

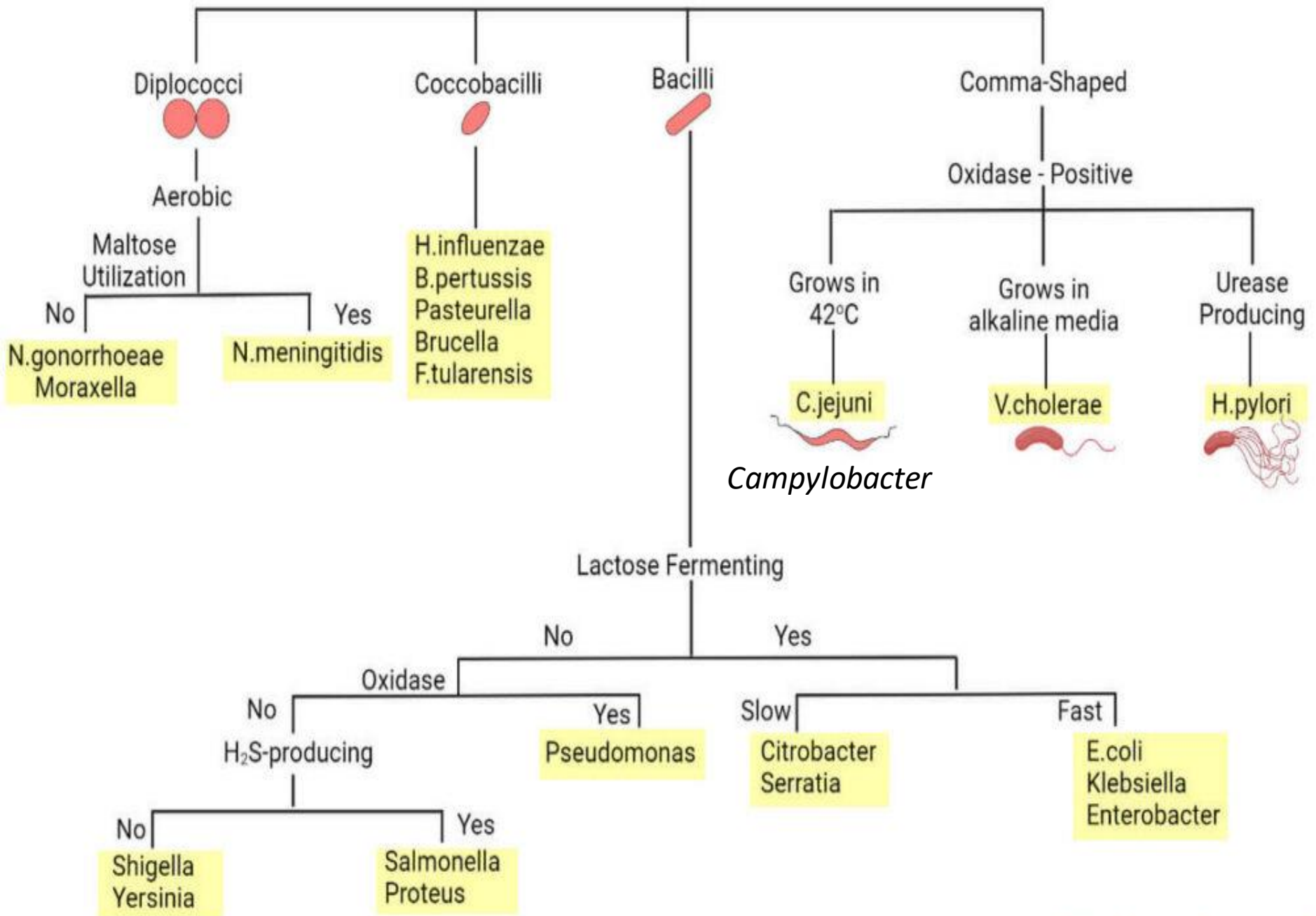
# Orientation to Gram Negative Bacteria of Medical Importance

**By**

**Professor Dina Moustafa Abou Rayia**

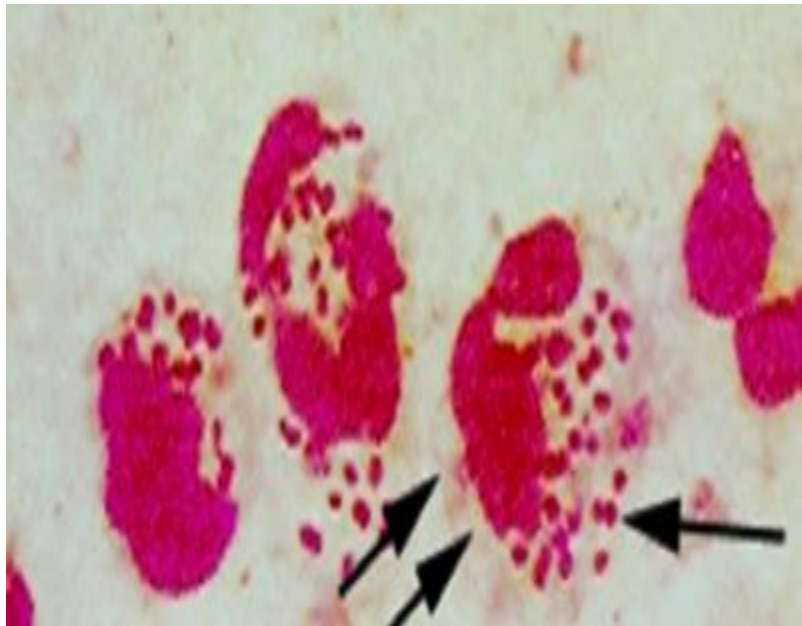
**Medical Microbiology and Immunology Department**

# Gram-Negative Bacteria

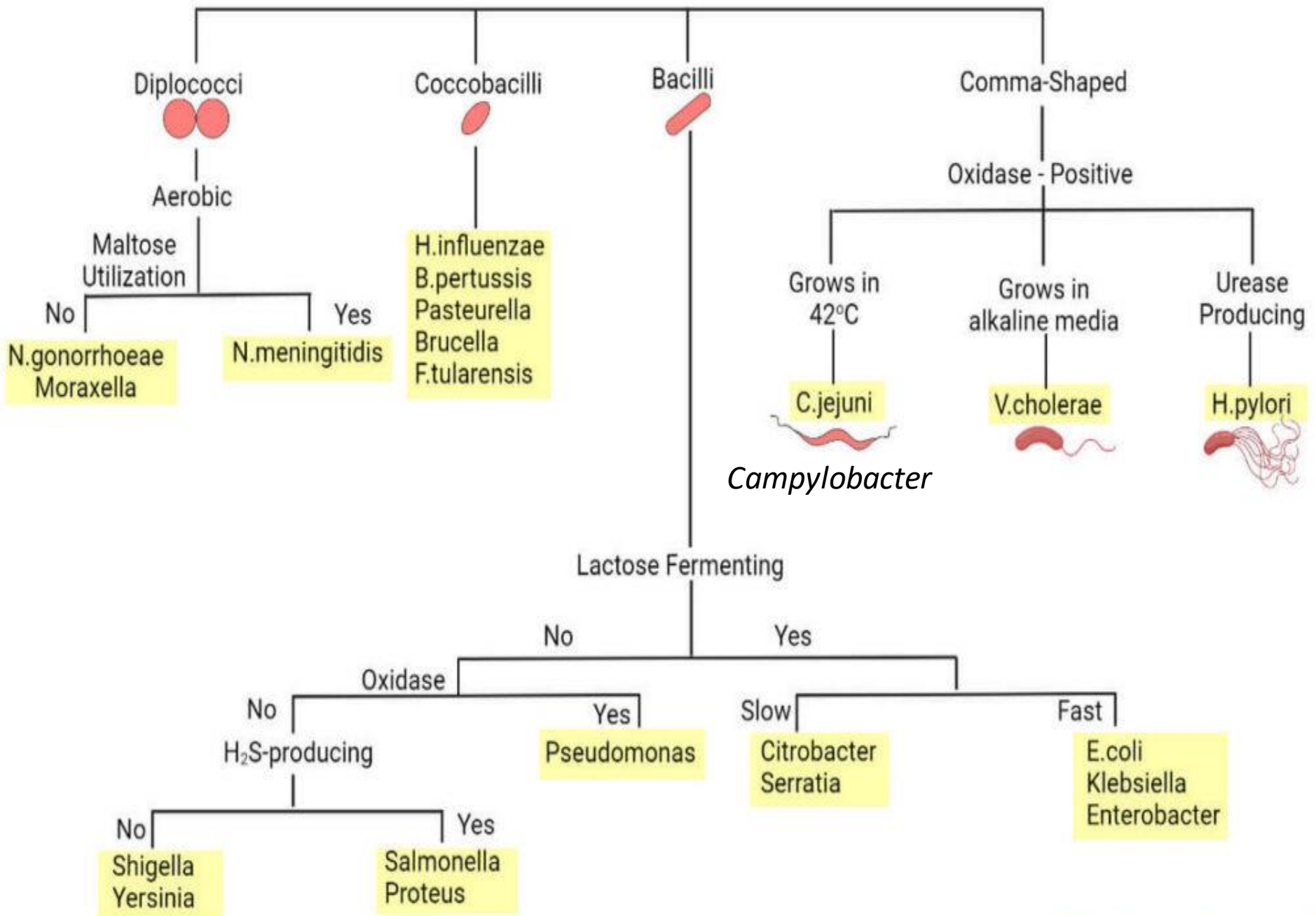


# Gram-negative diplococci

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



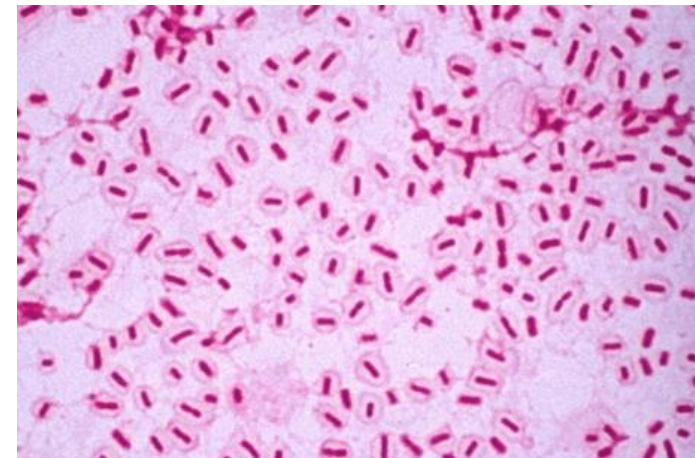
# Gram-Negative Bacteria



# Gram-negative coccobacilli

## *Haemophilus*: Blood -Loving Bacilli

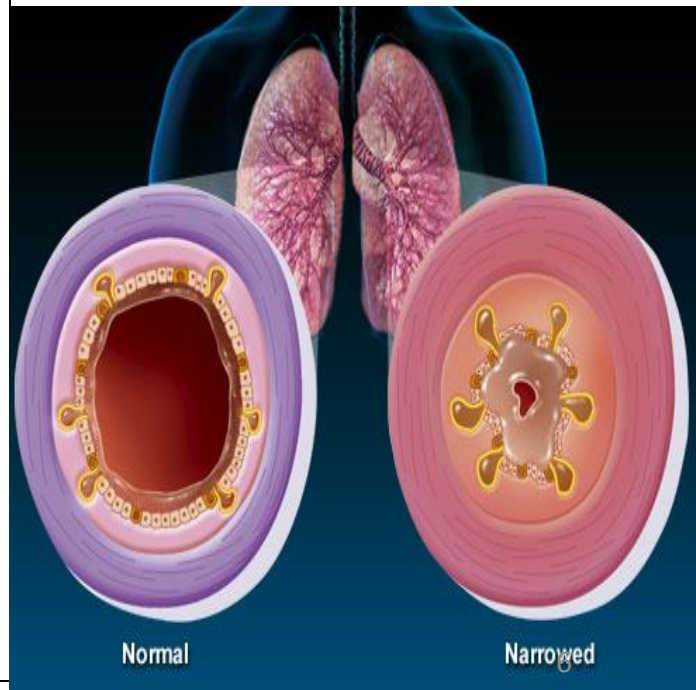
- **Fastidious**: require some chemicals from blood for their growth
- *H. influenzae*: bacterial meningitis: children 3 months to 5 years
- Most strains have a polysaccharide capsule that resists phagocytosis.
- *H. influenzae* type b is the most significant
  - Was the most common form of meningitis 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





# Bordetella

- *B. pertussis*:
  - 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

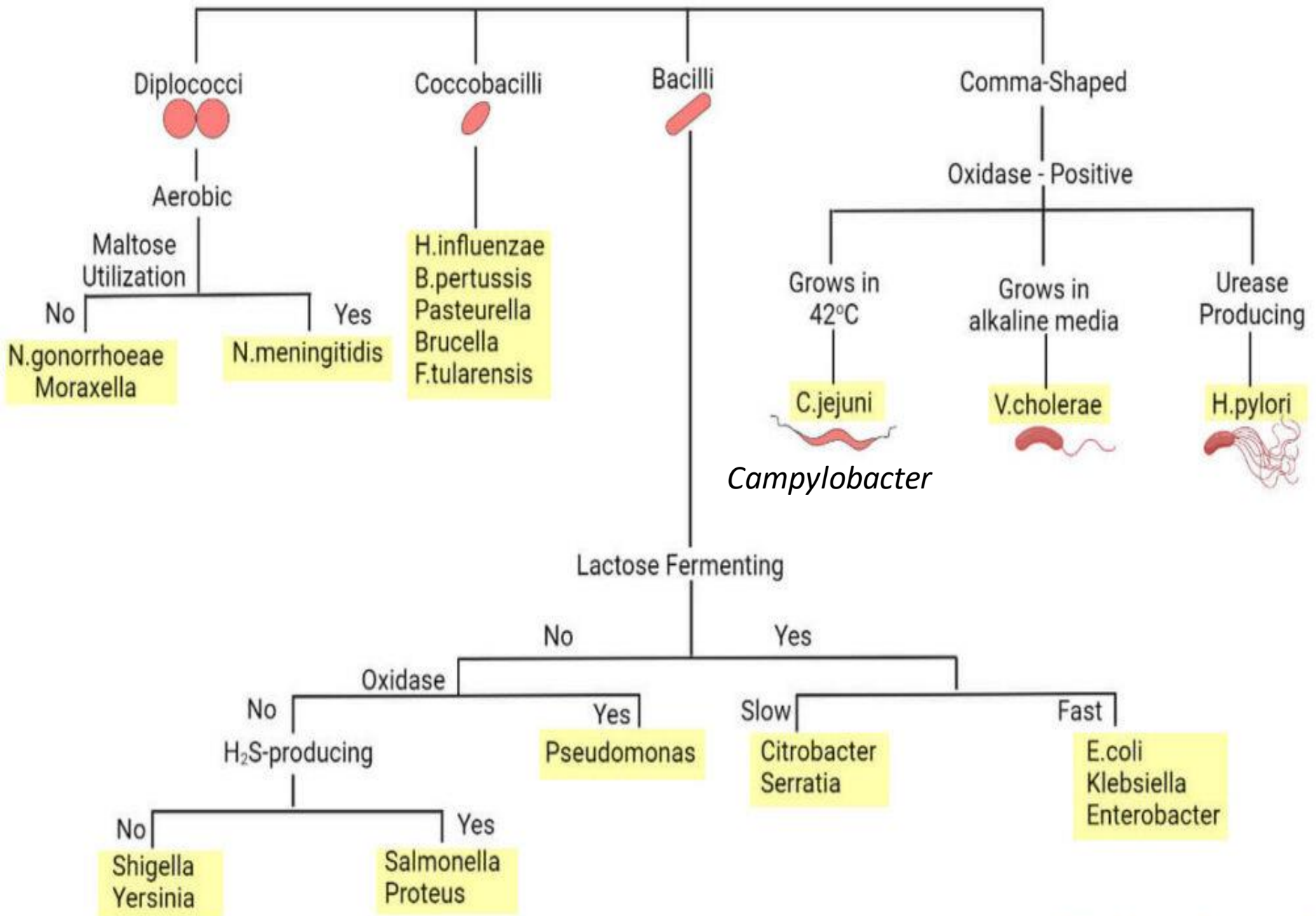


# *Brucella*

- Causes Brucellosis in man 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.



# Gram-Negative Bacteria



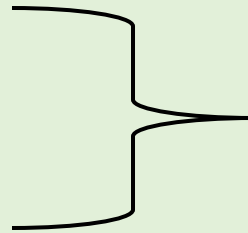


# Medically Important Gram-Negative bacilli

## •Bacilli

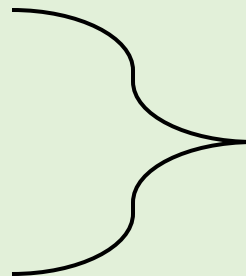
### - Enterobacteriaceae

- **Shigella**
- **Salmonella**
- **Proteus**
- **Yersinia**



Non-lactose fermenter (pale yellow colonies on **MacConkey's medium**)

- **Escherichia coli**
- **Klebsiella**
- **Citrobacter**
- **Enterobacter**
- **Serratia**



Lactose-fermenter (pink colonies on **MacConkey's medium**)

- **Pseudomonas**

# Gram-negative bacilli

- Enterobacteriaceae
- *Pseudomonas*

## Enterobacteriaceae

- Facultative anaerobe.
- They all ferment glucose.
- They are oxidase negative.

## *Pseudomonas*

- Strict aerobe
- Don't ferment carbohydrate.
- Oxidase positive.

# *Shigella*

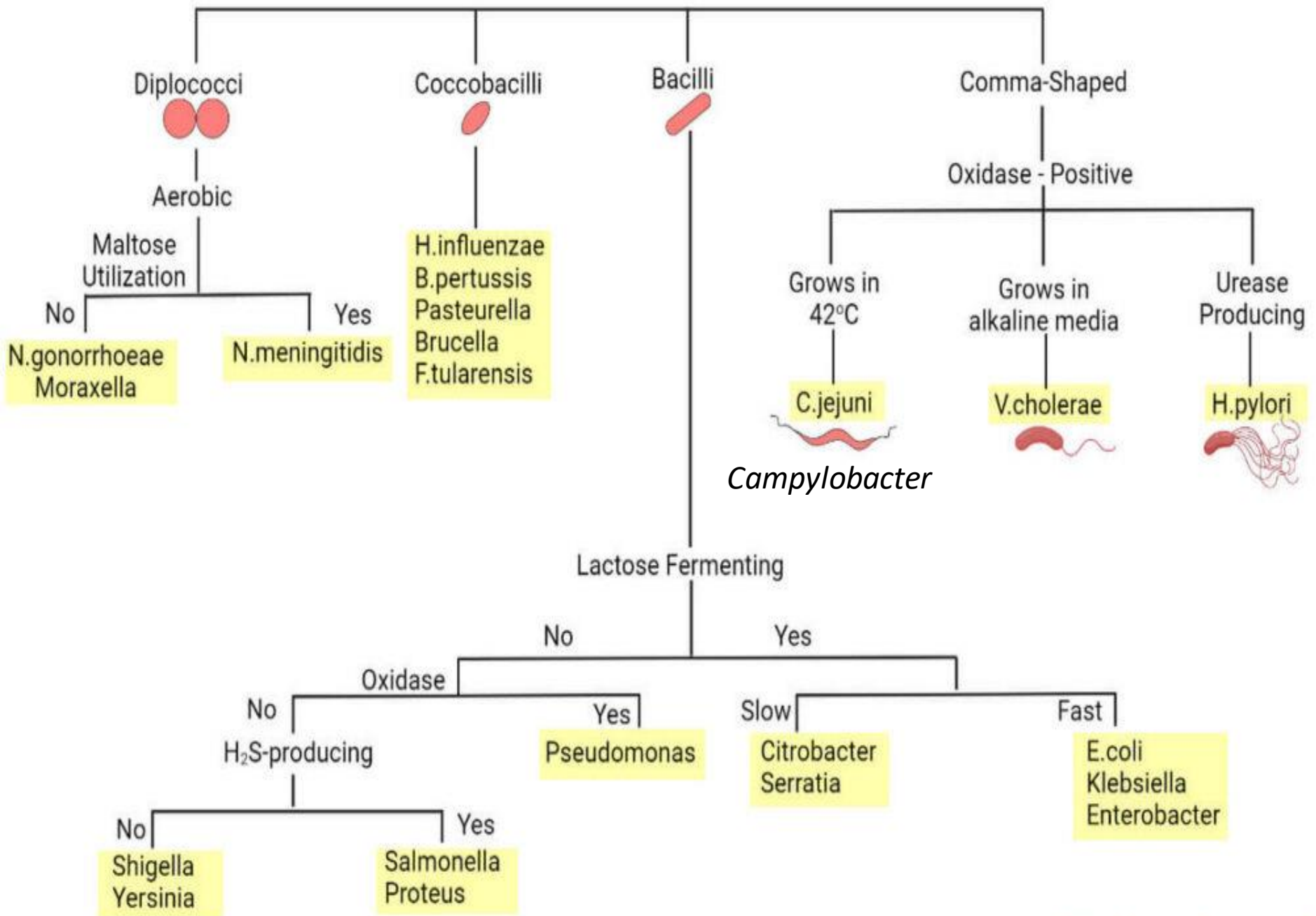
- *Shigella* a highly infectious Bacteria.
- One of the leading causes of diarrhea and bacillary dysentery.
- Most individuals are infected with *Shigella* when they ingest food or water contaminated with **human fecal material (faeco-oral)**.
- Outbreaks of *Shigella* infection are common in places where sanitation is poor.
- *Shigella* can survive up to 30 days in milk, eggs, cheese

# *Pseudomonads*

- Gram-negative, aerobic bacilli.
- Problematic in hospitals because they can be found in numerous locations.
- Opportunistic pathogens.
- Resistant to many antibiotics



# Gram-Negative Bacteria





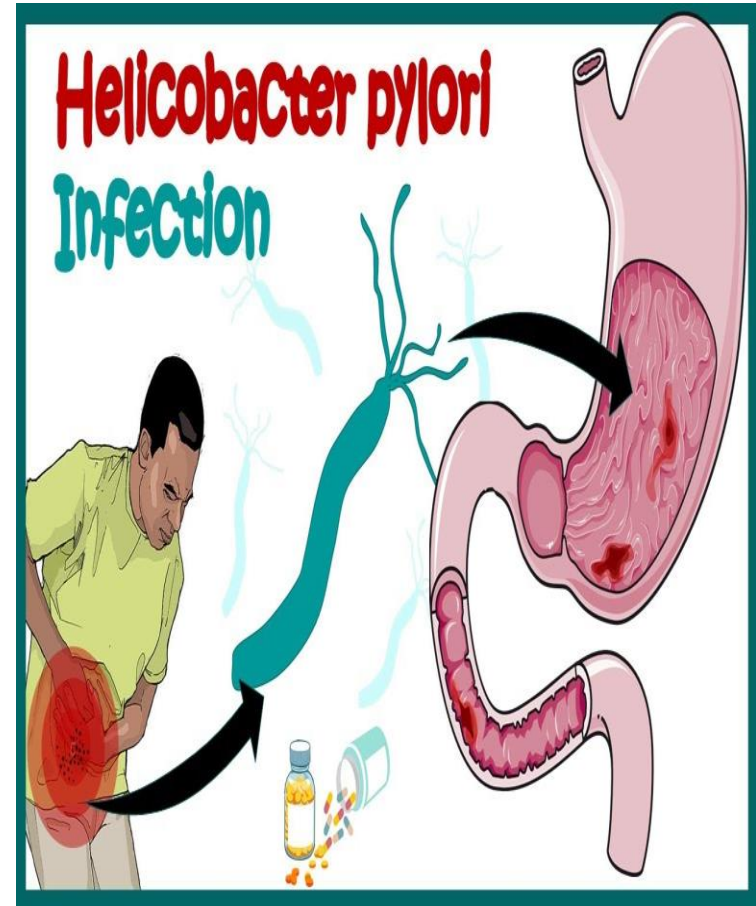
# Vibrio

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

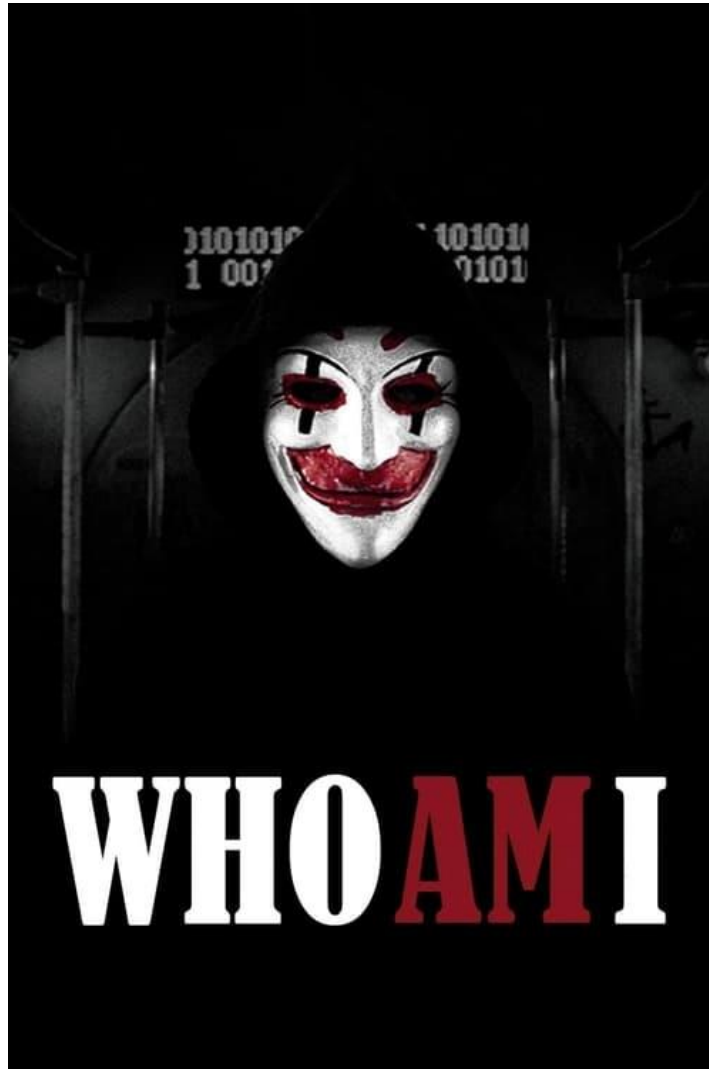


# *Helicobacter pylori*

- Slightly helical, highly motile bacterium that colonizes the stomach of its hosts.
- Causes most (if not all) peptic ulcers.
- *H.pylori* produces numerous virulence factors that enable it to colonize the stomach.
- 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.







????????????????

- The causative organism for gonorrhoea?
- Blood-loving bacillus that causes meningitis?
- The causative organism for whooping cough??
- The common organism causing bacillary dysentery??
- The causative organism for rice water diarrhoea??
- A risk for gastric ulcer ??
- Turn the nutrient agar to greenish colour??



Thank  
You

