

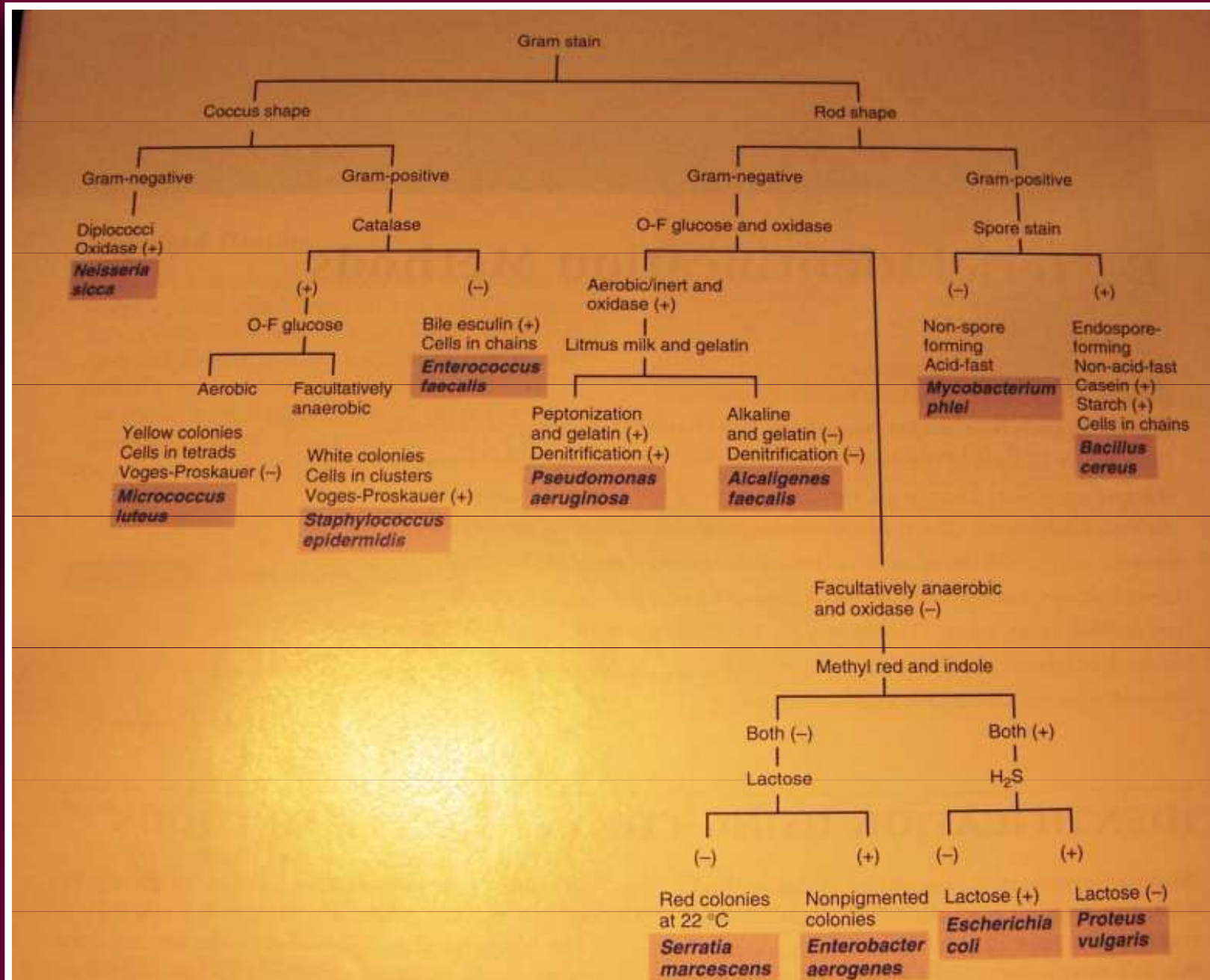
# KULTIVACE



Je předstupněm izolace bakteriálního druhu,  
následné identifikace  
a stanovuje se pomocí ní citlivost na ATB



- Sterilní odběr vzorků (klinika, prostředí, průmysl)
- Kultivace na vhodném mediu dle jejího účelu (univerzální; selektivní; selektivně diagnostické půdy...)
- A ve vhodné atmosféře (anaerobní, mikroaerofilní, kapnofilní...)
- Neznámý kmen - více souběžných kultivací..



**FIGURE 6.1** Identification scheme for 12 microbiology laboratory unknowns. You can use this scheme when identifying bacteria commonly used in microbiology teaching laboratories.



**FIGURE 4.16** Nutrient agar (left) and Sabouraud dextrose agar (right) inoculated with the same soil dilution. Notice that Sabouraud dextrose agar inhibited the growth of most bacteria while supporting the growth of fungi.

Izolace  
heterotrofů  
z prostředí:

Nutrient broth  
-růst bakterií  
potlačuje plísně

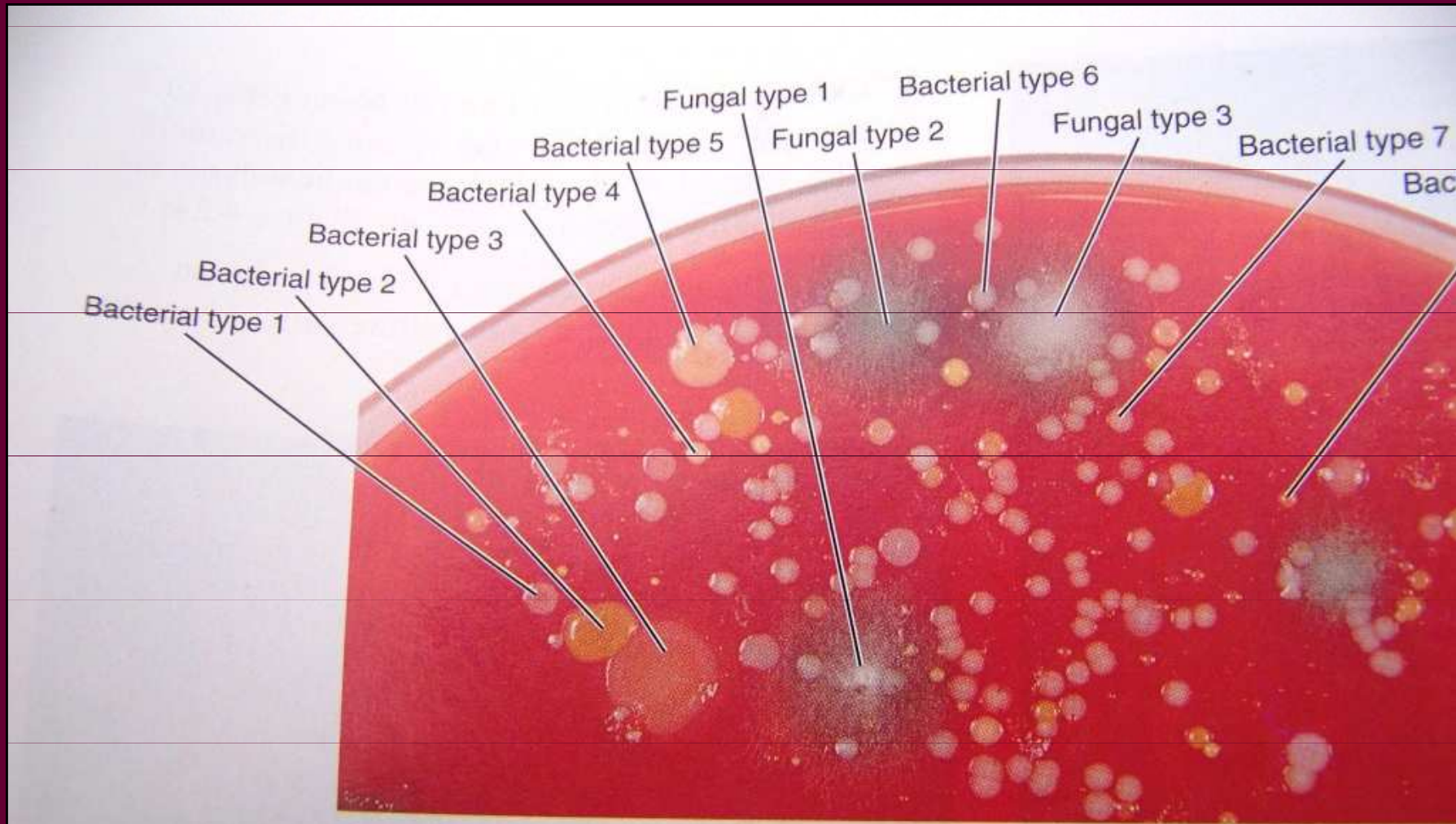
Sabouradův agar:  
selektivně působí  
na bakterie (díky  
nižšímu pH a ATB)

Univerzální vs selektivní medium...

# Klinické izoláty

- Obohacená media
- Př: krevní agar = základ + 5-10% krve
  - sledování typu hemolýzy....

- Stěr z kůže: bez hemolýzy...



**FIGURE 4.21** Bacterial and fungal growth on blood agar inoculated with a skin swab. Notice the great variety of bacteria and fungi that live on the skin.

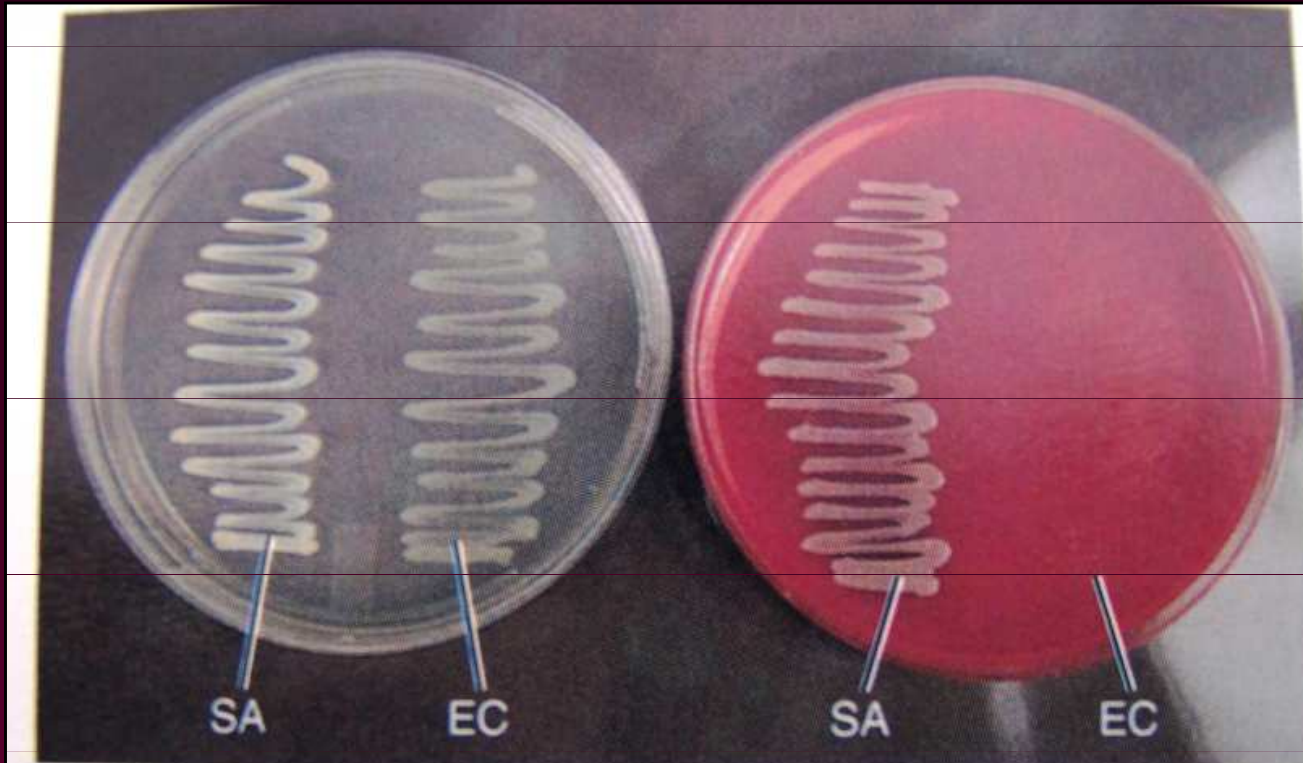
- Hemolýza úplná ( $\beta$ ) a neúplná (alfa = viridace)



Úplné projasnění  
krevního agaru v  
okolí růstu  
bakterií

**FIGURE 4.20** Bacterial growth on blood agar inoculated with a throat swab. Notice the clearing around growth, a reaction on blood agar called beta-hemolysis.

- Selekcce grampozitivních bakterií:
  - využití agaru s kolistinem a kyselinou nalidixovou



**FIGURE 4.27** Nutrient agar (left) and colistin-nalidixic acid agar (right), each inoculated with *Staphylococcus aureus* (SA) and *Escherichia coli* (EC). Gram-negative *E. coli* is inhibited on CNA agar, while Gram-positive *S. aureus* is not. This demonstrates the Gram-positive selective nature of CNA agar.

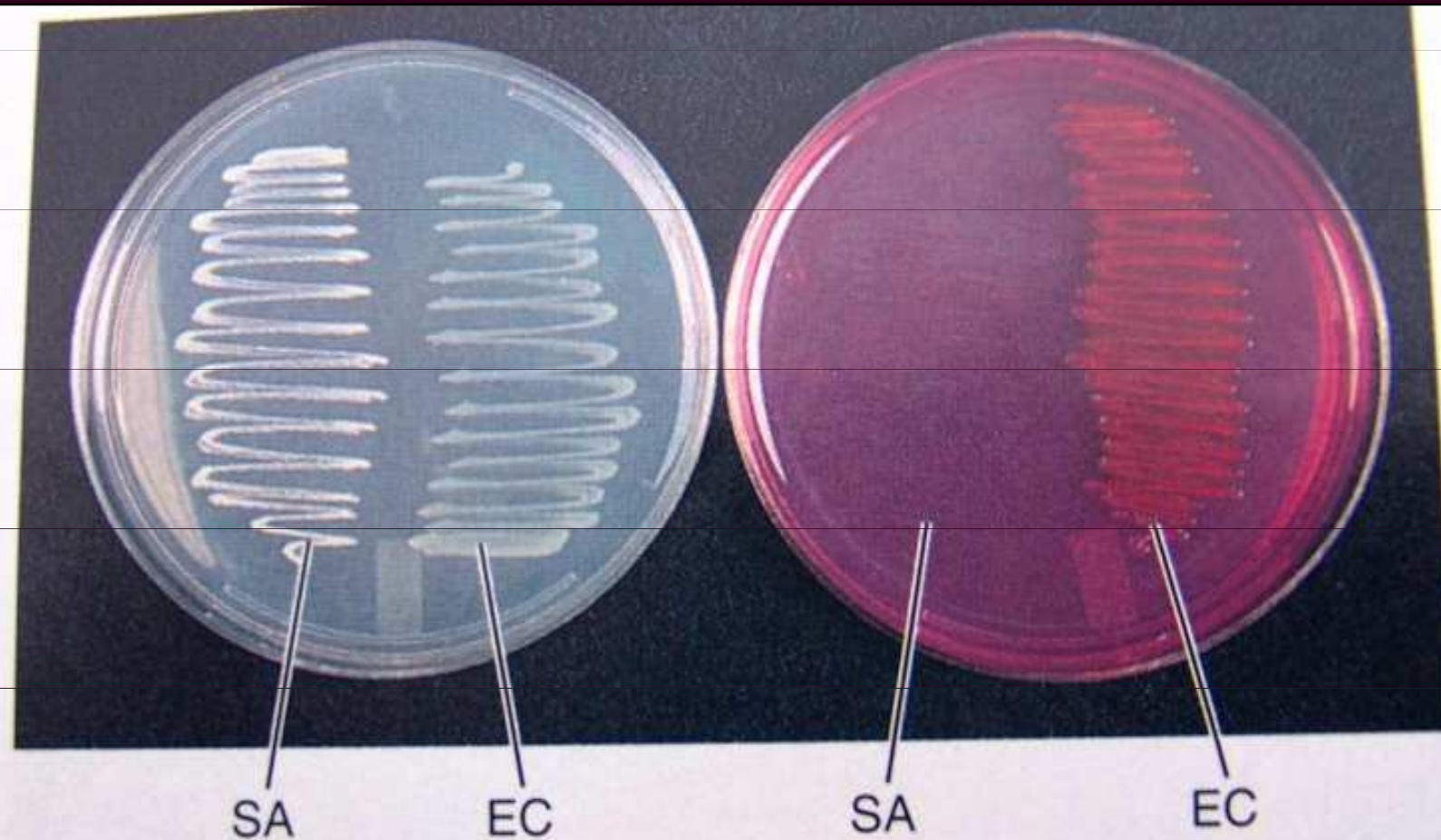




**FIGURE 4.28** Mannitol salt agar inoculated with *Staphylococcus aureus* (at left) and *Staphylococcus epidermidis* (at right). Both species of staphylococci grow on this medium, but only *S. aureus* ferments mannitol to form acidic products that change the color of the agar to yellow.

- Na jednom mediu selekce grampozitivních bakterií stafylokoků a zároveň diagnostika *Staphylococcus aureus* – Fermentuje manitol a okyselením indikátor zežloutne

- Selekcce gramnegativních buněk

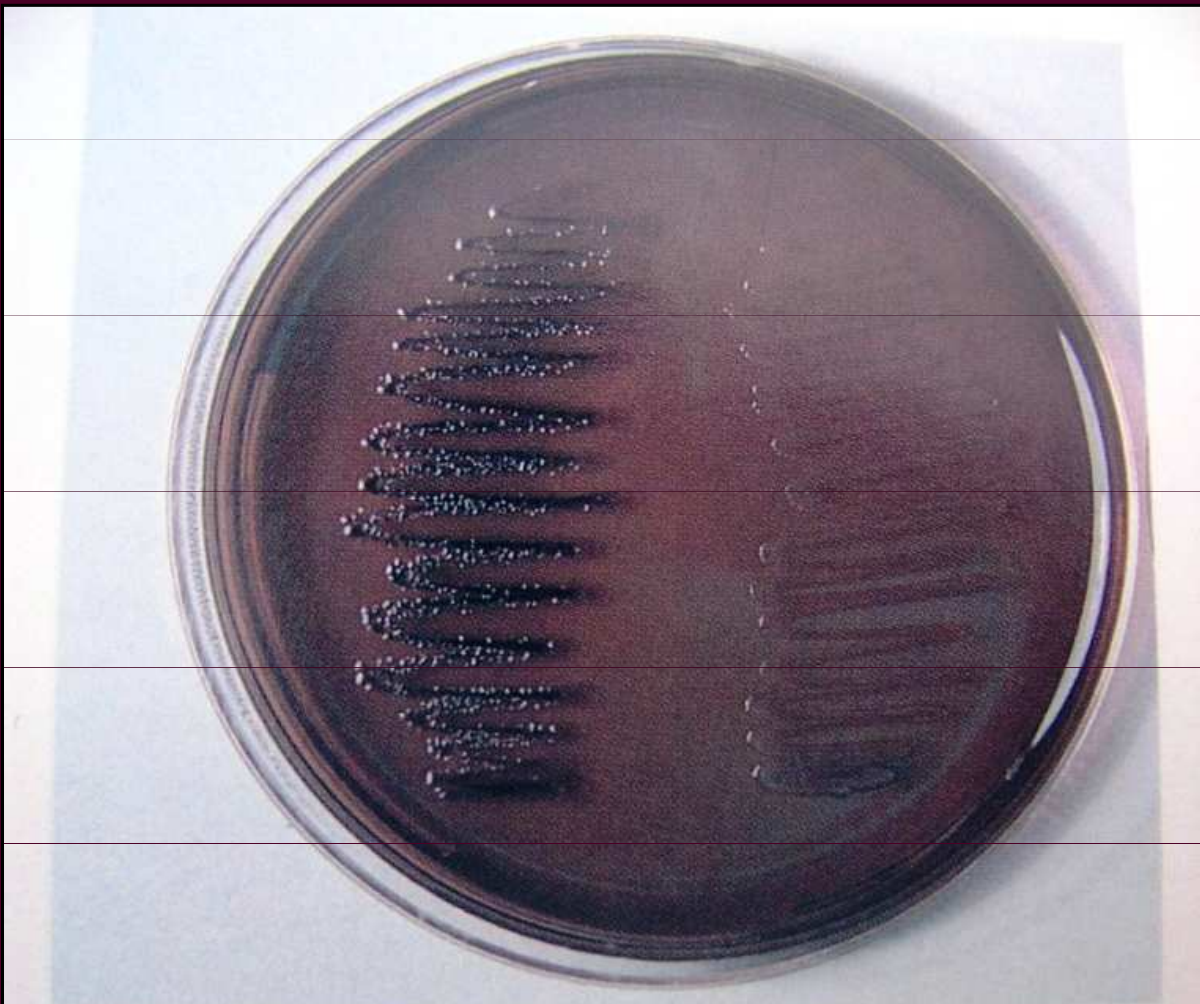


**FIGURE 4.31** Nutrient agar (left) and endo agar (right), each inoculated with *Staphylococcus aureus* (SA) and *Escherichia coli* (EC). Gram-positive *S. aureus* is inhibited on endo agar, while Gram-negative *E. coli* is not. This demonstrates the Gram-negative selective nature of endo agar.



**FIGURE 4.32** Endo agar inoculated with lactose-fermenting *Escherichia coli* (at left) and non-lactose-fermenting *Shigella flexneri* (at right). Lactose-fermenting bacteria appear red, while non-lactose-fermenting bacteria appear colorless. This demonstrates the differential nature of endo agar.

- Selekcce gramnegativních buněk a diagnostika laktózu-fermentujících na Endově půdě

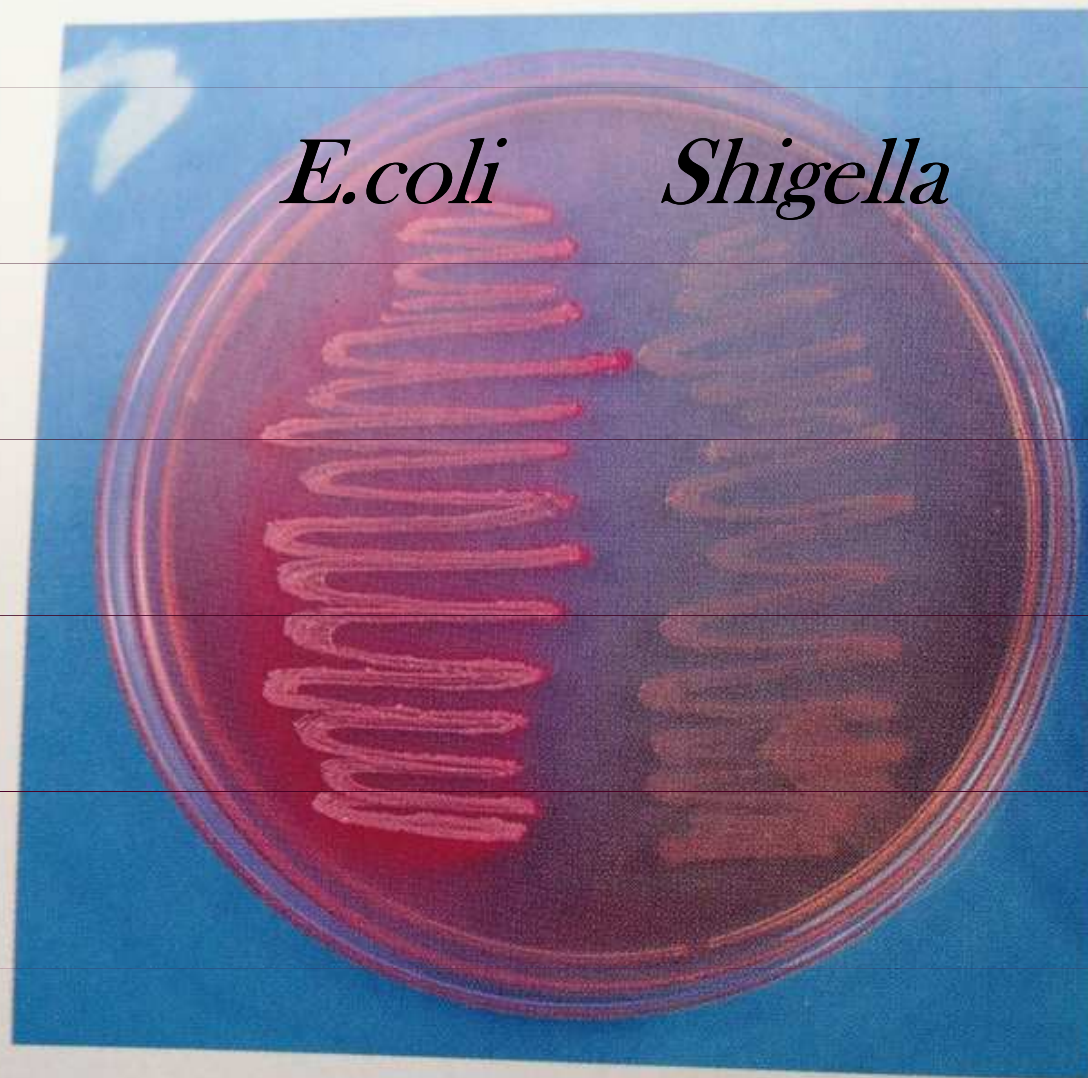


**FIGURE 4.35** Eosin-methylene blue agar inoculated with lactose-fermenting *Escherichia coli* (at left) and non-lactose-fermenting *Shigella flexneri* (at right). Lactose-fermenting bacteria appear dark, or dark with a green metallic sheen, while non-lactose-fermenting bacteria appear colorless. This demonstrates the differential nature of EMB agar.

- Selekcce gramnegativních buněk (grampozitivní inhibovány žlučovými solemi a eosinem). Na EMB půdě jsou laktózu fermentující druhy tmavé

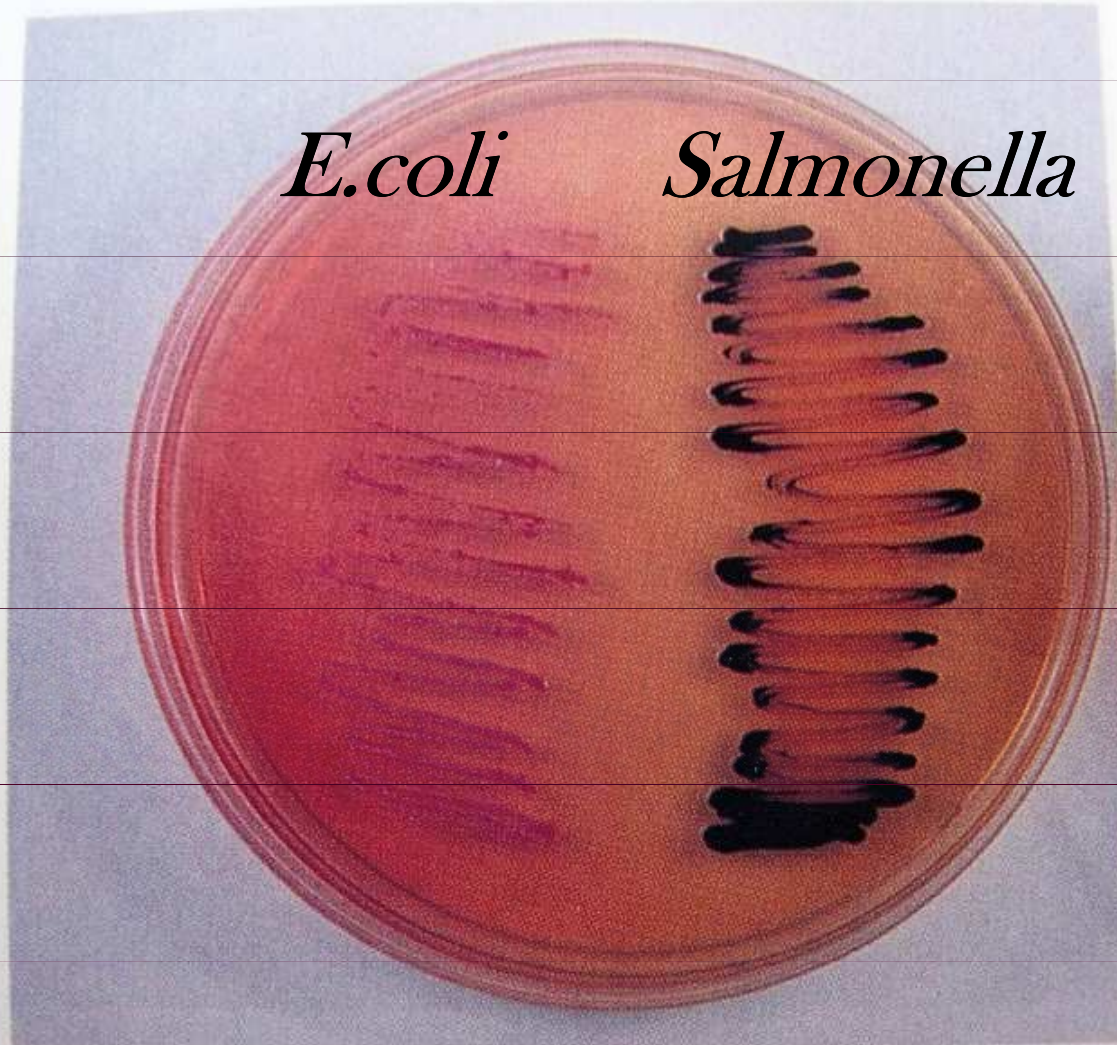


**FIGURE 4.38** Nutrient agar (left) and MacConkey agar (right), each inoculated with *Staphylococcus aureus* (SA) and *Escherichia coli* (EC). Gram-positive *S. aureus* is inhibited on MAC agar, while Gram-negative *E. coli* is not. This demonstrates the Gram-negative selective nature of MAC agar.



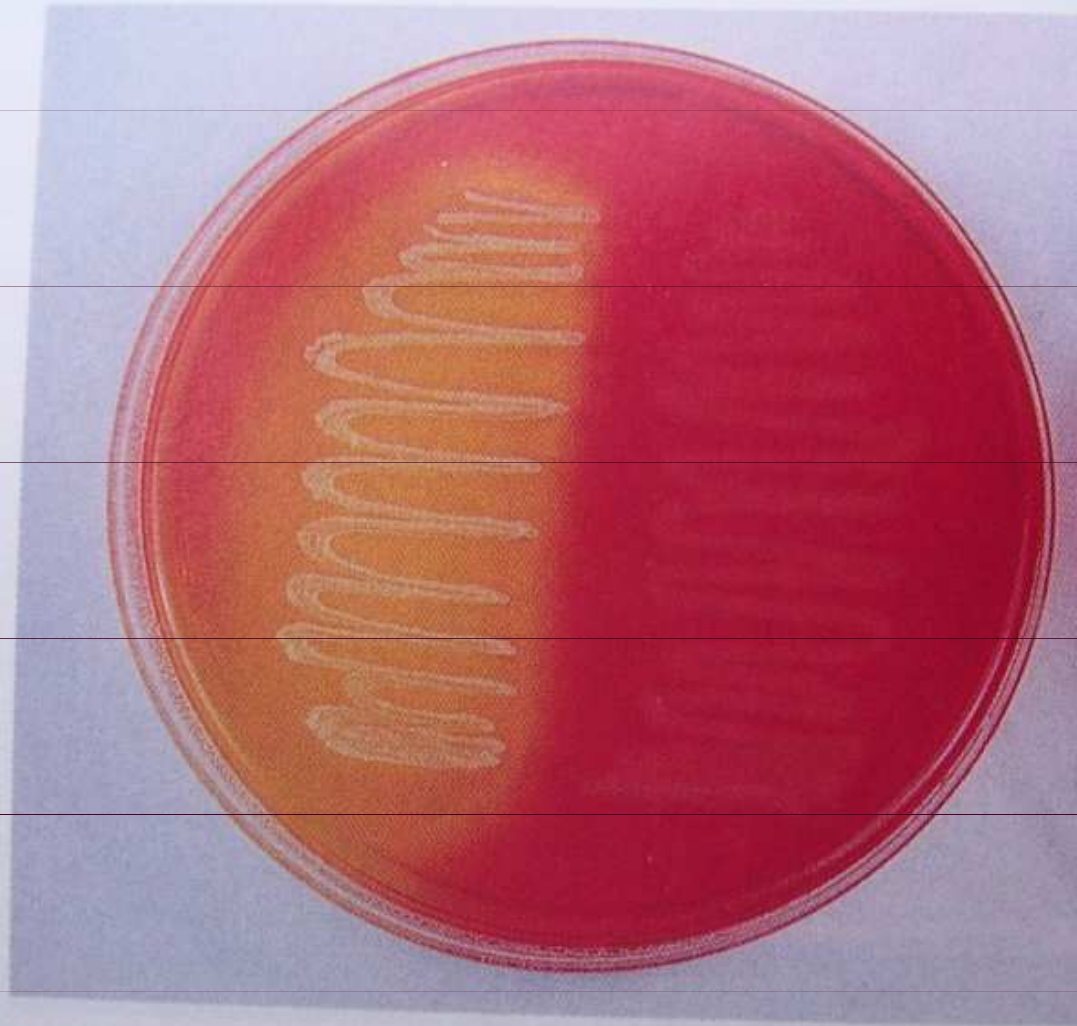
**FIGURE 4.39** MacConkey agar inoculated with lactose-fermenting *Escherichia coli* (at left) and non-lactose-fermenting *Shigella flexneri* (at right). Lactose-fermenting bacteria appear pink or red, while non-lactose-fermenting bacteria appear colorless. This demonstrates the differential nature of MAC agar.

- Selekce gramnegativních buněk (grampozitivní inhibovány žlučovými solemi a krystalovou violetí). Laktózu fermentující druhy jsou červené.



*Salmonella*  
produkuje  
sirovodík

**FIGURE 4.43** Salmonella-Shigella agar inoculated with the nonpathogenic enteric *Escherichia coli* (at left) and the pathogenic enteric *Salmonella typhimurium* (at right). Lactose-fermenting *E. coli* appear red, while non-lactose-fermenting *S. typhimurium* appear black. This demonstrates the differential nature of SS agar.

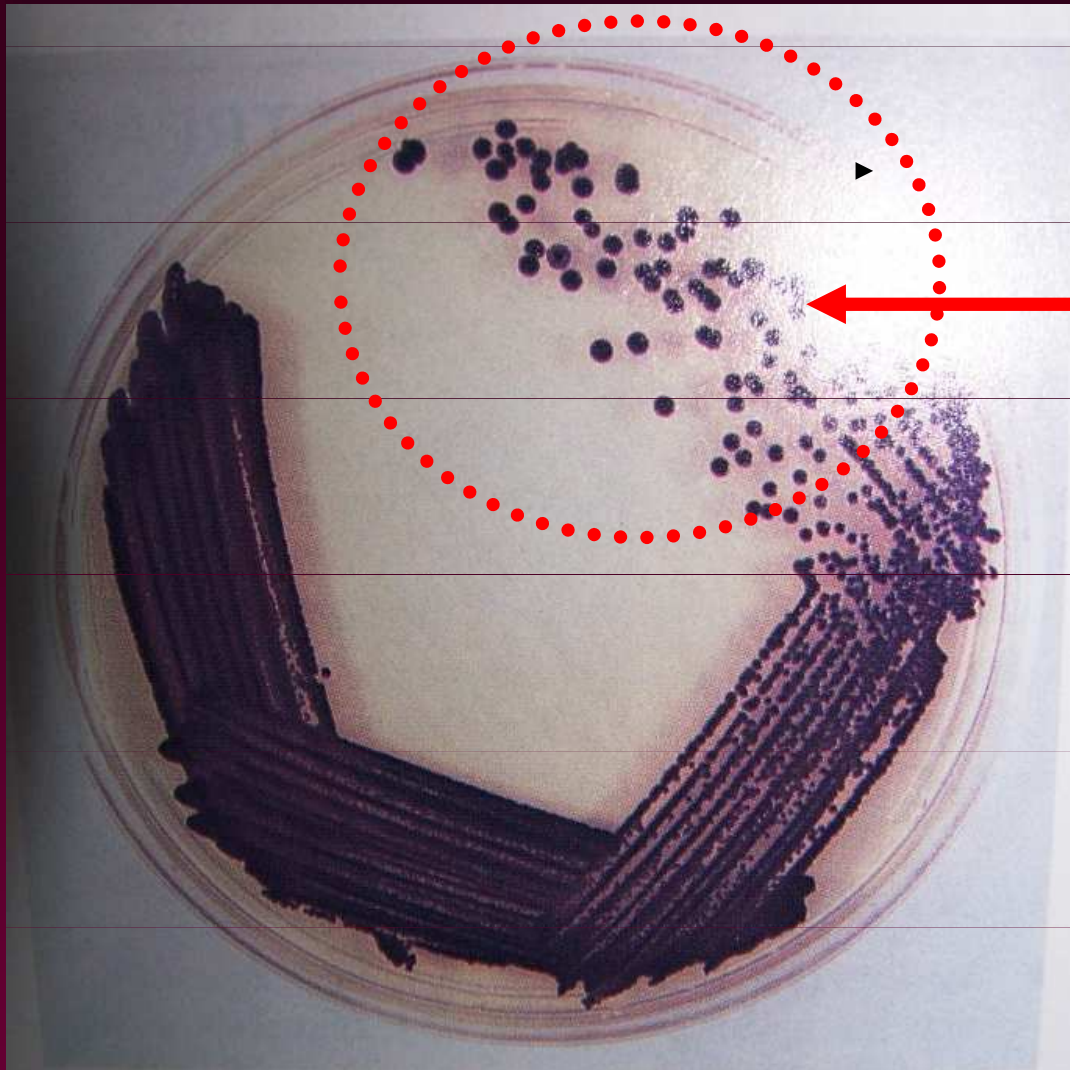


**FIGURE 4.45** Xylose-lysine-deoxycholate agar inoculated with the nonpathogenic enteric *Escherichia coli* (at left) and the pathogenic enteric *Shigella flexneri* (at right). Lactose-fermenting *E. coli* appear yellow, while non-lactose-fermenting *S. flexneri* appear red. This demonstrates the differential nature of XLD agar.

Na XLD mediu  
je grampozitivní  
flora odstíněna  
deoxycholátem,  
opět se sleduje  
fermentace  
laktózy



# Čistota kultury



**FIGURE 4.55** A streak plate of *Chromobacterium violaceum* on nutrient agar, illustrating expected results.

Je přítomen jeden  
nebo více  
morfologických  
typů kolonií?

Křížový roztěr:  
ředěním kultury  
získáme izolované  
kolonie...

# Různý vzhled kolonií...



**FIGURE 4.69** A streak plate of *Serratia marcescens* on nutrient agar. Colonies are circular, entire, convex, smooth, shiny, small, red, and opaque.



**FIGURE 4.58** The edge of a *Bacillus circulans* colony on nutrient agar. This organism produces colonies similar to *Bacillus cereus* (see Figure 4.57), but with filamentous margins that curl (3X).