

# **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.***

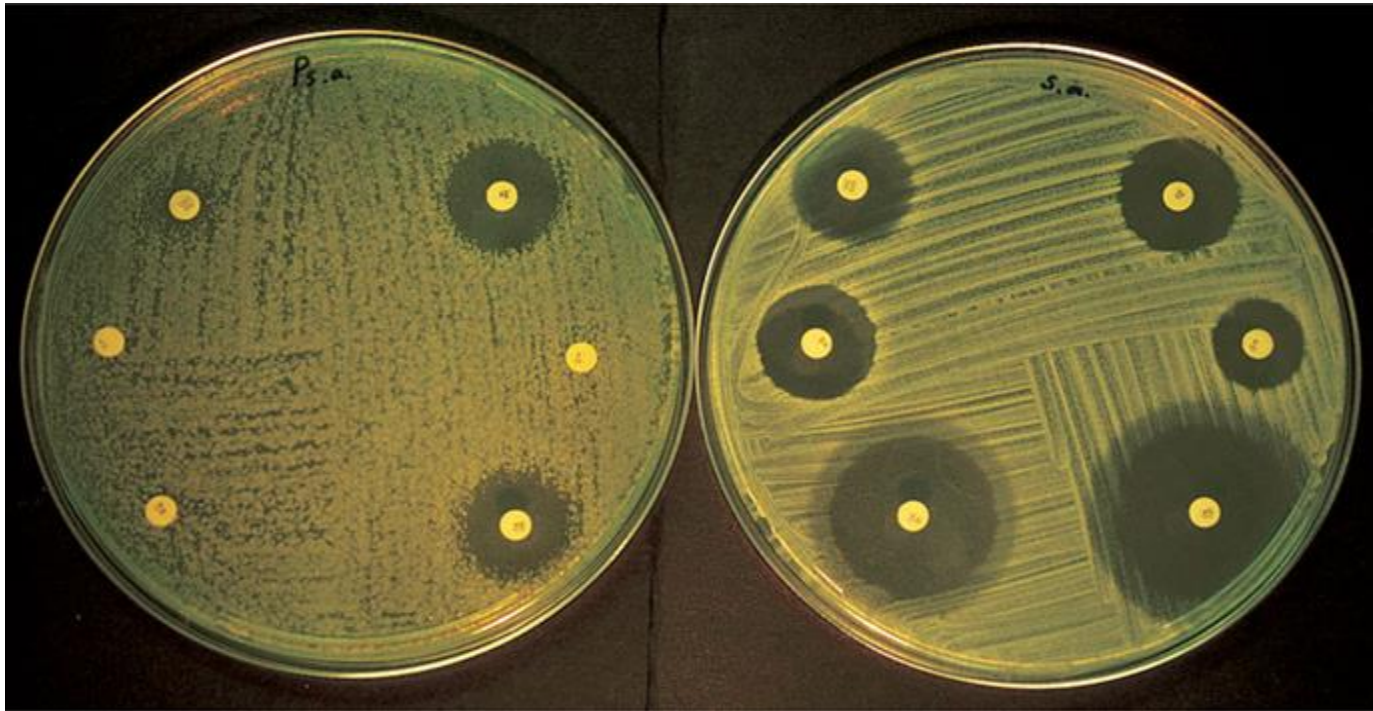


# *Pseudomonas aeruginosa*

- *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*

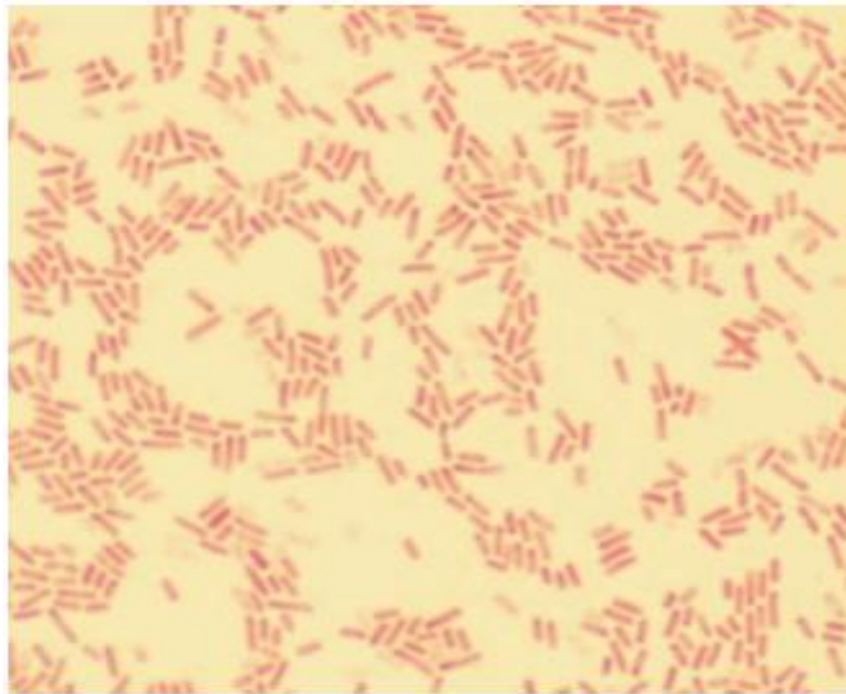


*Pseudomonas aeruginosa*

*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 ( $\beta$ -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*



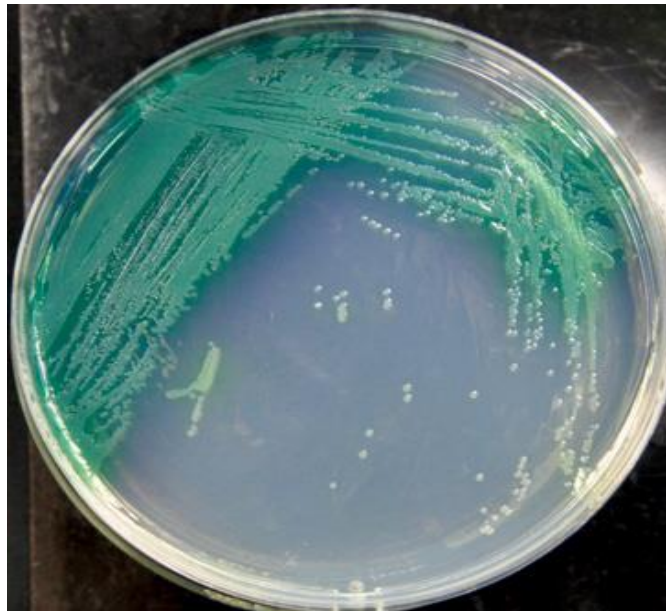
The greenish pigment



# 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 - / H<sub>2</sub>S -



TSI test