

Practical Medical Bacteriology

Lab 9

Laboratory Diagnosis of Enterobacteriaceae spp: *Proteus* spp



2021/2022

Non-lactose fermenter enterobacteriaceae spp

Proteus



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General characteristics of *Proteus*

- Gram -ve, Facultative anaerobic bacilli.
- Non-lactose fermenter.
- Non-capsulated and non-spore forming bacteria.
- The genus is characterized by
- Motile (Peritrichous flagella)
 - Rapid urease activity.
 - Typical swarming growth on nutrient agar and blood agar.
- Medically important species:
 - *Proteus vulgaris* and *Proteus mirabilis*



Laboratory diagnosis

- ❑ **Specimens:** urine, pus, blood and ear discharge
- ❑ **Gram Stain:** Gram negative bacilli



Proteus vulgaris

Laboratory diagnosis

❑ Cultural characteristics

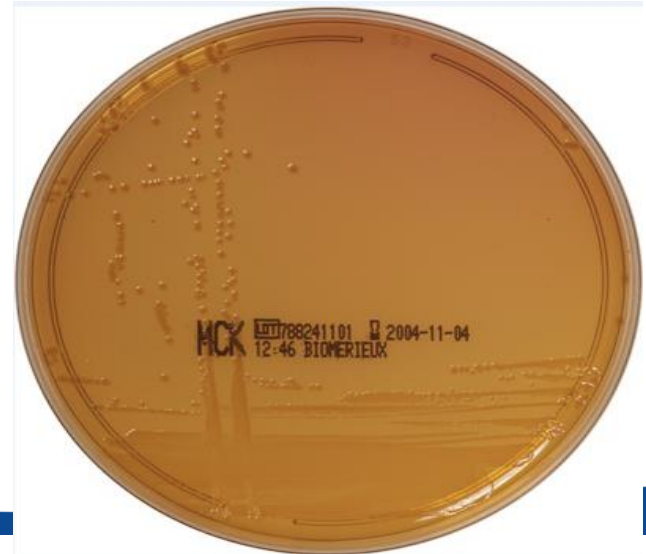
➤ On blood agar

- *Proteus spp* do not form distinctive colonies on Blood Agar, instead the bacteria swarm across the surface of the agar. Also *P. mirabilis* produces a very distinct fishy odor.



➤ On MacConkey agar

- Non-lactose fermenter colorless colonies with slight swarming.



Laboratory diagnosis

❑ Biochemical reactions:

➤ IMViC reactions:

➤ *P. vulgaris* : + + - +

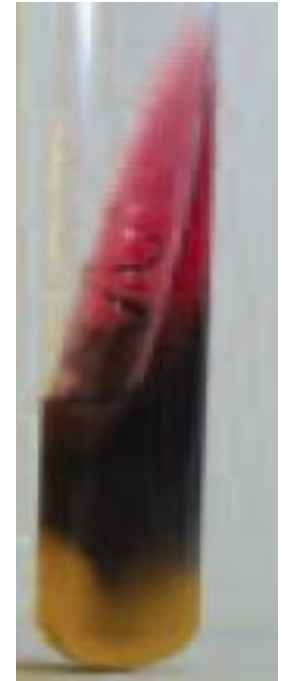
➤ *P. mirabilis* : - + - +

➤ **On Triple Sugar Iron (TSI) slant**
with a (K/A / g+ / H₂S+) profile.

➤ **Strong urease test +**

➤ **Catalase +**

➤ **Oxidase –**



TSI Result
(K/A / H₂S +)



Urease test

FIGURE 20-10 Urease reactions. Left to right, Negative, weak positive, positive.

Laboratory diagnosis

Selected Biochemical Reactions for differentiation between *P. vulgaris* and *P. mirabilis*

	IMViC				TSI			Urease	Motility
	I	M	V	C	Slant/Butt	Gas	H ₂ S		
<i>P. vulgaris</i>	+	+	-	+	K/A	+	+	+	Swarming motility
<i>P. mirabilis</i>	-	+	-	+	K/A	+	+	+	Swarming motility



Proteus mirabilis

