



2. LÉKAŘSKÁ FAKULTA
UNIVERZITA KARLOVA




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Národní institut
virologie a bakteriologie

Diagnostics of G-rods II. Non-fermenters, *Campylobacter, Helicobacter*

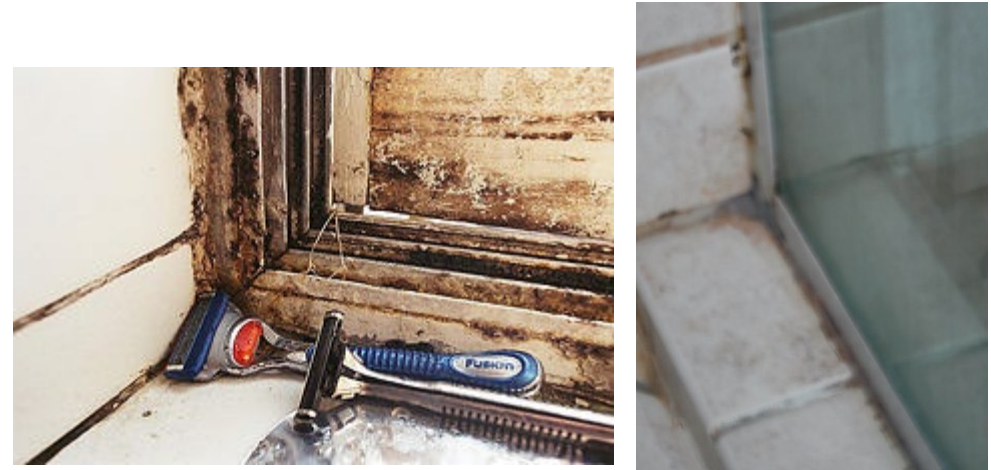
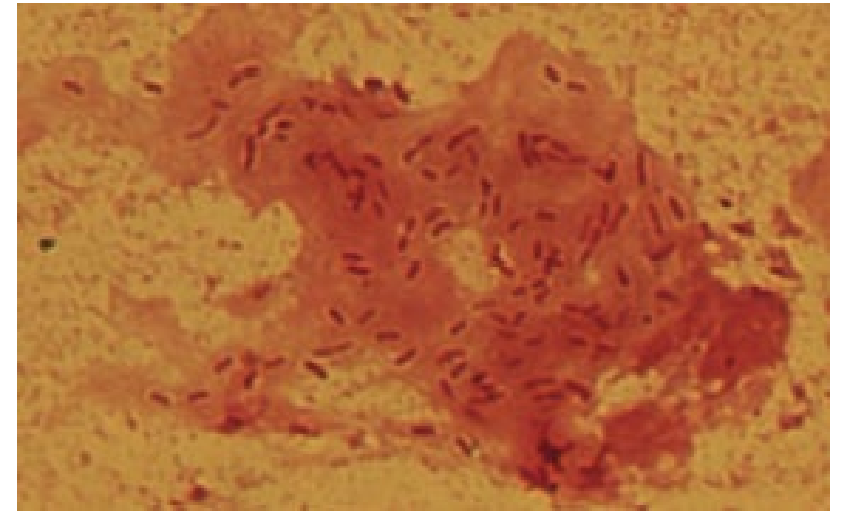
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Microbiology I.
Practical sessions

Non-fermenting rods

- G-aerobic rods (up to coccobacilli)
- **Cultivation**
 - Undemanding; they survive even outdoors in a damp environment
 - Do not ferment glucose
- **Significance**
 - Causative agents of HAI
 - Antibiotic resistance
 - Resistance to disinfectants



Pseudomonas aeruginosa



Pseudomonas aeruginosa infections

Damage to defense mechanisms

- Trauma
- Invasive procedures
- Serious underlying disease

Colonization of mucous membranes

Wet reservoirs

- Equipment and devices
- Faucets
- Sinks
- Solutions

Infections caused by *Pseudomonas aeruginosa*

Skin and soft tissue infections

Catheter-related infections

Surgical site infections

Ventilator-associated pneumonia

HAI

Urinary tract infections

Osteomyelitis

Sepsis

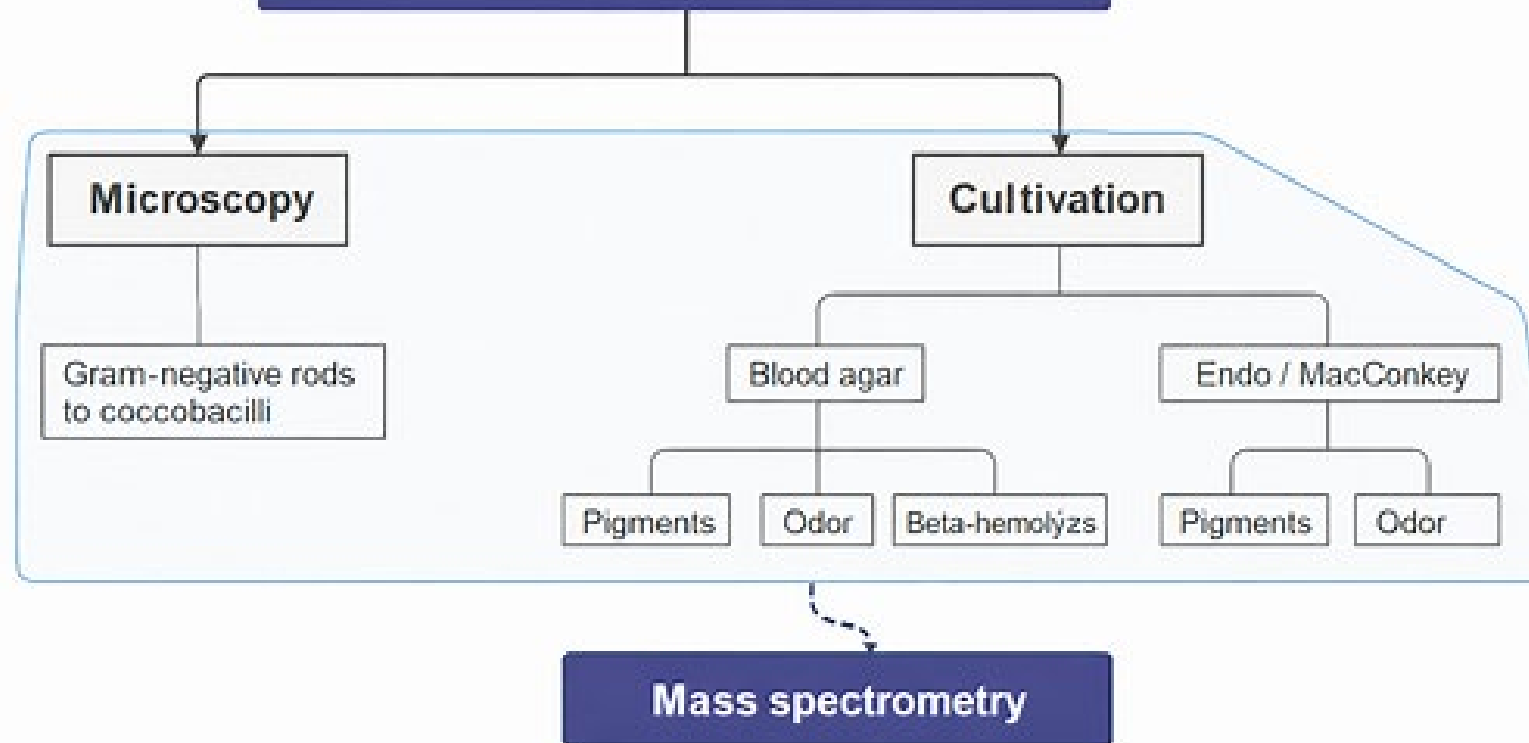
Example: **swimmer's ear** (*otitis externa* in swimmers)

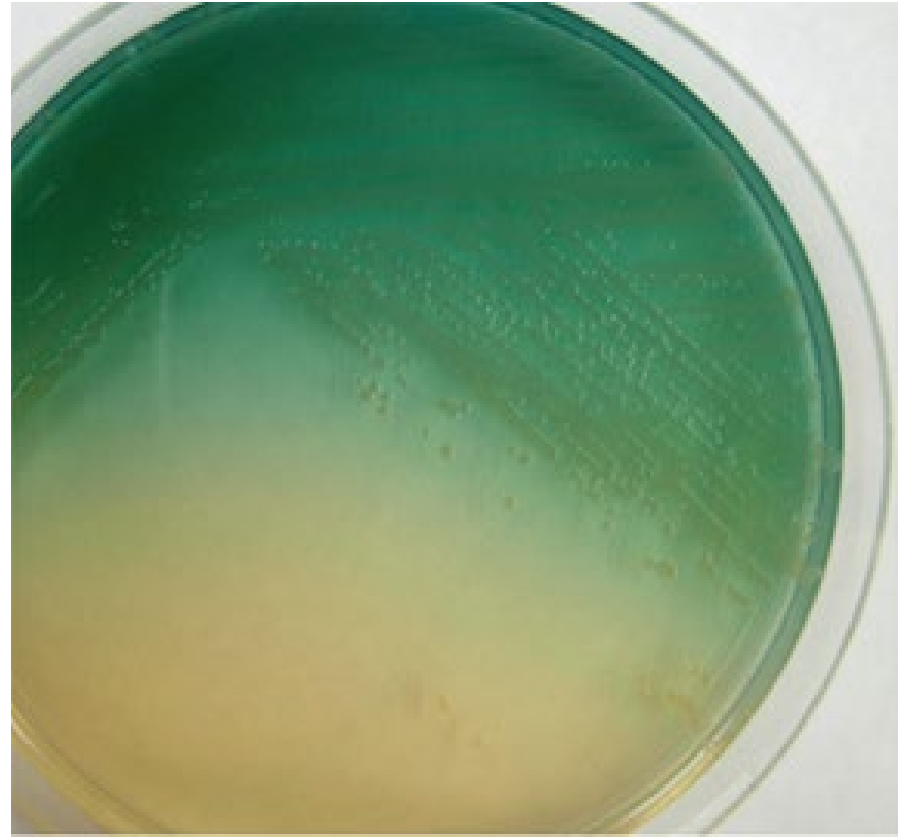
Community-acquired

Chronic pulmonary infections in cystic fibrosis (CF)

Material?

Diagnosis of *Pseudomonas aeruginosa*





Therapy

Basic antibiotics

- **Ceftazidime**
- Piperacillin/tazobactam

Resistant strains

- Cefepime
- Meropenem

Multiresistant strains

- New ATB / colistin / amikacin

Inhalation therapy

- Tobramycin
- Colistin
- Aztreonam

Acinetobacter baumannii



Features

- **Characteristics**
 - G-aerobic coccobacillus
 - Oxidase-negative, catalase-positive
 - Non-motile, forms **biofilm**
 - **Marked ability to survive on dry surfaces** (days to weeks)
- **Cultivation**
 - Grows well at 35–37 °C
 - **Does not ferment lactose**
 - MacConkey: pale, colourless to slightly pinkish colonies
 - Blood agar: creamy, smooth, without haemolysis



Prevalence

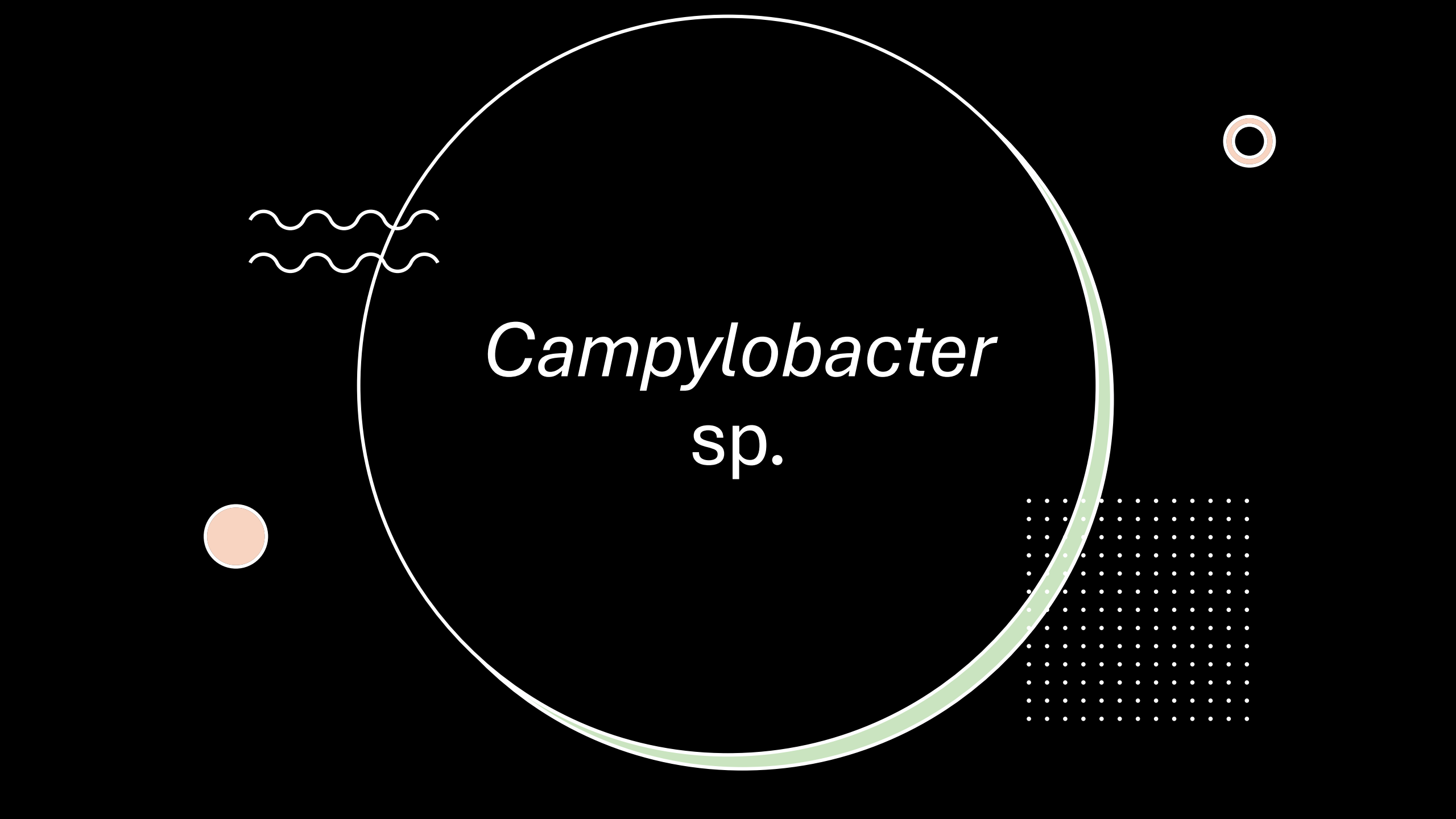
- Primarily a hospital-acquired pathogen (ICU, ventilation, catheters)
- Common cause of HAIs: VAP, sepsis, wound infections, urinary tract infections
- Colonises equipment, surfaces, staff hands



Therapy

- Treatment based on **susceptibility**
- For resistant strains, **ampicillin/sulbactam** may be used up to a total dose of 24 g (usually 12 g) – effect of sulbactam
- Often MDR strains – need for reserve antibiotics





Campylobacter
sp.

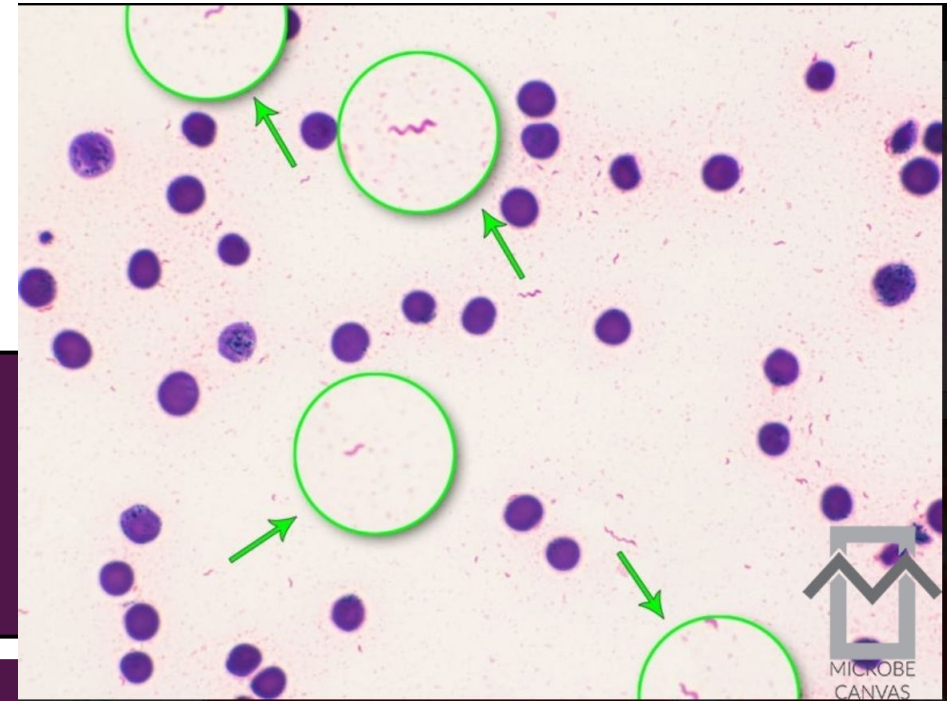
The image features a large, thin white circle centered on a black background. A thick, light green arc is positioned on the right side of this circle. To the left of the circle, there are two white wavy lines. Below the circle, on the left, is a solid light orange circle. To the right of the circle, there is a small double-lined light orange circle in the upper right and a rectangular grid of small white dots in the lower right.

Campylobacter jejuni

G-microaerophilic rod (spiral shape)

Grows on special KARMALI agar

Small, transparent colonies



CAMPYLOBACTERIOSIS

- **Zoonosis**
- The most common bacterial cause of infectious diarrhoea in the Czech Republic
- Non-infectious complications: Guillain-Barré syndrome, reactive arthritis



DIAGNOSTICS

- Rectal swab – transport medium required
- Extended culture (48 hours), selective medium
- PCR from stool is also possible



maripoc 

The true solution for acute infections diagnostics

THERAPY

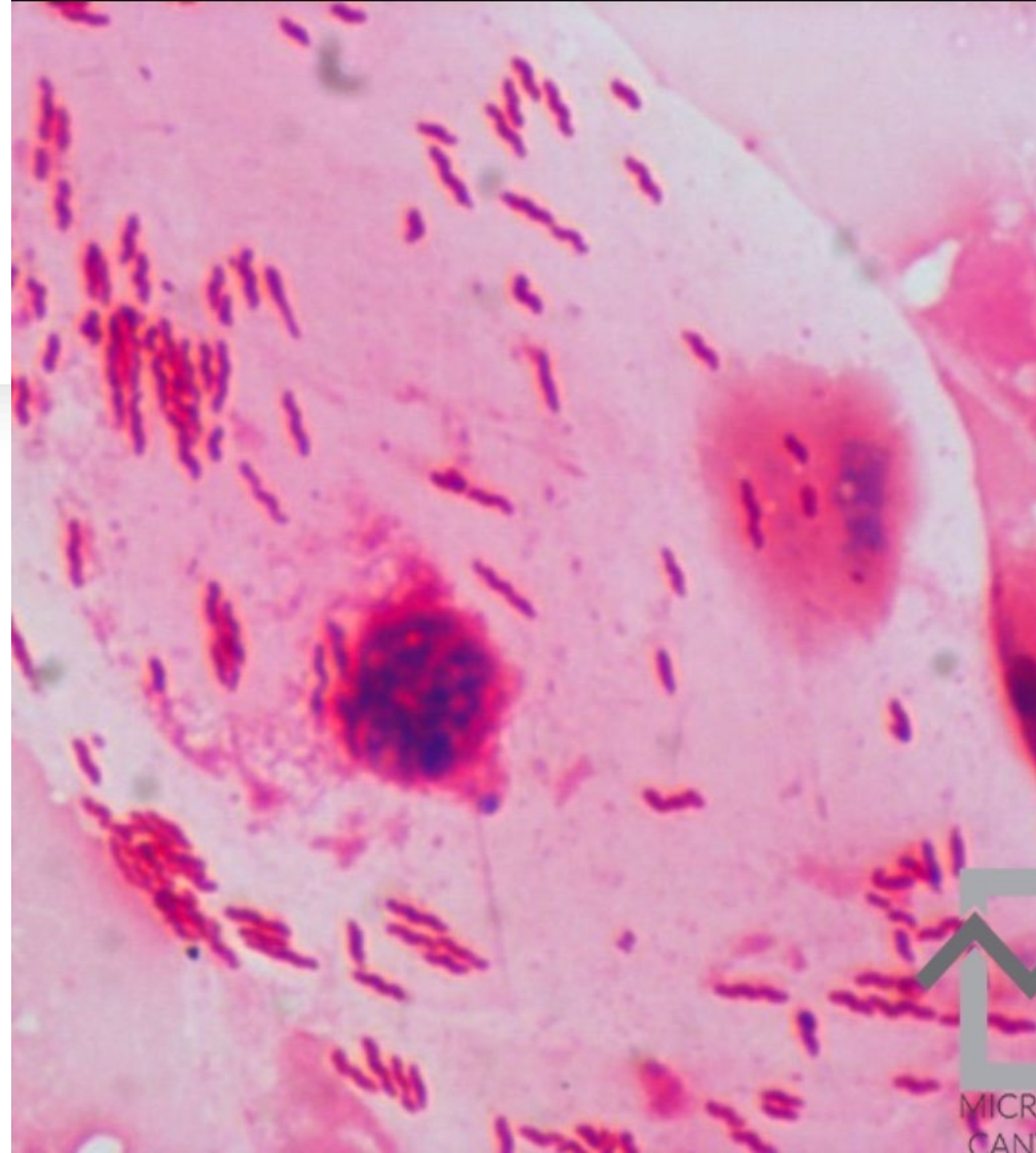
- Antibiotics?
 - Symptomatic treatment only
 - or macrolides



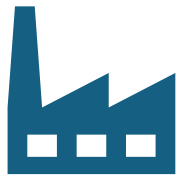
*Helicobacter
pylori*

Properties

- G-microaerophilic rod, **spiral shape**
- Chronic gastritis, VCHGD, gastric adenocarcinoma, gastric MALT lymphoma



Diagnostics



Biopsy

urease (Ag),
PCR,
microscopy,
culture (min. 4 days, enriched
medium)



Stool

antigen



Breath test

Therapy

Combination

- PPI + amoxicillin + clarithromycin (metronidazole)
- **When to treat?**
 - VCHGD
 - Do not treat in children (protective nature)

