

Practical Medical Bacteriology

Lab 10

Laboratory Diagnosis of *Pseudomonas* spp



2021/2022

General characteristics of *Pseudomonas*

- Gram-negative bacilli arranged in single, pairs, and occasionally in short chains.
- Widely distributed in soil and water as saprophytic microbe.
- Obligate aerobic bacteria.
- Motile usually with polar flagella.
- Oxidase positive (except *P. luteolus* and *P. oryzihabitans*)
- Don't ferment carbohydrates, but many strains oxidize glucose.
- Medically important species is ***P. aeruginosa.***

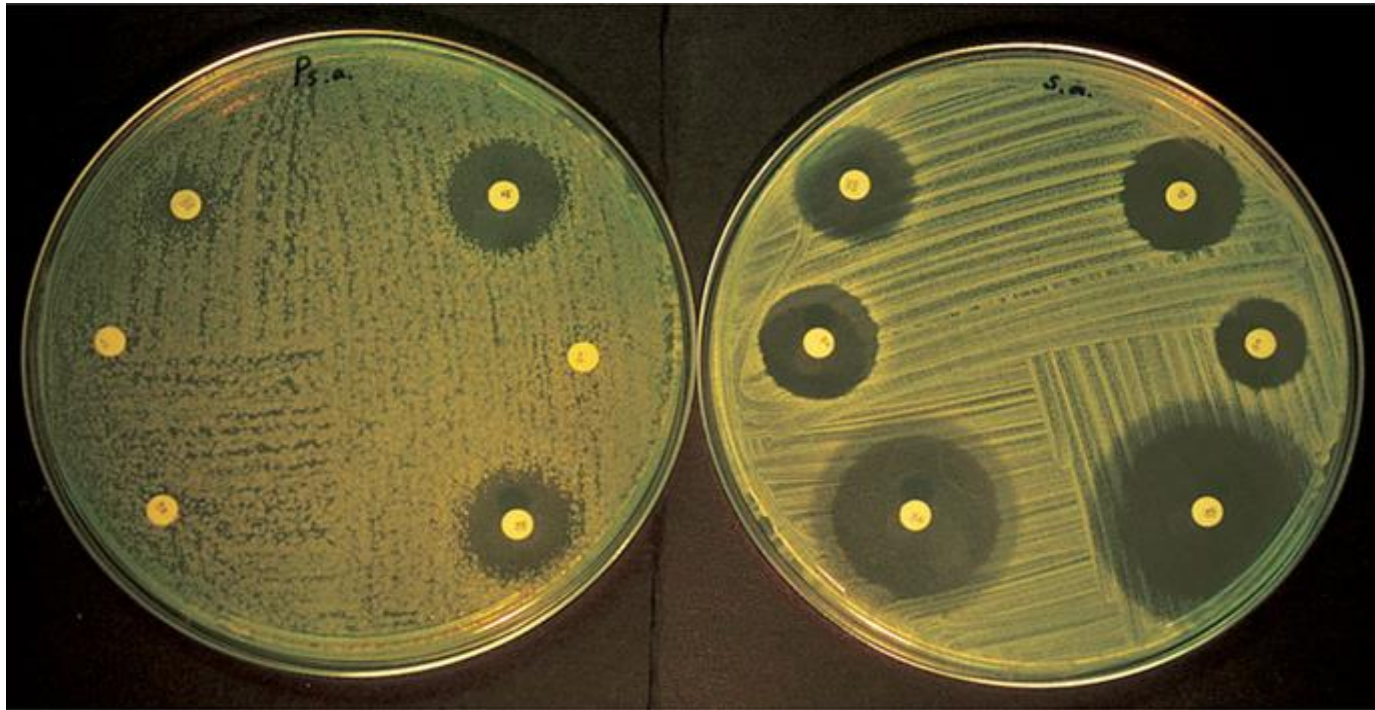


Pseudomonas aeruginosa

- *P. aeruginosa* is Gram negative bacilli and motile.
- Obligate aerobe that grows on any media (very simple bacteria).
- Resistant to soaps, dyes, disinfectants, drugs, and drying.
- Sometimes producing a sweet or grapelike odor.
- Most strains produce water soluble and diffusible pigments:
 - **Pyocyanin** (bluish green in color)
 - **Fluorescein “Pyoverdin”** (yellowish green in color)
 - When pyocyanin combines with pyoverdin, the green color is produced.



Multiple drug resistance of *P. aeruginosa*

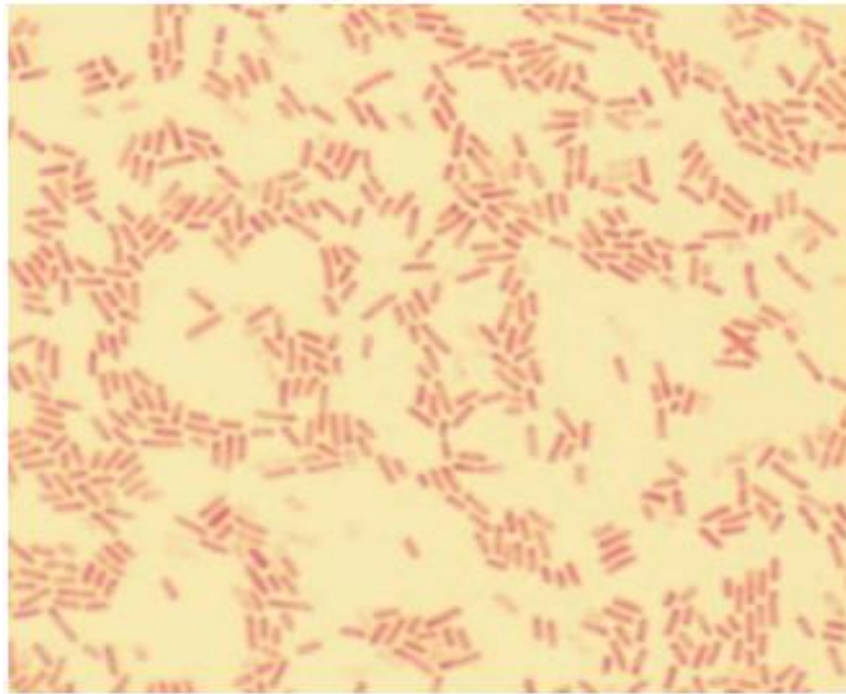


Pseudomonas aeruginosa

Staphylococcus aureus

Laboratory diagnosis

- ❑ **Specimens:** skin lesions, pus, urine, blood, sputum, and CSF
- ❑ **Gram Stain:** Gram negative bacilli in single, pairs, and occasionally in short chains.



Gram stain of *Pseudomonas aeruginosa*

Laboratory diagnosis

❑ Cultural characteristics

➤ On blood agar:

- Some strains hemolyze blood (β -hemolytic) or produce darkness due to the hemodigestion.
- Most strains produce blue green pigment (**pyocyanin**).
- Most strains also produce yellow green pigment (**pyoverdinin**).
- Most colonies produce a sweet or grape-like odor.



Hemodigestion caused by *P. aeruginosa*

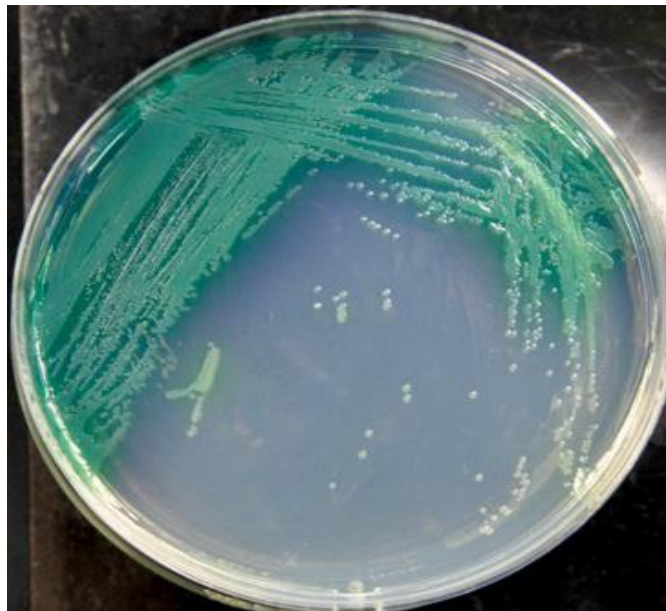


The greenish pigment

Laboratory diagnosis

❑ Cultural characteristics

- **On nutrient agar:** It produces large, opaque, irregular colonies with greenish blue pigment and sweetish aromatic odor.



On Nutrient agar : The blue-green pigment

Laboratory diagnosis

❑ Cultural characteristics

➤ On MacConkey agar

- Colorless or pale non-lactose fermenter.



➤ On selective media (Cetrimide agar):

- Cetrimide in the media acts as a detergent and inhibits most bacteria; the medium also enhances the production of the two pigments produced by *P. aeruginosa*.



Laboratory diagnosis

❑ Biochemical reactions:

- Oxidase test: positive
- Catalase test: positive
- Urease test: negative
- IMViC: — — — +
- TSI: K/K / G - / H₂S -



TSI test