OLYMPUS

Microbiology: The Basics of Bacteria

Hygiene & Reprocessing Training Material

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01 What are Bacteria?

01 What are Bacteria?

The most relevant micro-organisms in endoscopy

Find out more

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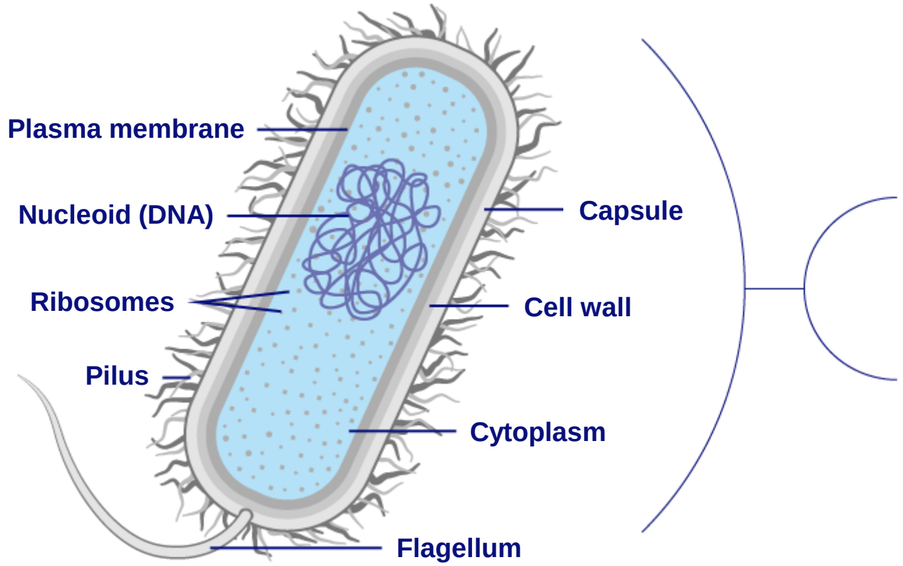

- Bacteria can be found in **water**, **the environment**, as well as in **the human body**

Source and further reading

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- Size between 0,5 - 10 µm (1 µm is 0,001 mm!)

Just one example in endoscopy for rod shaped bacteria: *Escherichia coli*

01 What are Bacteria?

The most relevant micro-organisms in endoscopy

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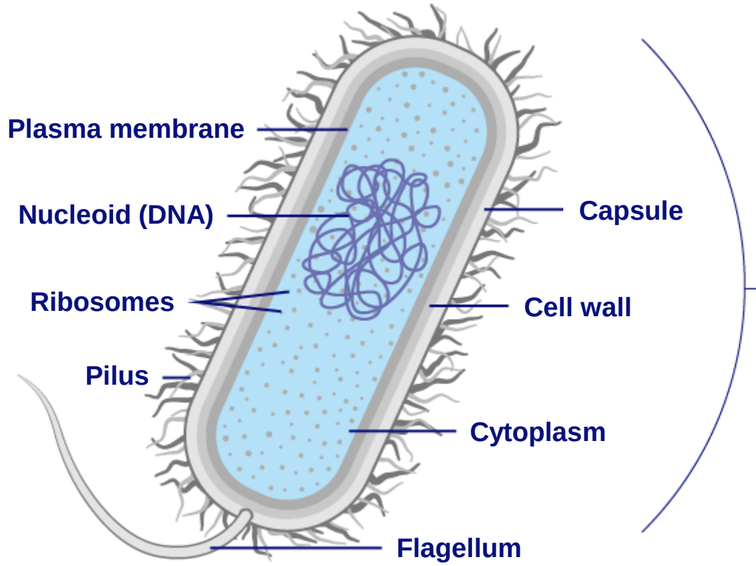

- Bacteria are **microscopic single-celled organisms** that exist in the millions, in every environment, both inside and outside the body

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- They play an important role in ensuring the health and balance of all organisms

Just one example in endoscopy for rod shaped bacteria: *Escherichia coli*

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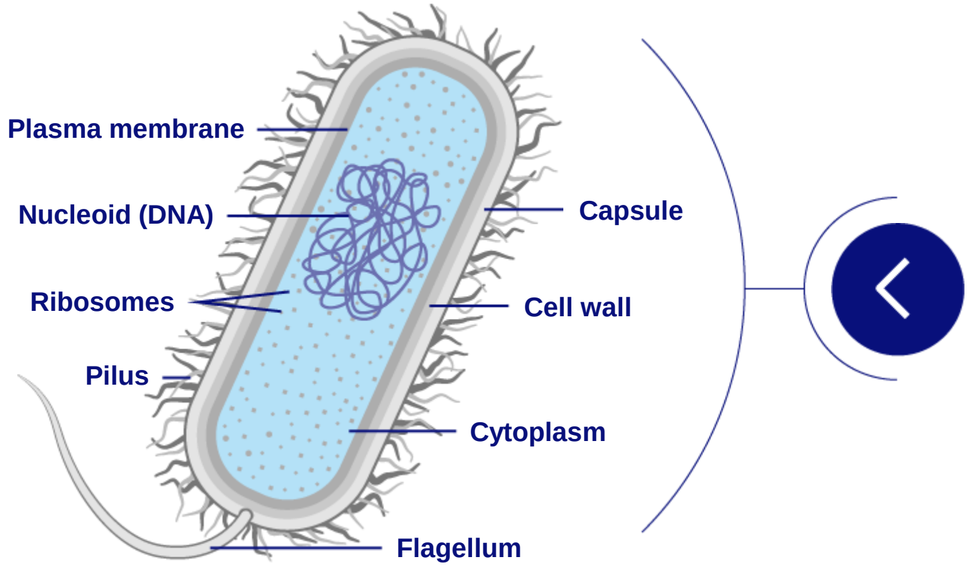
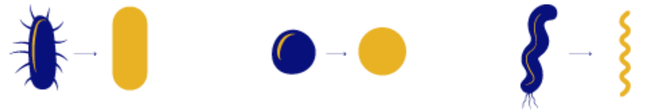


- Bacteria can have different shapes:



rod-shaped (bacilli)

spherical (cocci)

helical (spirilla)

Source and further reading

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Just one example in endoscopy for rod shaped bacteria: *Escherichia coli*

07 | 30

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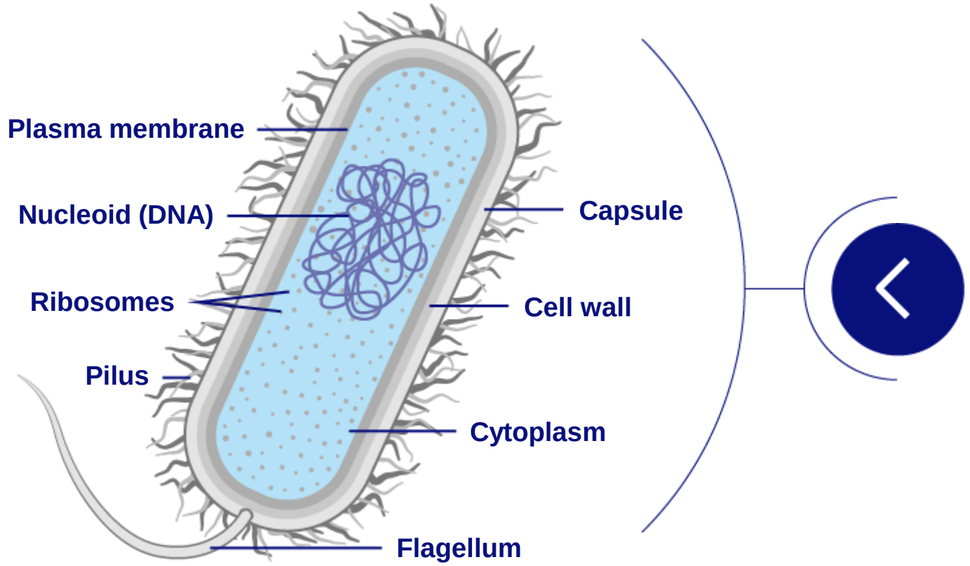

- Can multiply themselves, do not need a host
- Can form endo- and exotoxins

Just one example in endoscopy for rod shaped bacteria: *Escherichia coli*

01 What are Bacteria?

Escherichia coli in endoscopy

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Delayed reprocessing

Read the Olympus white paper >

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Time	Escherichia coli
0	1
20 min	2
40 min	4
60 min	8
80 min	16
100 min	32
200 min (more than 3h)	1024 (>10^3)
400 min (more than 6h)	>1.000.000 (>10^6)
600 min (10h)	>1.000.000.000 (>10^9)

This is the reason why reprocessing must be performed immediately after the procedure is finished to ensure successful reprocessing!

Otherwise there is a potential risk of developing a biofilm in the endoscope channels!

Bacteria have their own metabolism - they reproduce via cell division!

Example: *Escherichia coli* reproduction time = 20 minutes

02 Good (Commensal) Bacteria

02 Good (Commensal) Bacteria

Bacteria hotspots

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“Good bacteria”, such as lactobacillus and bifidobacteria play a role in:

- Fighting off infection
- Digestion & optimal gut health
- Wound healing
- Protection against “harmful bacteria”

Source and further reading

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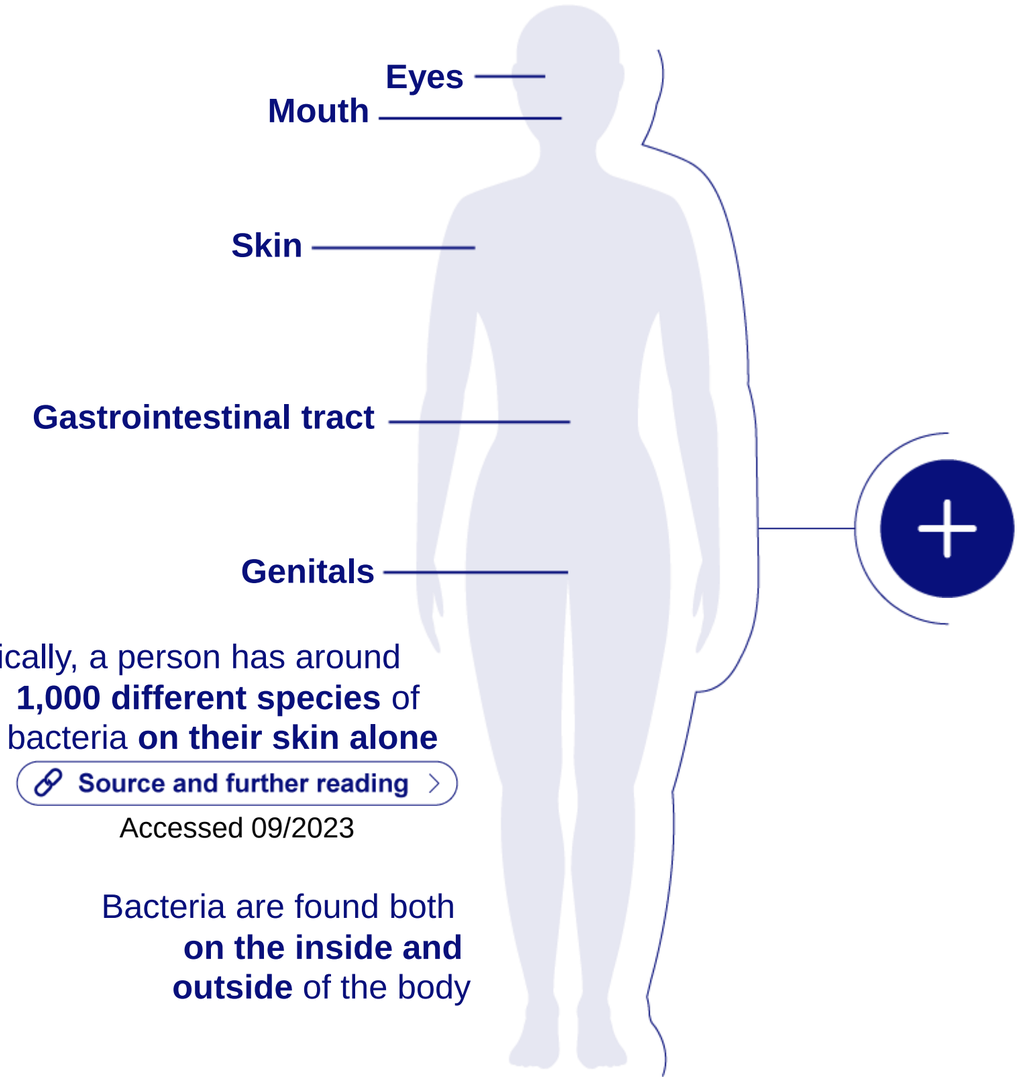

Typically, a person has around **1,000 different species** of bacteria **on their skin alone**

Source and further reading

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Bacteria are found both **on the inside and outside** of the body

Click on the plus-symbol for further information.

02 Good (commensal) bacte

Bacteria hotspots

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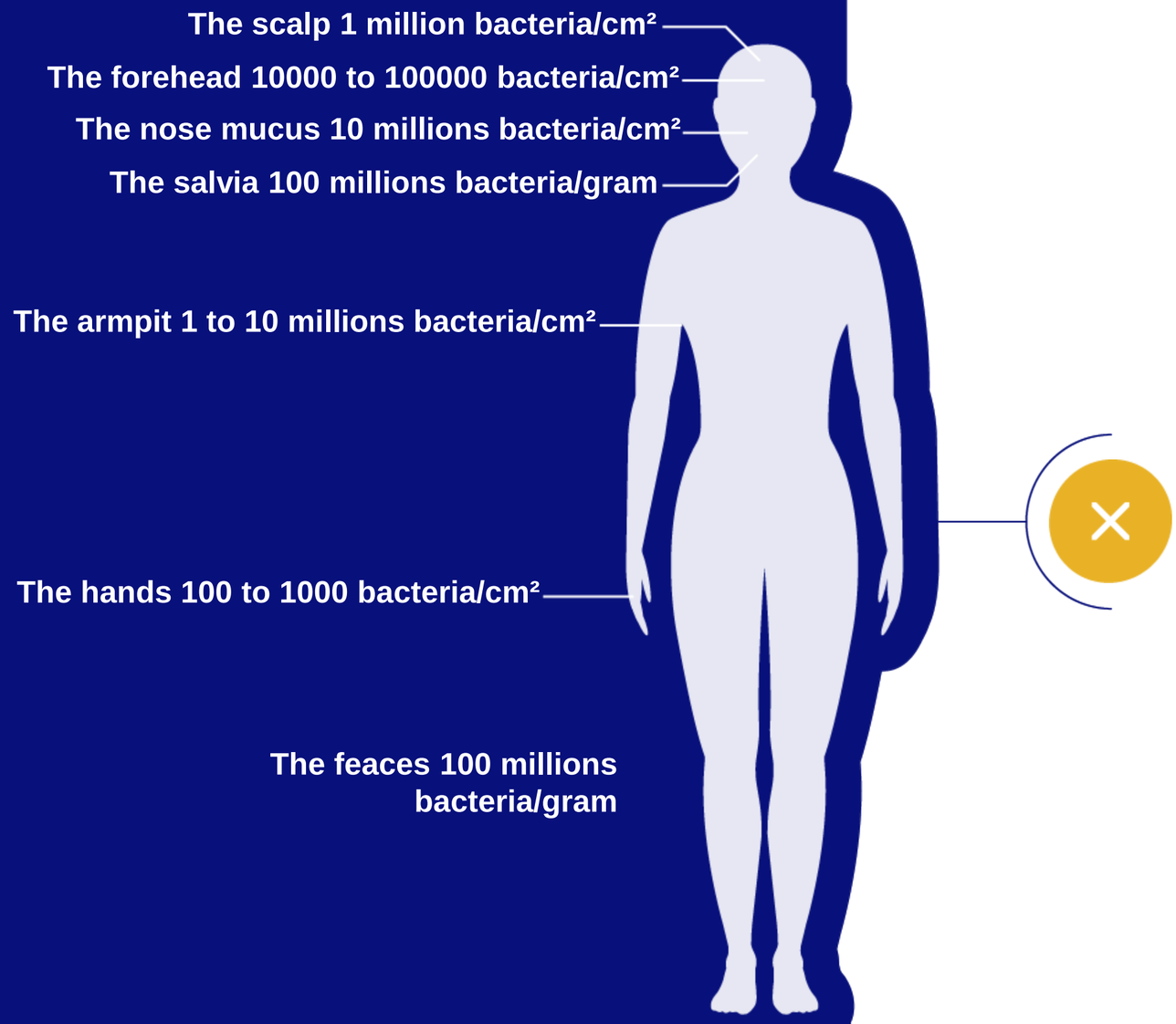
Find out more about Germs

Click on the Plus-Symbol for further information.

Bacteria Hotspots



03 Harmful (Pathogen) Bacteria

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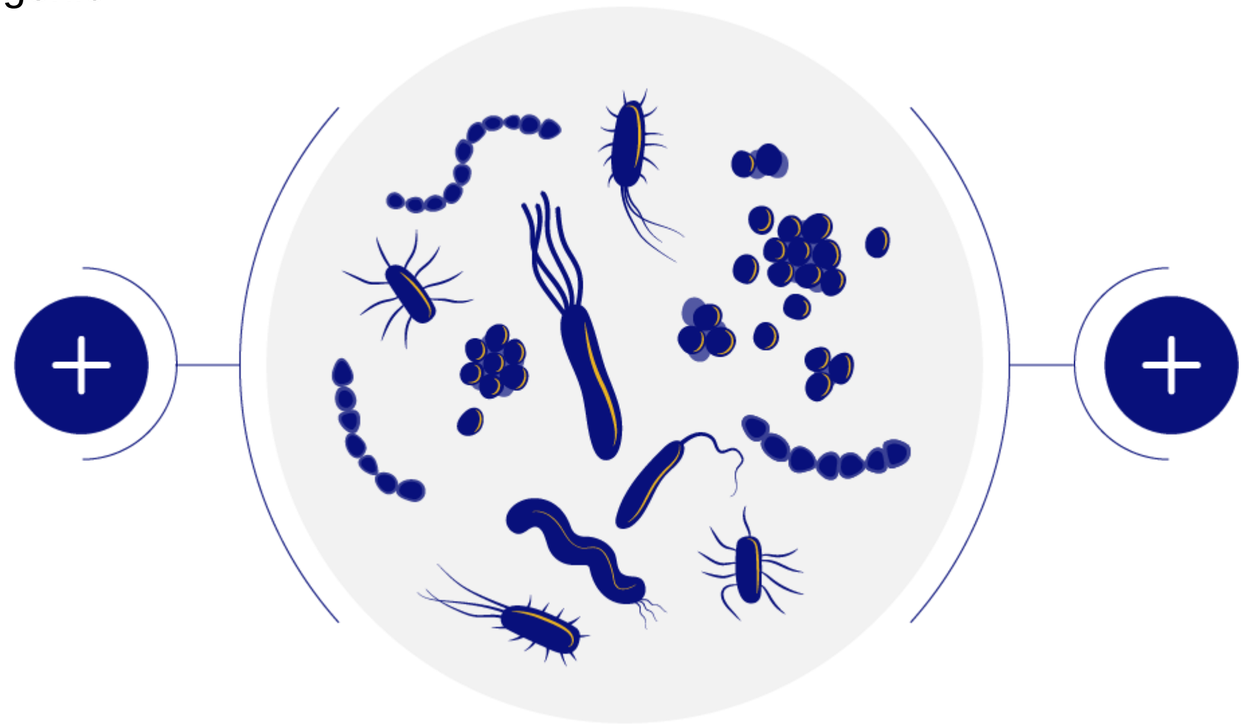
Definition: Pathogenic microorganisms

Microorganisms can be pathogenic
and non-pathogenic



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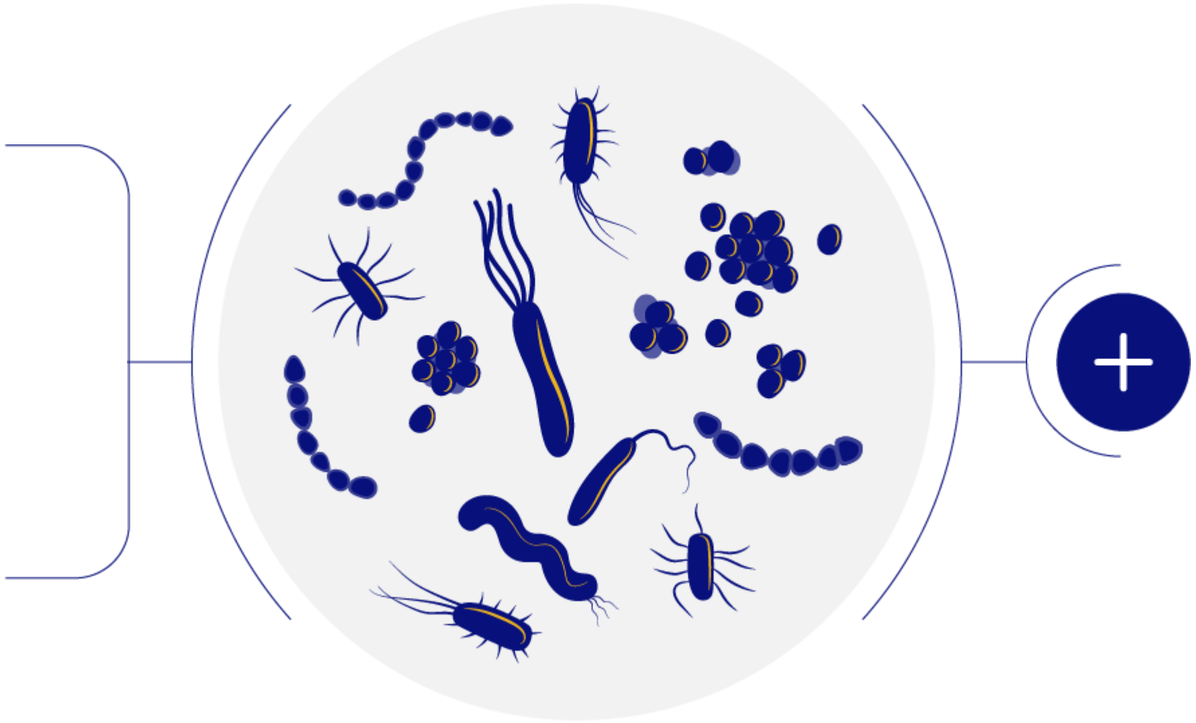
03 Harmful (Pathogen) Bacteria

Non-pathogenic

- Not disease causing



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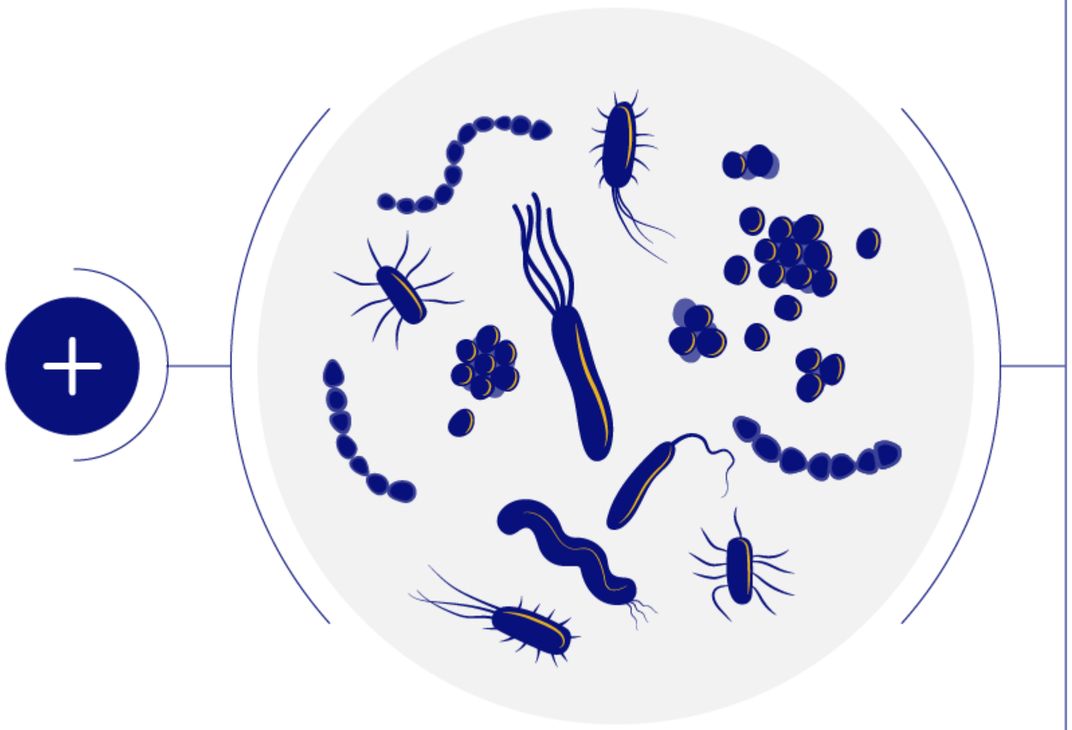
03 Harmful (Pathogen) Bacteria

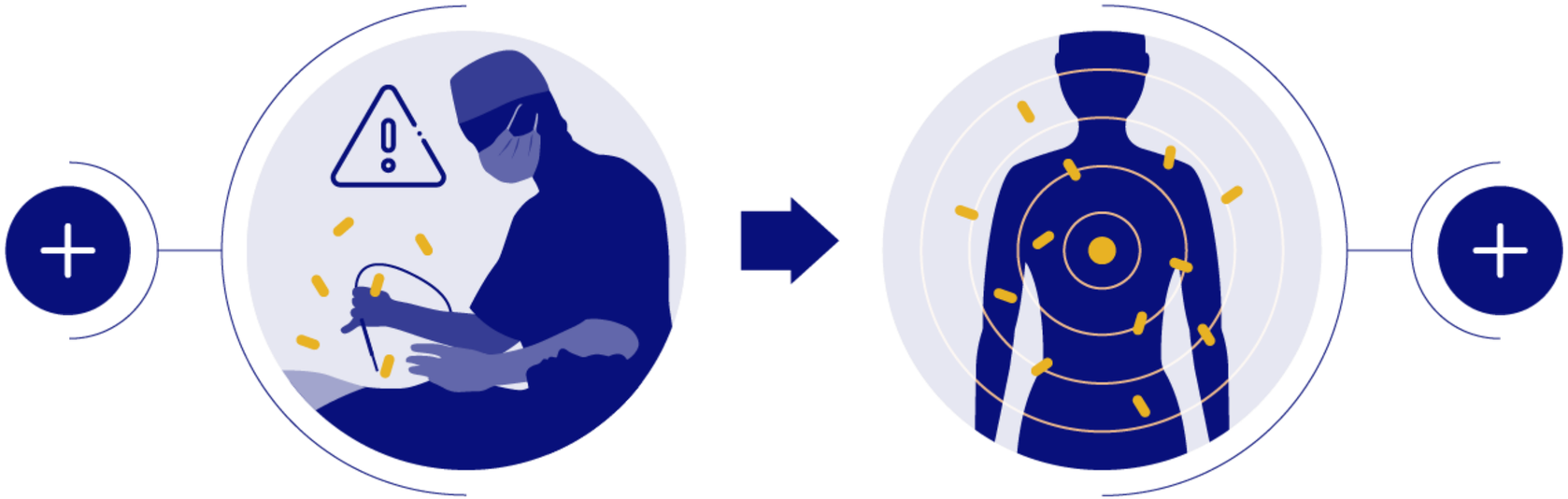


Pathogenic

- Disease causing
- For immuno-compromised patients, non-pathogenic microorganisms are also potentially dangerous.
  E.g. *Escherichia coli*
- If bacteria leave their natural habitant, e.g., via translocation to other habitants or non hygienic behavior, they may cause potential infections.
  E.g. wound infections, urinary tract infections, cholecystits and pneumonia

Click on the plus-symbols for further information.

03 Harmful (Pathogen) Bacteria



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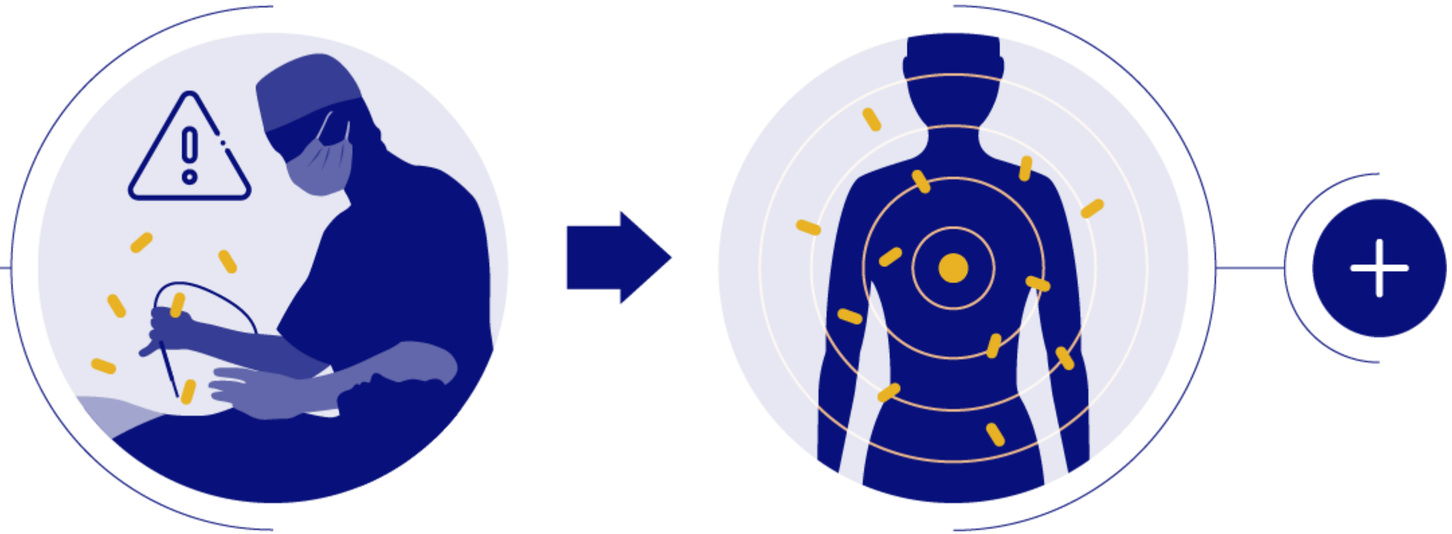
03 Harmful (Pathogen) Bacteria

Harmful bacteria are especially problematic when **introduced during invasive medical or surgical procedures,** as they can cause bacterial infections



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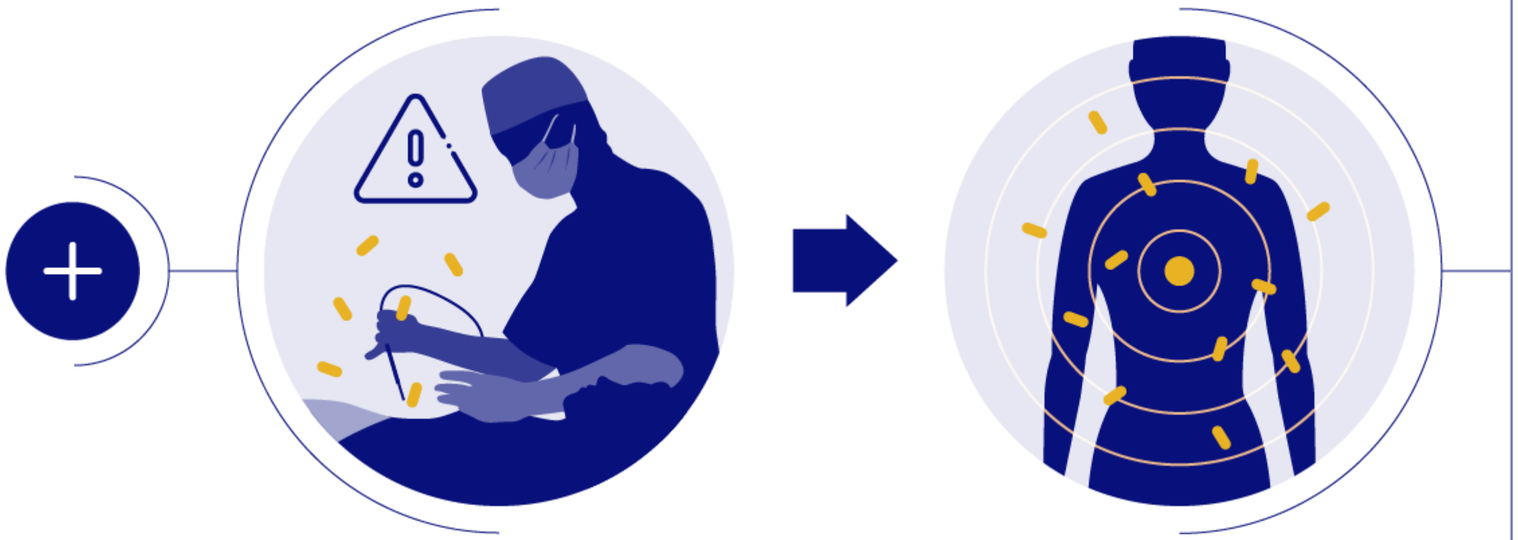
03 Harmful (Pathogen) Bacteria



They can infect any area of the body.
If untreated, these **infections can be life-threatening**

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E.g., *Salmonella, EHEC (enterohemorrhagic Escherrichia coli)*

Source and further reading

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04 Bacterial Infections

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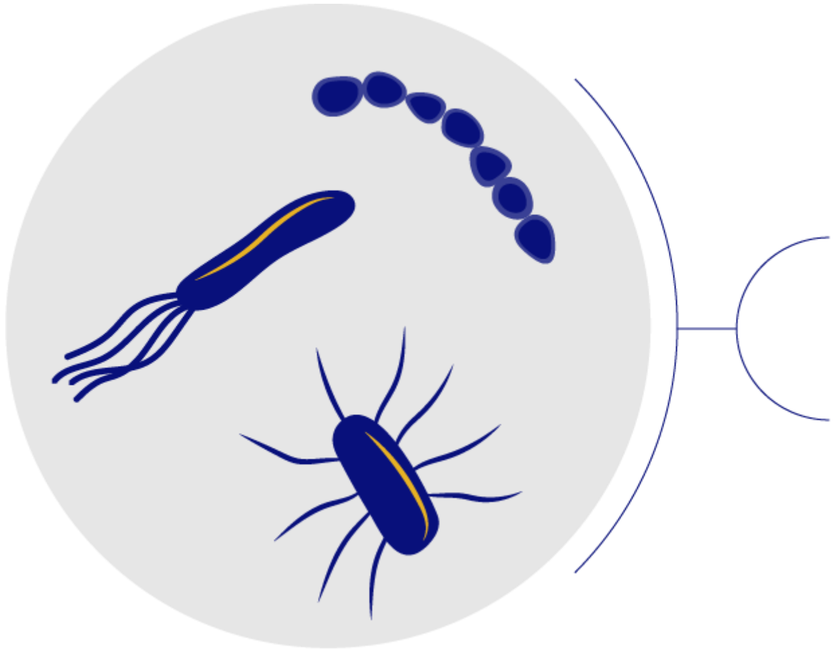

- A bacterial infection is a **spread of a harmful strain of bacteria** on, or inside, the body

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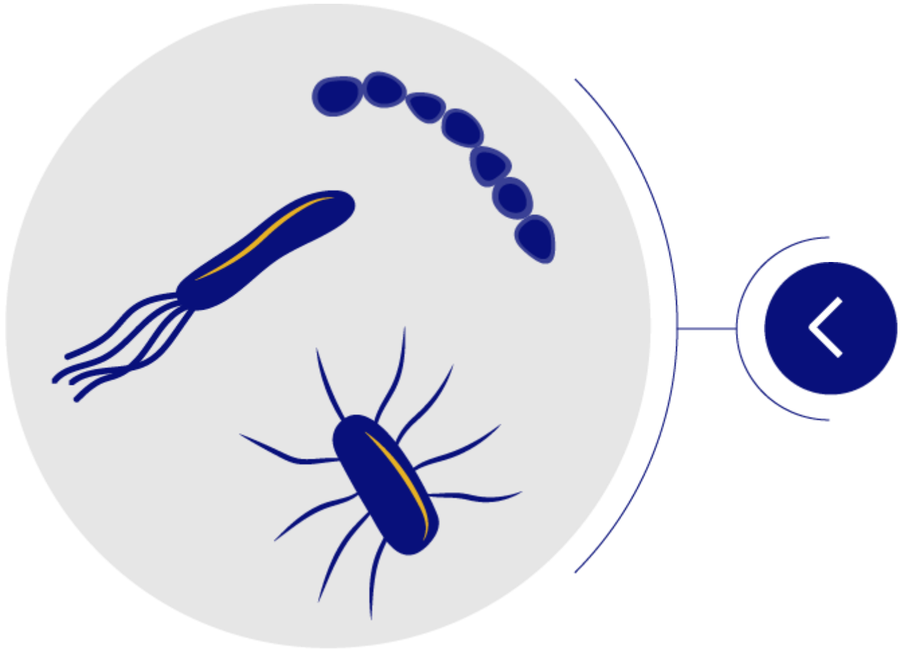
04 Bacterial Infections



- A bacterial infection occurs when harmful bacteria enter the body and multiply, **causing a reaction in the body**

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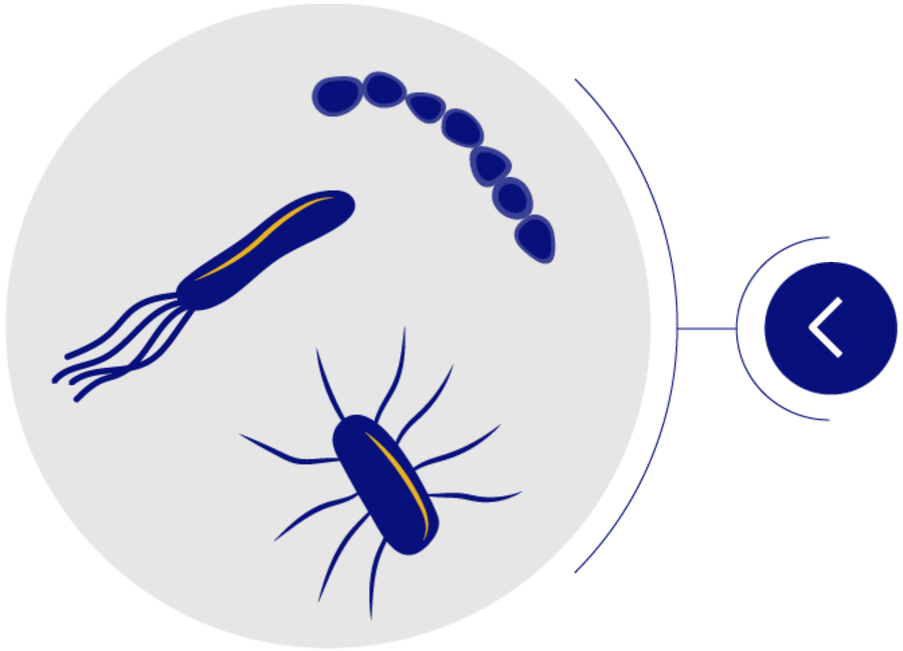
04 Bacterial Infections



- **Most hospital infections are related to bacteria** e.g., urinary tract infections (UTI) or wound infections

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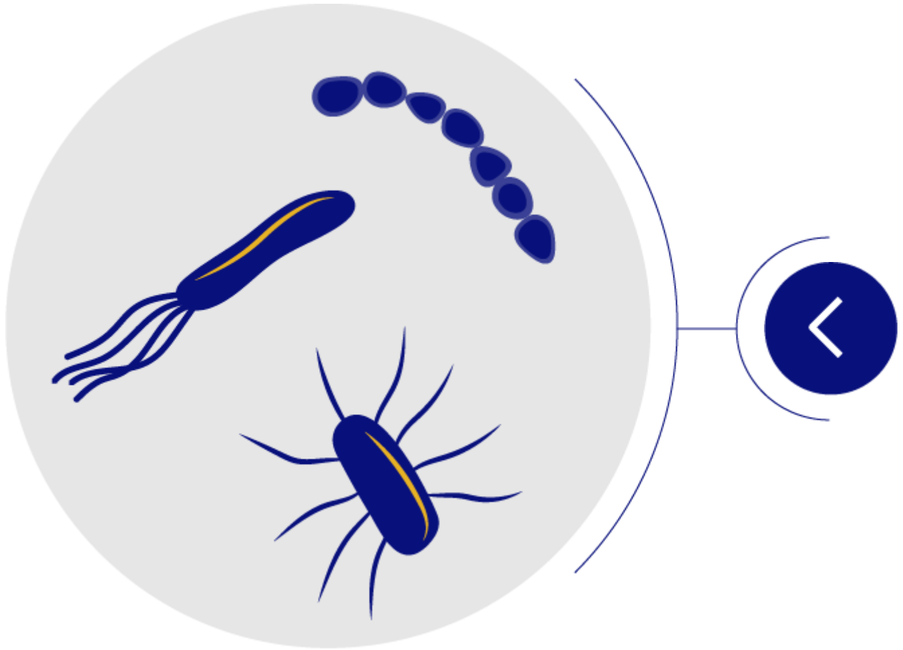
04 Bacterial Infections



- If those infections are the result of treatment in a hospital or healthcare facility, they are called “**H**ospital-**A**cquired **I**nfection” (HAI) or “**H**ealth**C**are-**A**ssociated **I**nfection” (HCAI)

04 Bacterial Infections

- In recent years some **bacteria have evolved, leading to antibiotics becoming ineffective** (i.e., no longer able to kill or prevent the growth of bacteria). This is known as **antibiotic resistance**

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04 Bacterial Infections

- We are now facing an antibiotic crisis, as **without effective antibiotics,** bacterial infections are **hard to control/eradicate**

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05 Minimizing Risk in Endoscopy

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Endoscopes are extremely useful clinical tools, and if processed and used properly, **present no increased risk of infection** compared to other clinical tools

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05 Minimizing Risk in Endoscopy

Processing protocols are designed in such a way to ensure patients are not placed at unnecessary risk of infection during routine health procedures

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05 Minimizing Risk in Endoscopy

Adherence to processing protocols and the **elimination of external contamination** are key to reducing the risk of infection

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