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Agents of digestive system infections – I

Digestive system

- „a fruitful microbial garden“
- Its both ends are the „buggiest“ parts of the body
- in the colon: approx. 10^{12} bacteria/g
- **Normal colonic flora: 99 % anaerobes**
(*Bacteroides*, *Fusobacterium*,
Clostridium, *Peptostreptococcus*),
only 1 % enteric bacteria (mostly *E. coli*)
& *enterococci*

Mouth cavity – I

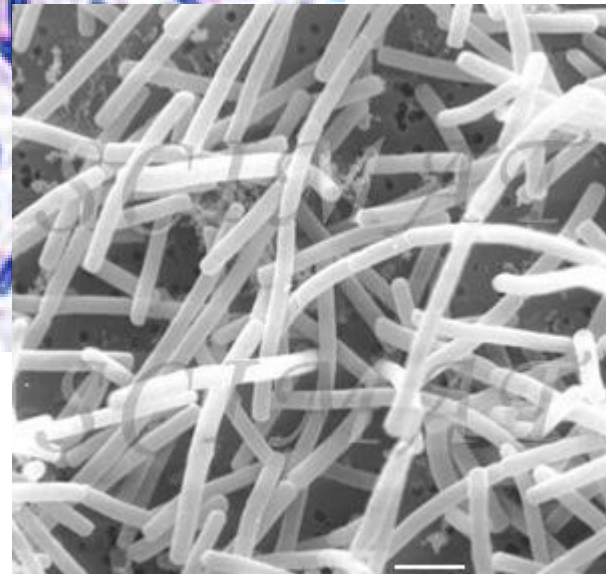
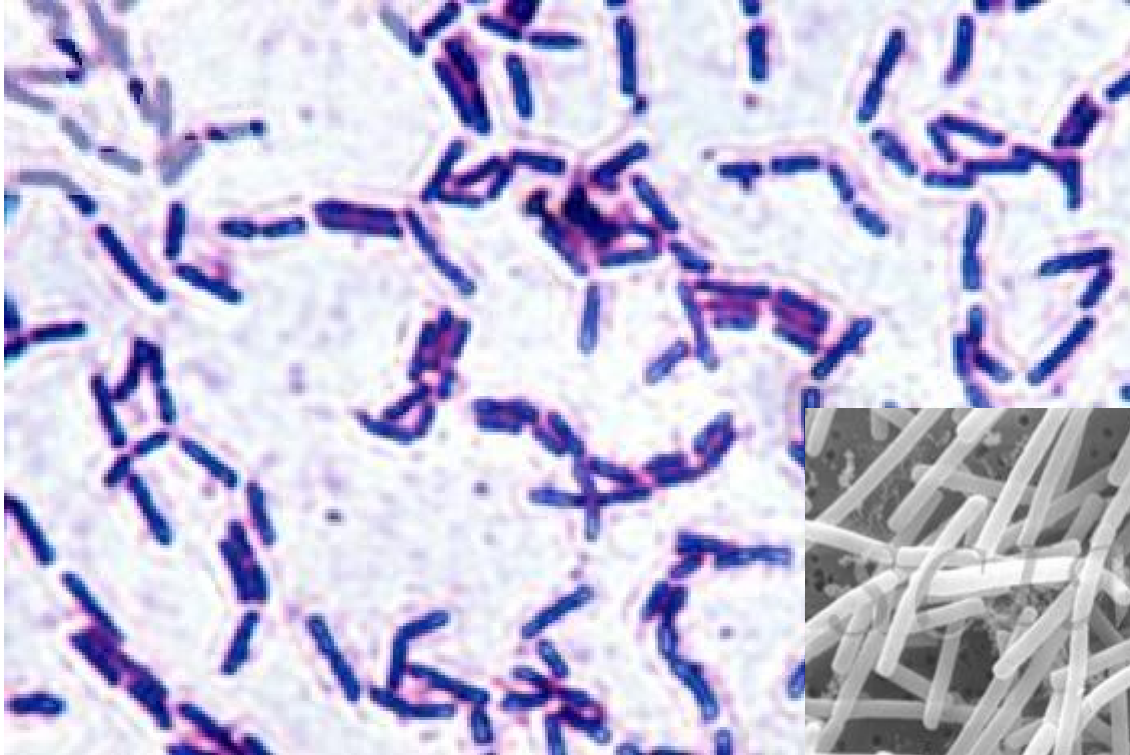
Normal flora:

- viridans (= α -haemolytic) streptococci (e.g. *Streptococcus salivarius*)
- oral neisseriae (e.g. *Neisseria subflava*)
- haemophili of very low pathogenity (e.g. *Haemophilus parainfluenzae*)

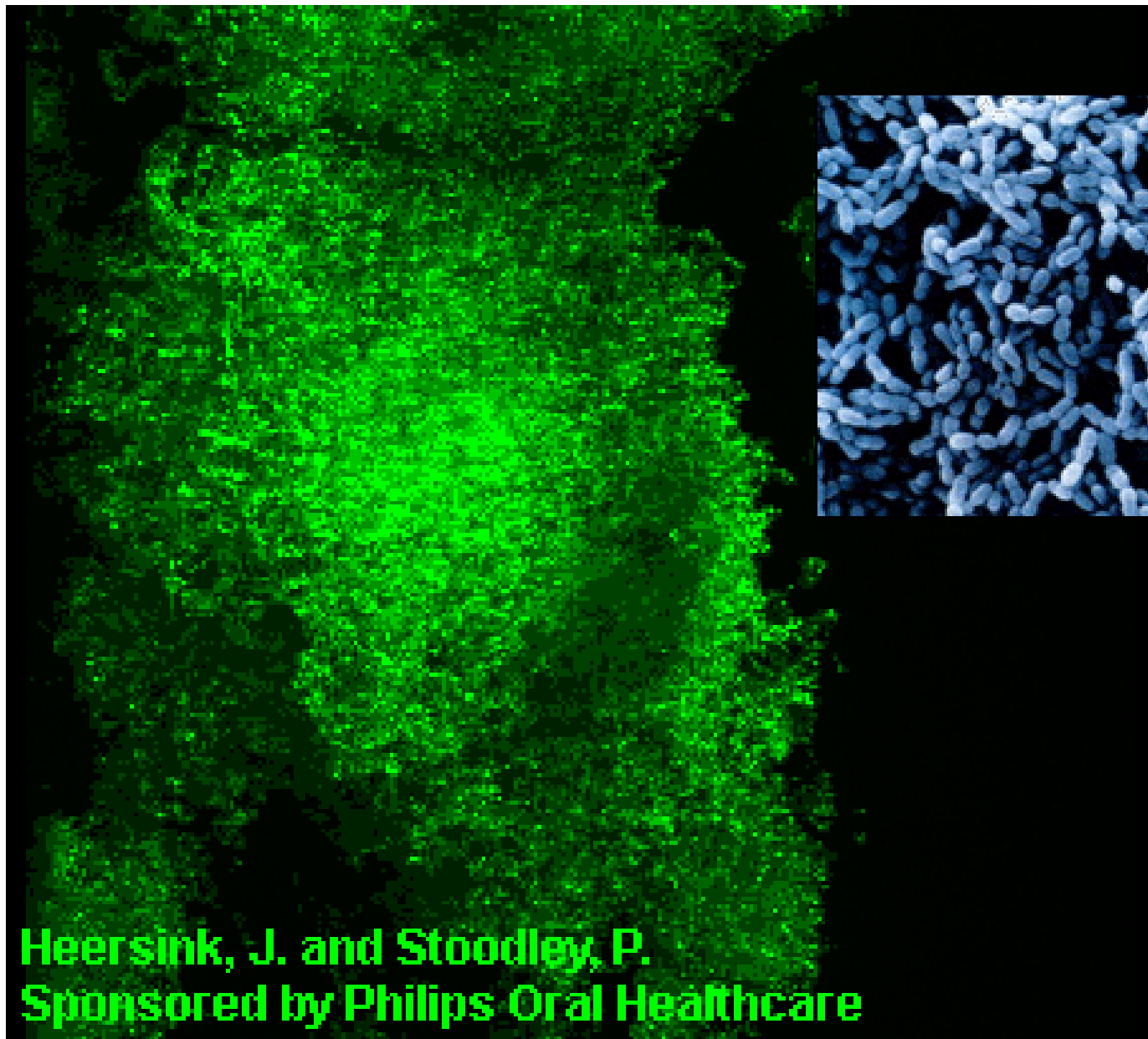
Dental plaque: adherent microbial layer at the tooth surface made up from living and dead bacteria and their products together with components from the saliva

In essence, **dental plaque is a biofilm**

It cannot be washed off, only mechanically removed



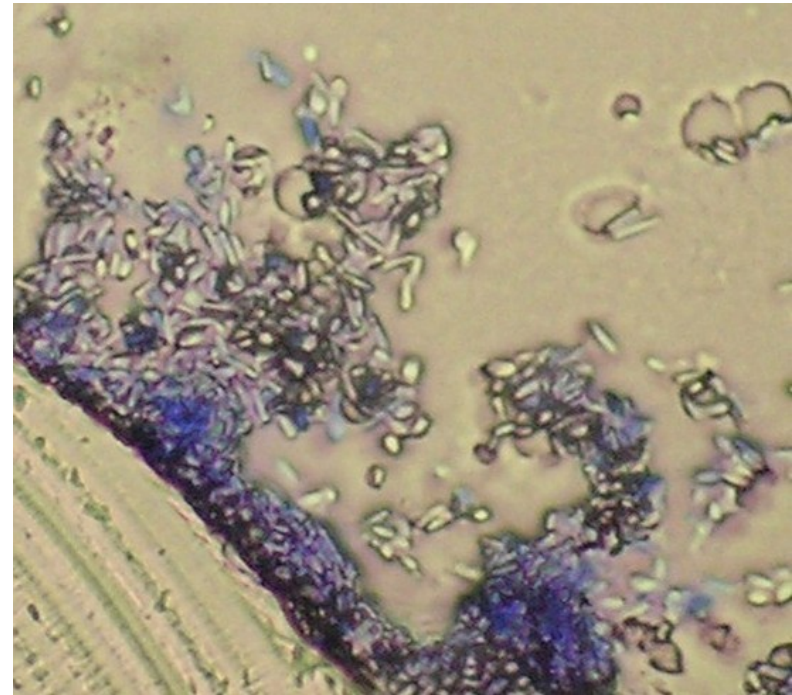
Lactobacillus



**Heersink, J. and Stoodley, P.
Sponsored by Philips Oral Healthcare**

Biofilm

- **Bacteria can regulate the quantity of their population by regulative compounds**
- **Process – quorum sensing**
- **More resistant to**
 - **desinfectants**
 - **antibiotics**
 - **immune reaction**
- **A product of normal flora (which is positive) and pathogens as well**





Mouth cavity – II

Dental caries: chronic infections caused by normal oral flora → localized destruction of tooth tissue

Etiology: mouth microbes (mostly *Strept. mutans*) making acids from sucrose in food

Thrush (in Latin soor): *Candida albicans*
It occurs mostly in newborns

Herpetic stomatitis: primary infection with **HSV 1**

Ludwig s angina: polymicrobial **anaerobic** infection of sublingual and submandibular spaces (*Porphyromonas, Prevotella* etc.)

Herpetic stomatitis



Thrush



http://www.mydochub.com/images/oral_thrush.jpg

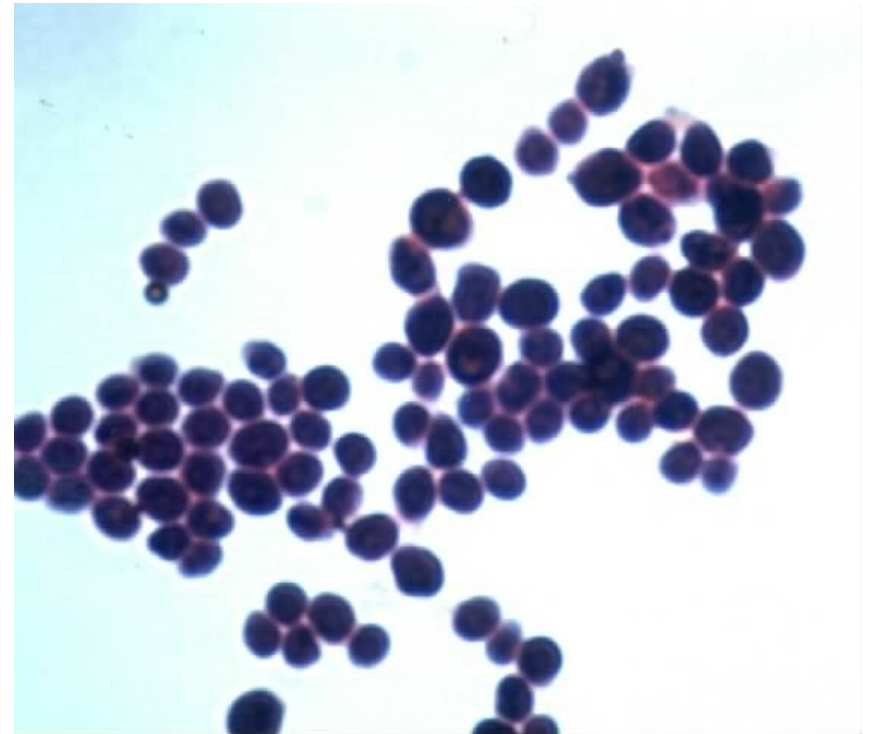
Oral thrush



 ADAM.

<http://www.clarian.org/ADAM/doc/graphics/images/en/17284.jpg>

C.albicans



Oesophagus

Infections **never** in previously healthy individuals

Only in severely immunocompromised persons (AIDS):

- *Candida albicans*
- Cytomegalovirus (CMV)

Stomach

Stomach = a sterilization chamber killing by means of HCl most of swallowed microbes

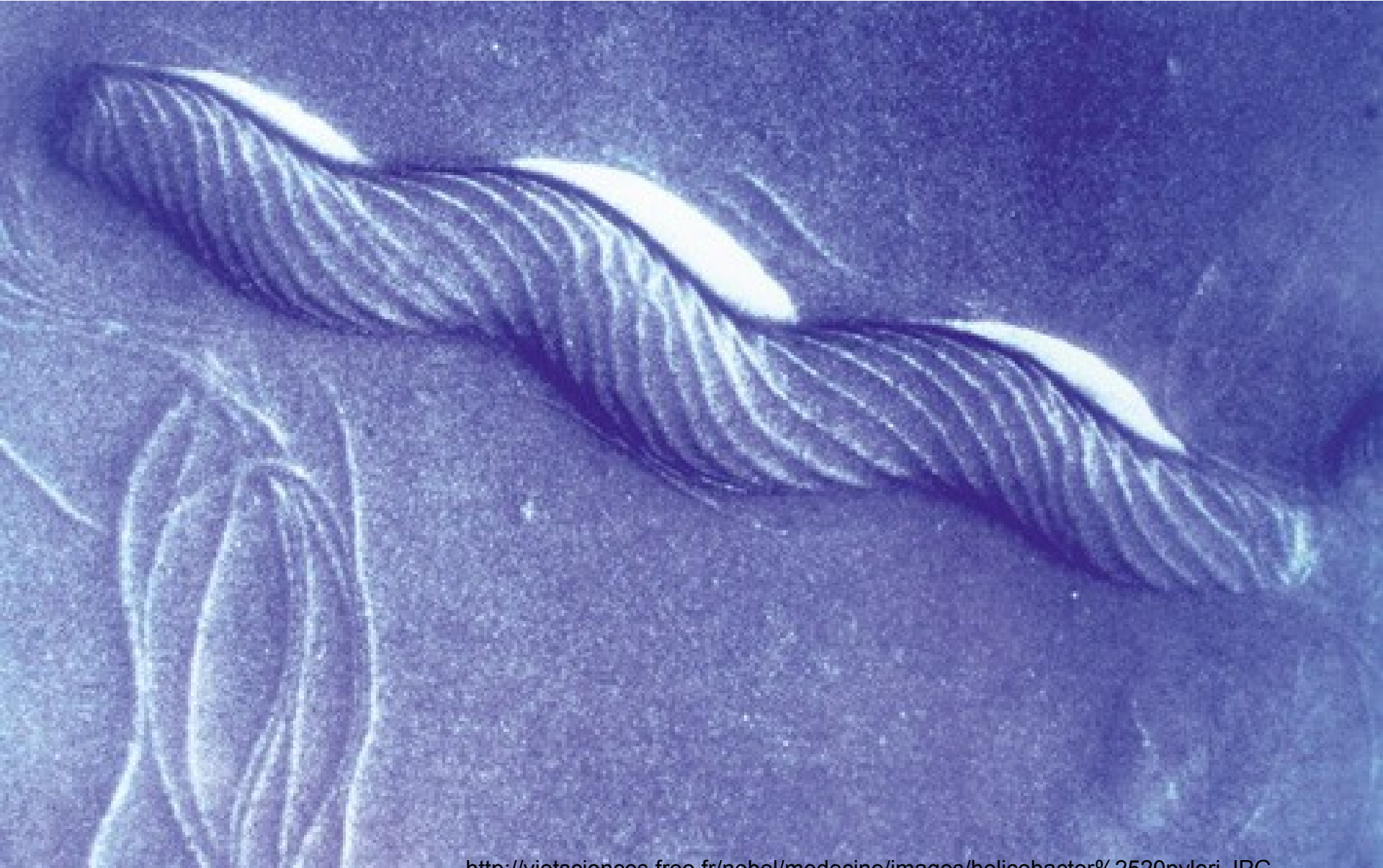
Exception: *Helicobacter pylori*

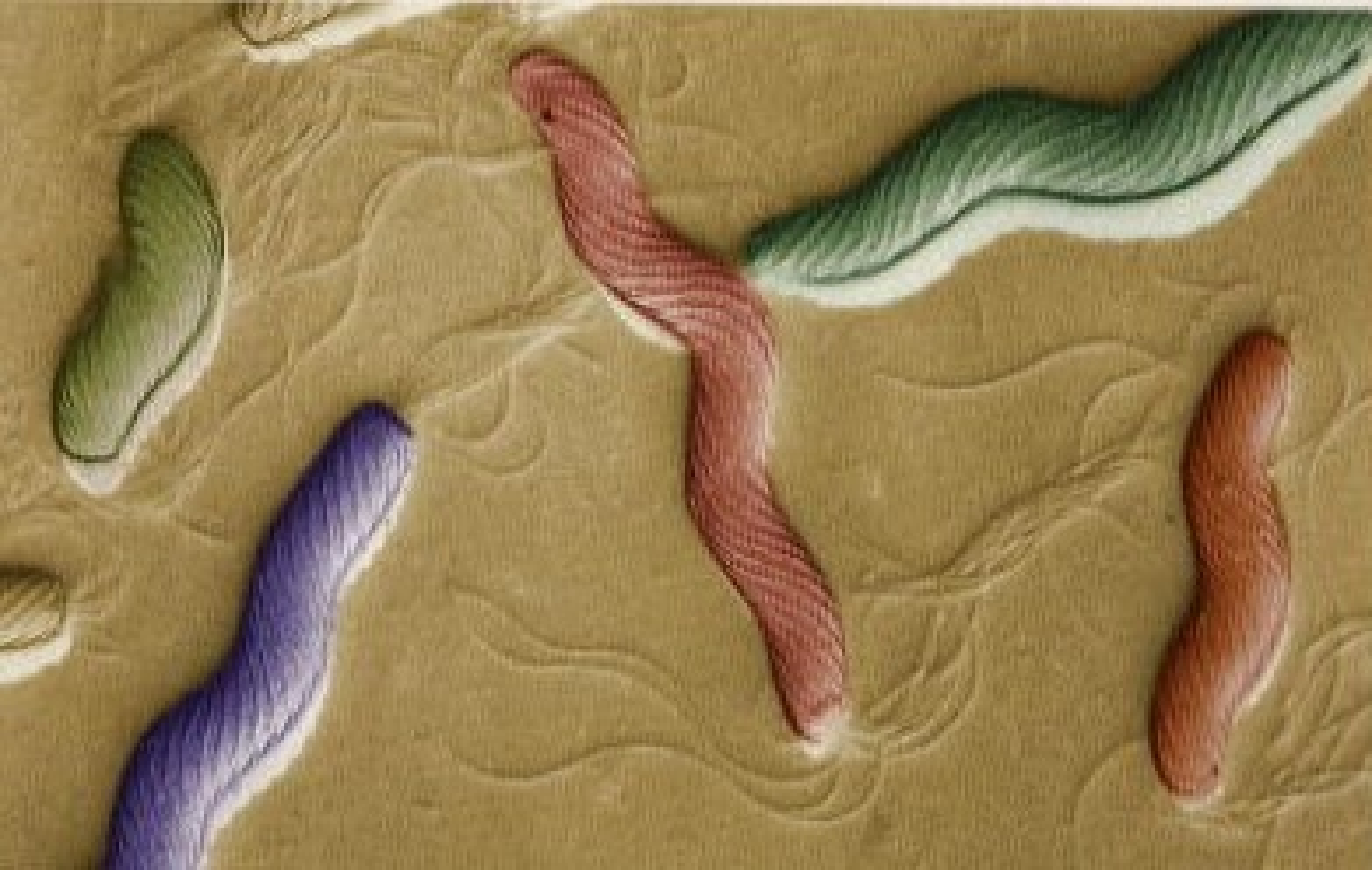
It produces a potent **urease and by splitting tissue urea it increases pH around itself (1 molecule of urea \rightarrow 1 CO_2 + 2 NH_3)**

***H. pylori* causes**

- chronic gastritis**
- peptic ulcers (Nobel price in 2005)**

Helicobacter pylori





www.univie.ac.at/hygiene-aktuell/helicobacter.jpg

Biliary tree & the liver – I

Acute cholecystitis (colic, jaundice, fever):
obstruction due to gallstones

Etiology: intestinal bacteria (*E. coli* etc.)

Complication: ascending cholangitis

Chronic cholecystitis: the most important
is *Salmonella Typhi* (carriers of typhoid
fever)

Granulomatous hepatitis: Q fever, tbc,
brucellosis

Biliary tree & the liver – II

Parasitic infections of the liver:

Amoebiasis (*Entamoeba histolytica*: liver abscess)

Malaria (the very first, clinically silent part of the life cycle of malaric plasmodia)

Leishmaniasis (*Leishmania donovani*: kala-azar, *L. infantum*)

Schistosomiasis (eggs of *Schistosoma japonicum*, less often *S. mansoni*)

Systemic infections which start in the digestive tract

Enteric fever (typhoid fever and paratyphoid fever): *Salmonella Typhi*, *Salmonella Paratyphi A*, *B* and *C*

Listeriosis: *Listeria monocytogenes*

Peritonitis: colonic flora (*Bacteroides fragilis* + other anaerobes + mixture of facultative anaerobes)

Viral hepatitis: HAV, HBV, HCV, HDV, HEV

Small and large intestine

Bacterial overgrowth syndrome:

After surgery, depressed peristalsis, or gastric achlorhydria bacteria may overgrow in the small intestine → steatorrhea, deficiency of vitamin B₁₂, diarrhea, malabsorption of vitamins A and D

Diarrhea: increase in daily amount of stool water
– common intestinal response to many agents

Dysentery: acute inflammation of the colon → abdominal pain & small-volume stools with blood, pus and mucus

Diarrheal disease

Infectious:

- **Bacterial (most frequent)**
- **Viral**
- **Parasitic**
- **Mycotic**

Non-infectious:

- **Food poisoning**

„Homework 1“

What is the name of the picture and of its author?

