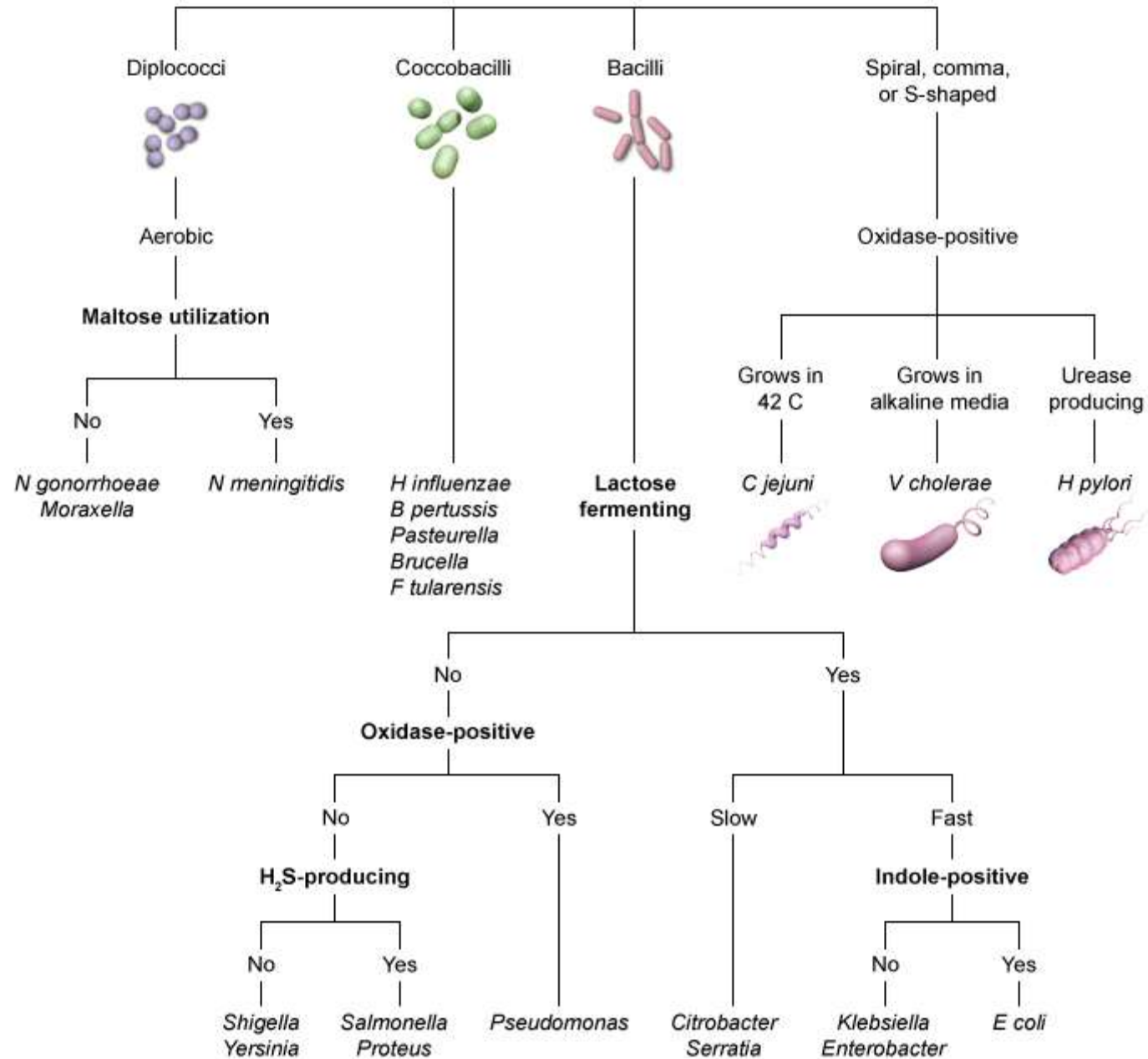
Neisseria



- Gram-negative intracellular diplococcus ✓
- Two major pathogenic species
 - *Neisseria gonorrhoeae*:
 - Associated with Sexually Transmitted Diseases (STDs).
 - *Neisseria meningitidis*:
 - Associated with respiratory and CNS infections.



Gram-negative bacteria



1- what is the feature of it? 2- what's the type of virulence factor?

Medically Important Gram-negative coccobacilli

Haemophilus: Blood-Loving Bacilli

blood loving

3- what's the function of it?

4- what's special type of it? why.

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• **Fastidious:** require some chemicals from blood for their growth (Factor V, X)

• H. influenzae: bacterial meningitis: children 3 months to 5 years

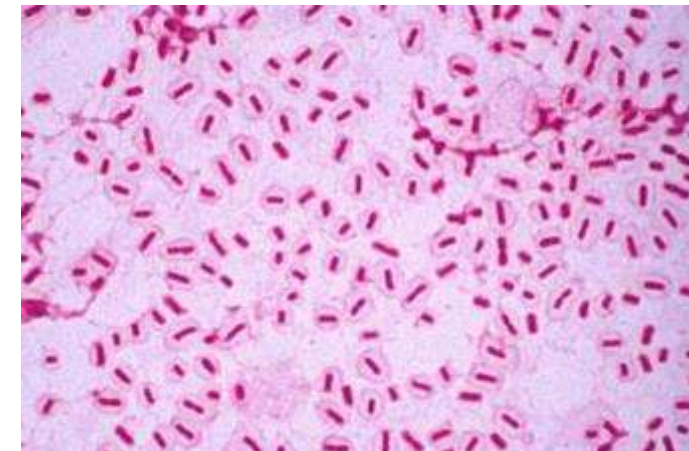
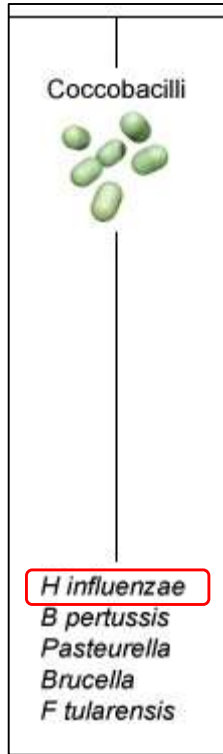
• Most strains have a polysaccharide capsule that resists phagocytosis.
↳ virulence factor

• Colonize the mucous membranes of humans and some animals. ✓

• **H. influenzae type b** is the most significant ✓

• Was the most common form of meningitis in infants prior to the use of an effective vaccine

• Use of the Hib vaccine has eliminated much of the disease caused by H. influenzae b



1-what's the other name of it? what's special about it?

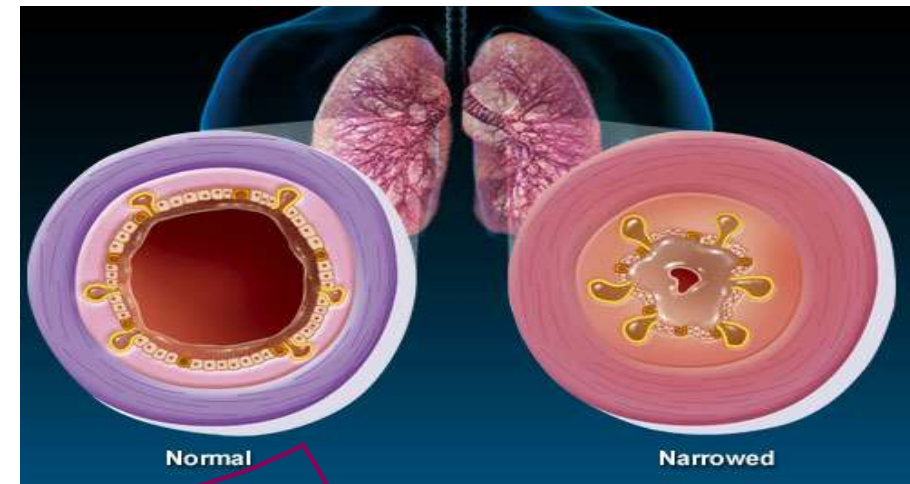
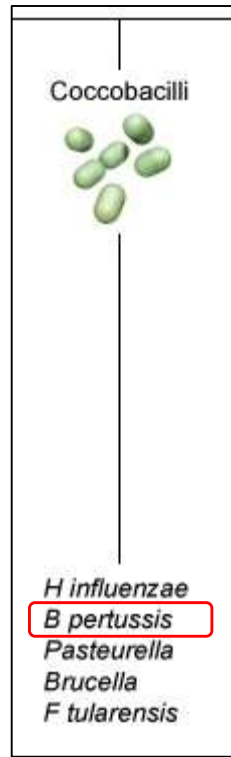
Medically Important Gram-negative coccobacilli

Bordetella

- Small, aerobic, nonmotile coccobacillus
- **B. pertussis**: wobbling cult → R's tract ... inflamed. → Thick mucus ... narrow lumen
 - Causes pertussis, also called whooping cough.
 - Most cases of disease are in children.
 - **Bacteria** are first inhaled in aerosols and multiply in epithelial cells.
 - a build-up of thick mucus – which causes the intense attacks of coughing as your body tries to expel it
 - swollen airways – which makes breathing more difficult and causing the "whoop" sound as you gasp for breath after coughing

2-what's the infection mechanism, why?

3-what's the result of it?



Wobbling Cough.



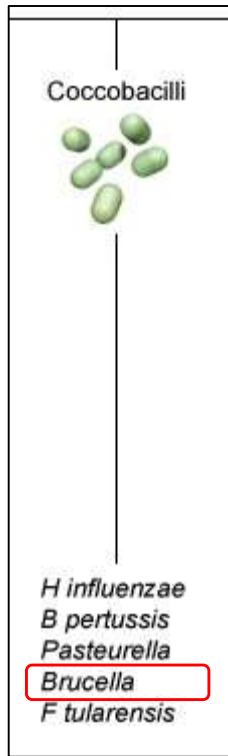
1- what's the causes of it? 2. what're the symptoms?

Medically Important Gram-negative coccobacilli

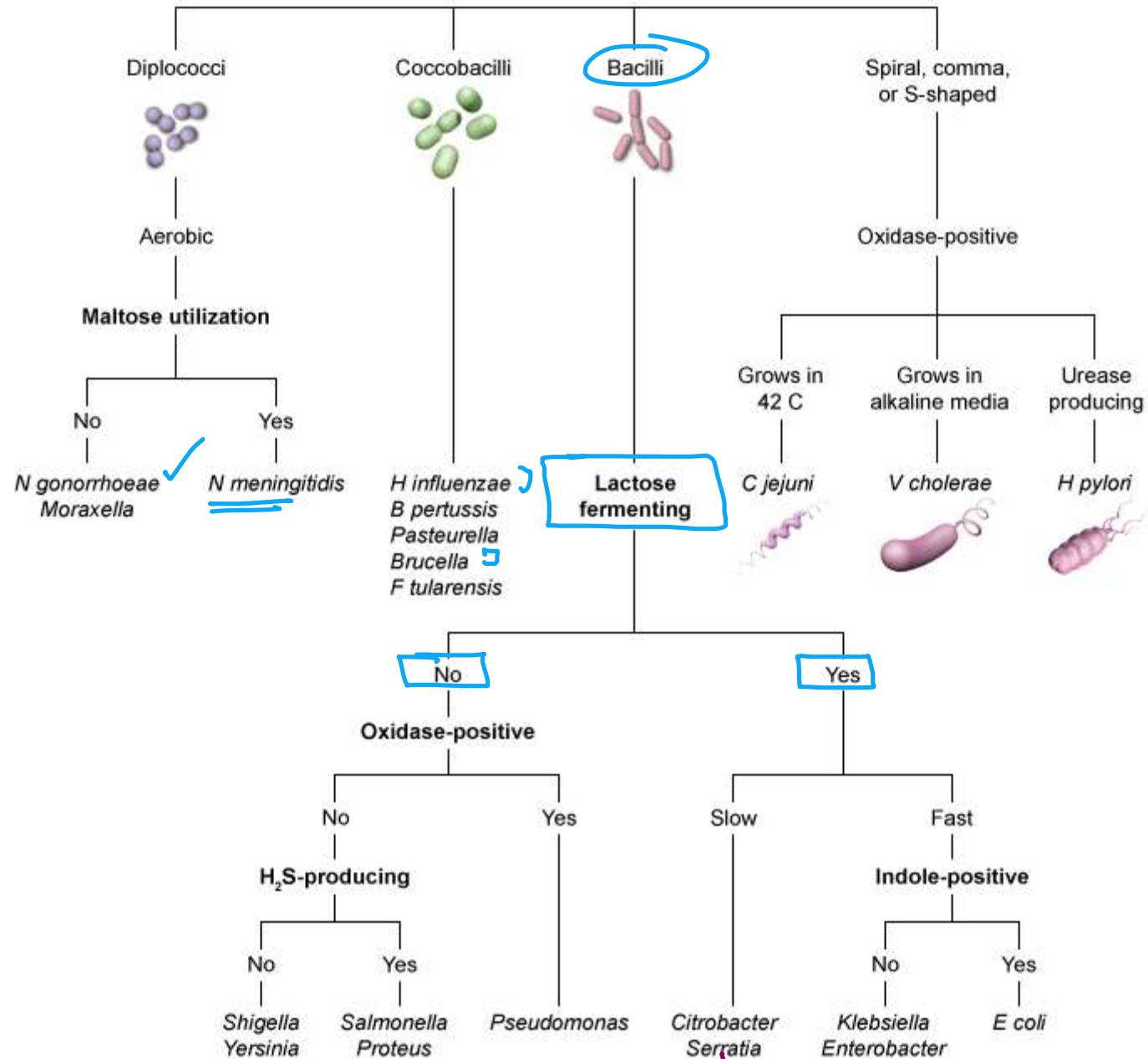
Brucella

- Causes Brucellosis in humans following ingestion of contaminated milk or cheese from goats and cows.
- Clinical manifestations range from subclinical, to chronic with low grade symptoms of low fever and muscular stiffness, to acute with fever and chills.

→ non-specific diagnosis.
→ To get proper diagnosis is a good history.

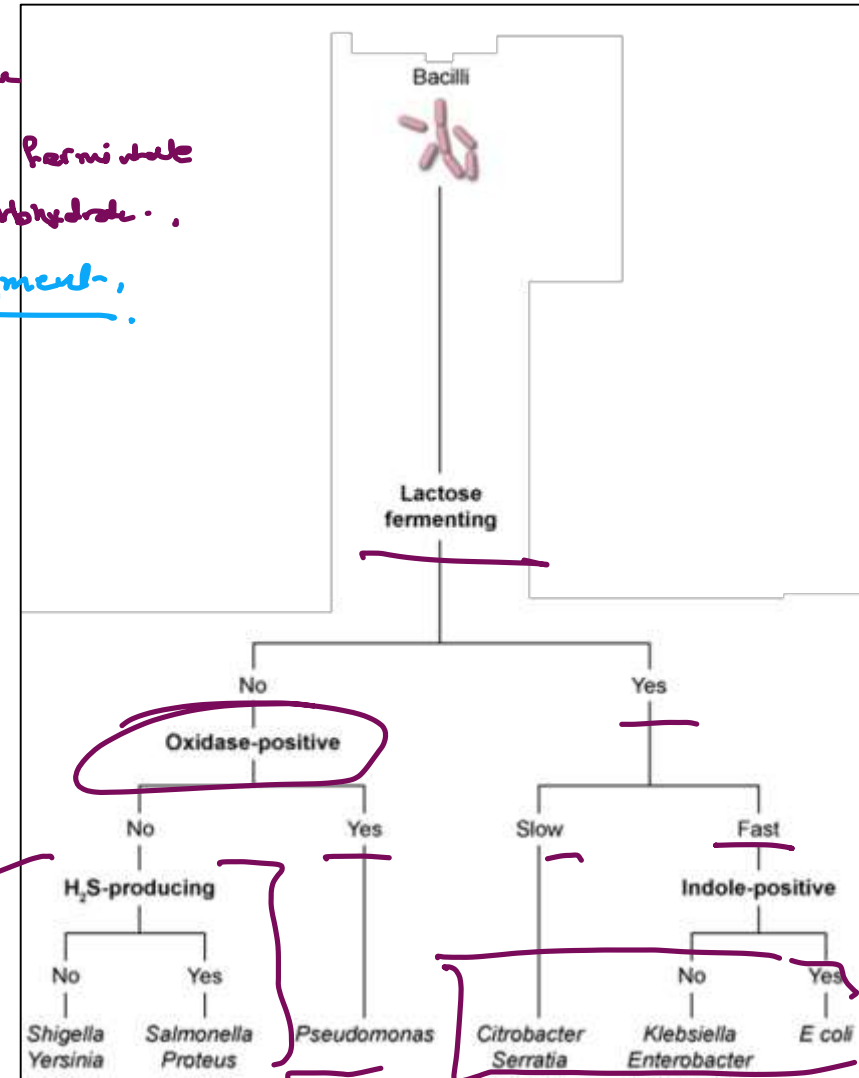
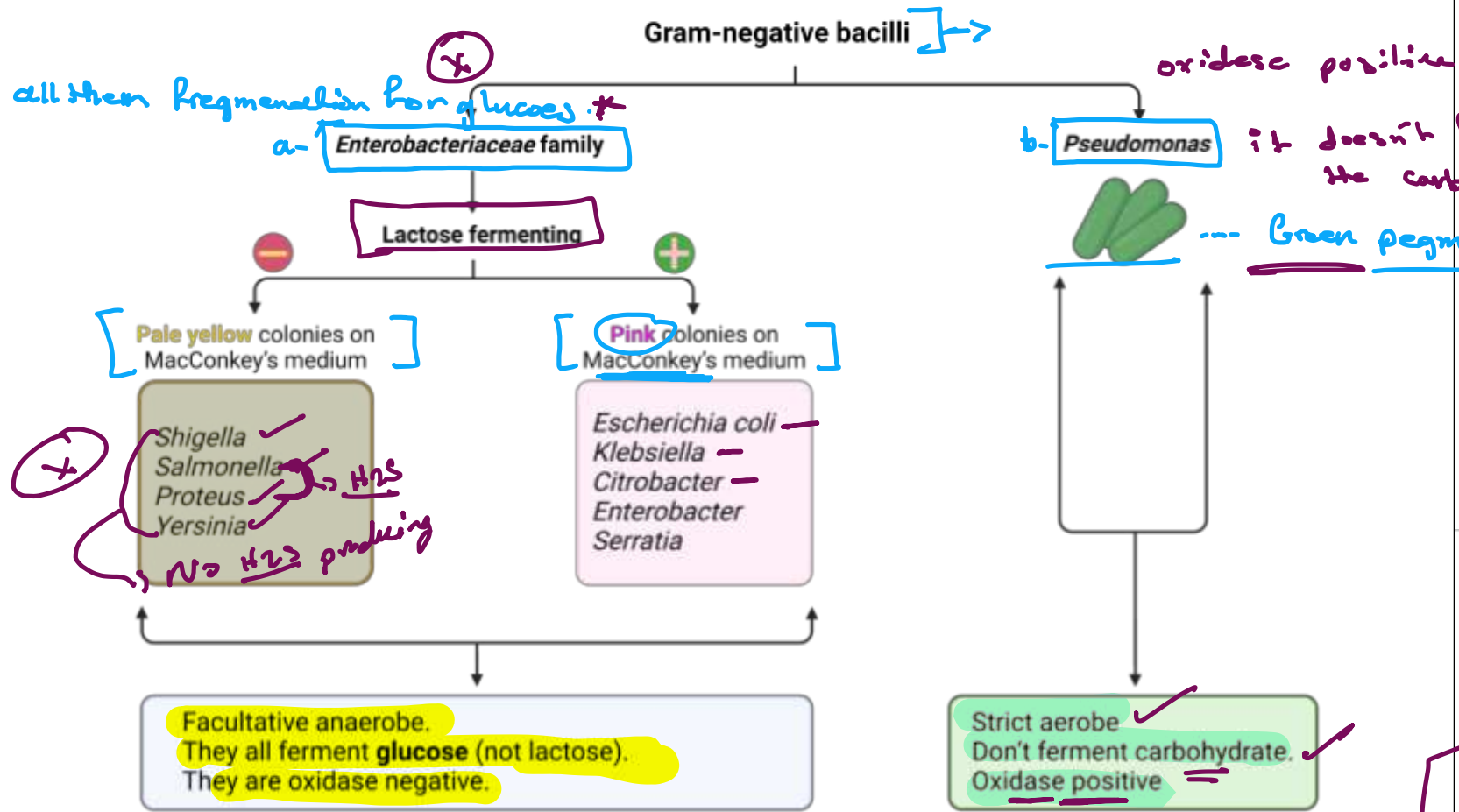


Gram-negative bacteria



Medically Important Gram-negative bacilli

Another classification



Medically Important Gram-negative bacilli

Another classification



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بكتريا

LACTOSE FERMENTOR COLONIES

NON-LACTOSE FERMENTOR COLONIES



Medically Important Gram-negative bacilli

Enterobacteriaceae

- **Ubiquitous (they are everywhere)** - soil, water, vegetation, normal intestinal flora
 - ~40 genera, 150 species
- Members of family commonly associated with human disease:
 - *Escherichia*
 - *Salmonella*
 - *Shigella*
 - *Yersinia*
 - *Klebsiella*
 - *Serratia*
 - *Proteus*



1- what's special about shigella? 2- what's does it lead to? 3- what's the causes of it-?

Medically Important Gram-negative bacilli

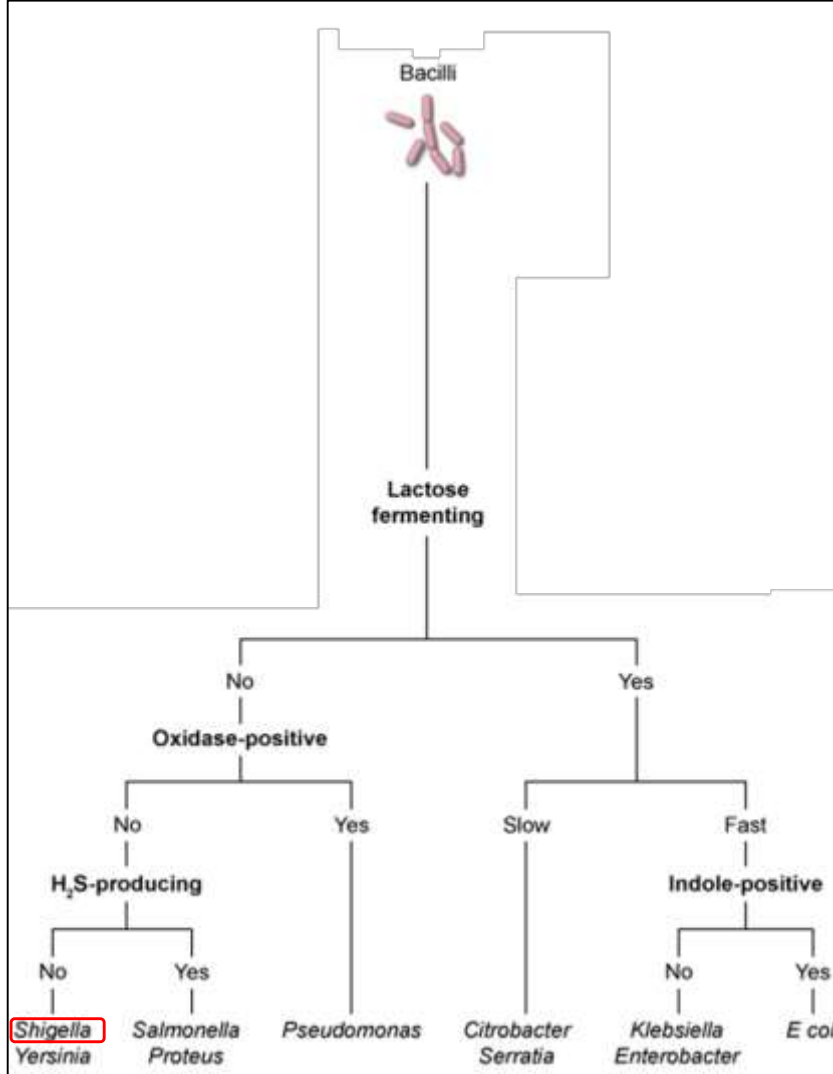
Shigella

→ desire to detect → No ability.
→ blood + mucus + diarrhea

4- where we can find it-?

- Shigella a Highly Infectious Bacteria. (100- 200)
- One of the leading causes of diarrhea and bacillary dysentery.
- Shigella is one of the most infectious of bacteria and ingestion of as few as 100- 200 organisms will cause disease.
- Most individuals are infected with shigella when they ingest food or water contaminated with human fecal material.
- Outbreaks of Shigella infection are common in places where sanitation is poor.
- Shigella can survive up to 30 days in milk, eggs, cheese

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Medically Important Gram-negative bacilli

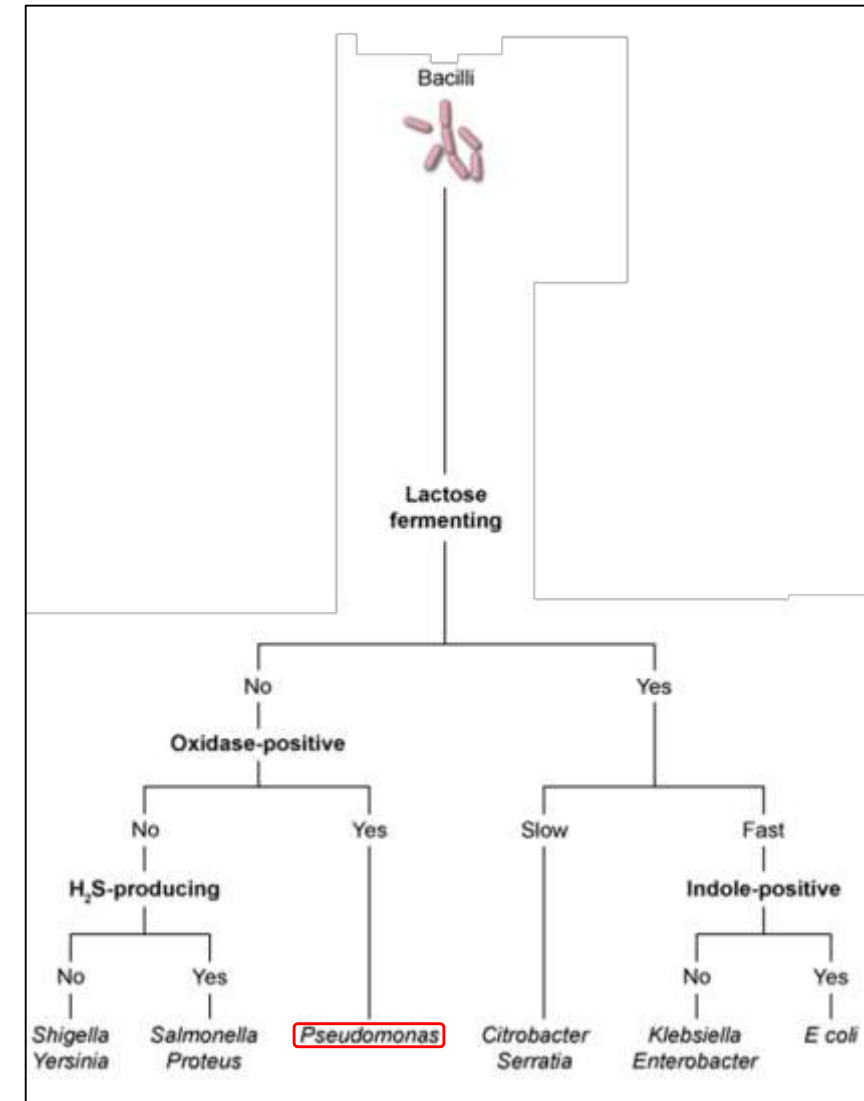
Pseudomonads

No Fermentation For carb.

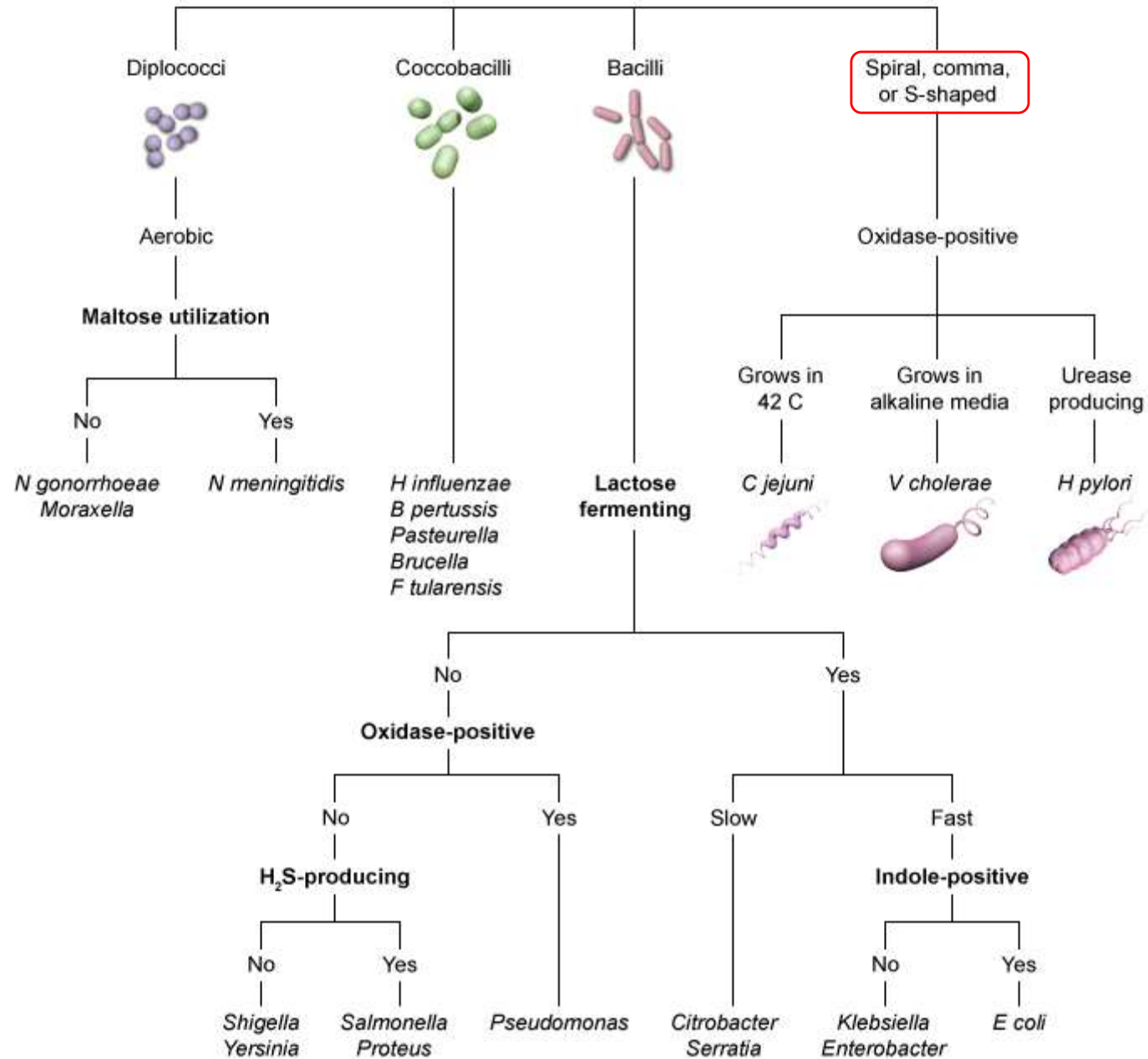
- Gram-negative, aerobic bacilli. / oxidase ⊕
- Ubiquitous in soil, decaying organic matter, and almost every moist environment.
- Problematic in hospitals because they can be found in numerous locations. → some strains are resistant.
- Opportunistic pathogens.



→ Green pigment

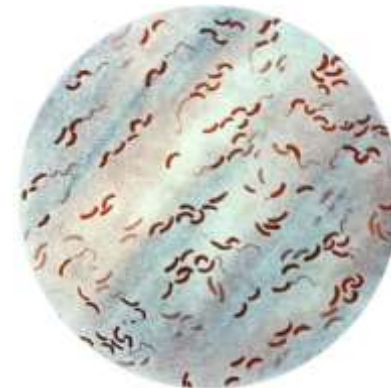
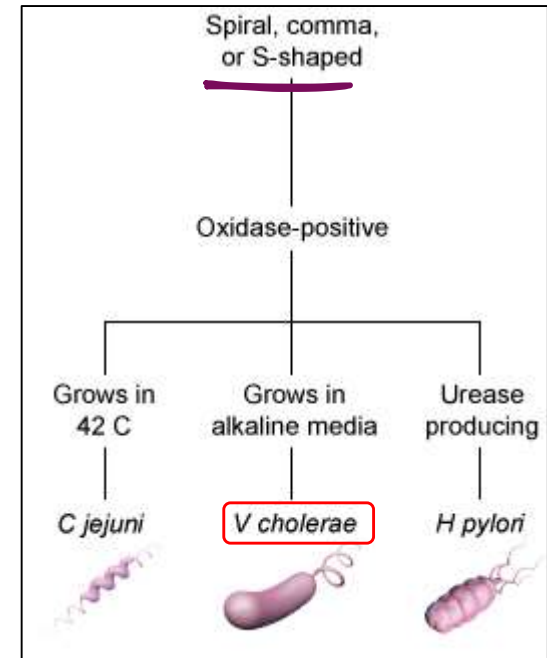


Gram-negative bacteria



Medically Important Gram-negative comma *Vibrio*

- *Vibrio cholerae* is the most common species to infect humans:
 - Causes cholera. = watery diarrhea.
 - Humans become infected with *V. cholerae* by ingesting contaminated food and water.
 - Found most often in communities with poor sewage and water treatment.



1- what's the feature of it? 2- what does it cause? 3- what're the type of virulence factors?

Medically Important Gram-negative comma

Helicobacter pylori

4- what're the causes of it?
5- what're the check lab?

- ① Slightly helical, highly motile bacterium that colonizes the stomach of its hosts.
- ② Causes most (if not all) peptic ulcers.
- ③ *H. pylori* produces numerous virulence factors that enable it to colonize the stomach.
 - It is protected from gastric acid by endogenous urease production: urease converts urea to ammonia, which alkalinizes the surrounding pH but injures gastric epithelial cells. *> protected itself from HCl*
- Coffee drinking, smoking, and drinking alcohol increase your risk for an ulcer.
- Simple blood, breath, and stool tests can determine if you are infected with *H. pylori*.
- The most accurate way to diagnose is through upper endoscopy.

