

Microbiology and Infection Control

Darren Makin

Microbiology

- The study of microscopic organisms:
 - Bacteria
 - Fungi
 - Parasites
 - Viruses
- Further definitions online (Module 3)

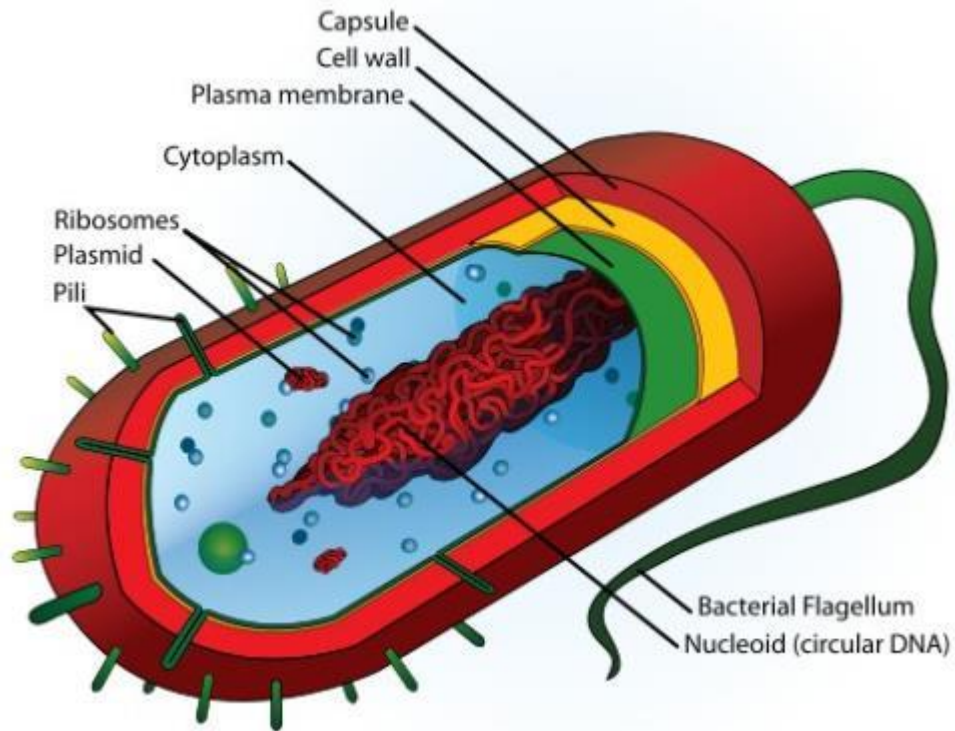
How small are bacteria and viruses?



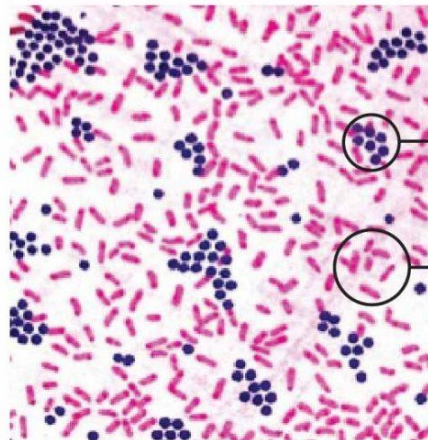
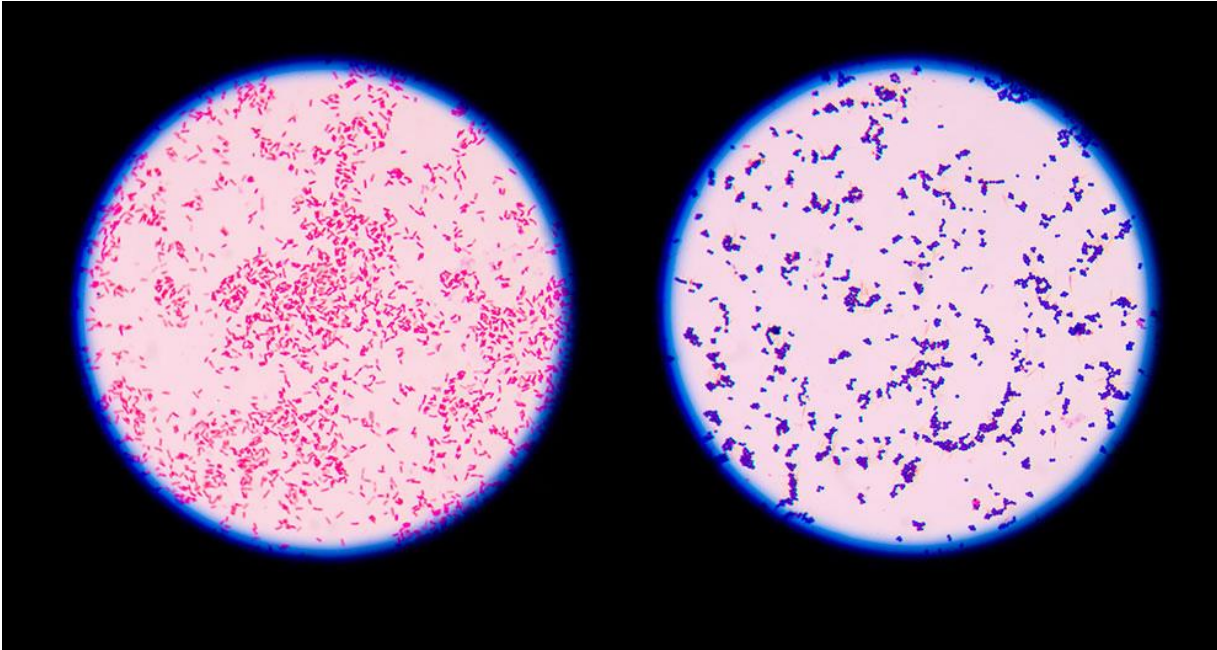
Bacteria

- Present in most habitats on earth
- Bacteria: Good or bad?

Typical Bacterial Cell Structure



Down the Microscope



Gram-positive
Cocci (spherical)

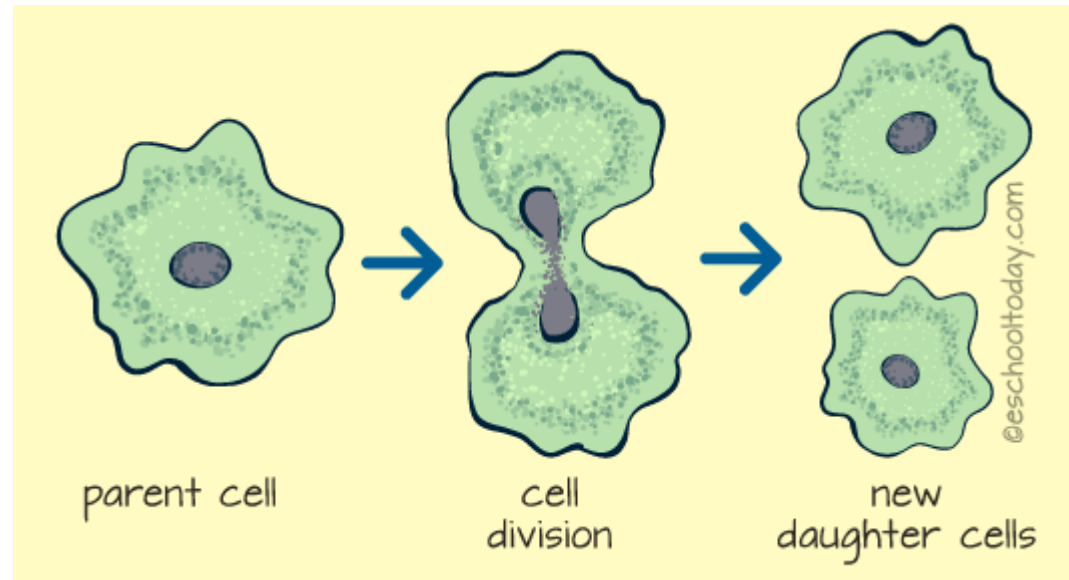
Gram-negative
Bacilli (rod-shaped)

Bacterial Growth

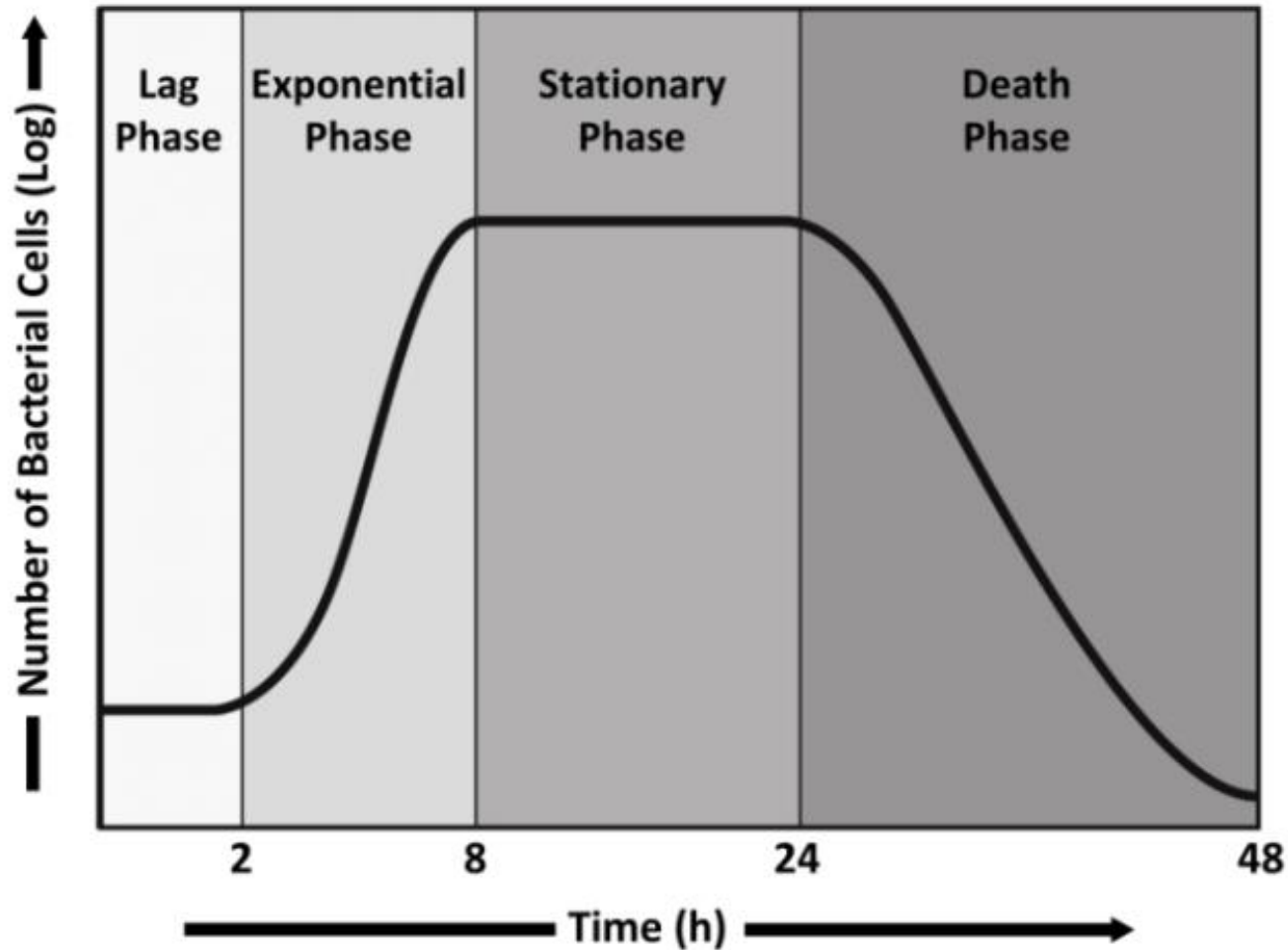
- Refers to cell numbers rather than size (binary fission)
- Relies on several factors:
 - Nutritional requirements
 - Temperature
 - Atmosphere
 - Water

What is Binary Fission

In Binary Fission, the cell divides itself into two, equal, identical parts with the same DNA



Bacterial growth curve



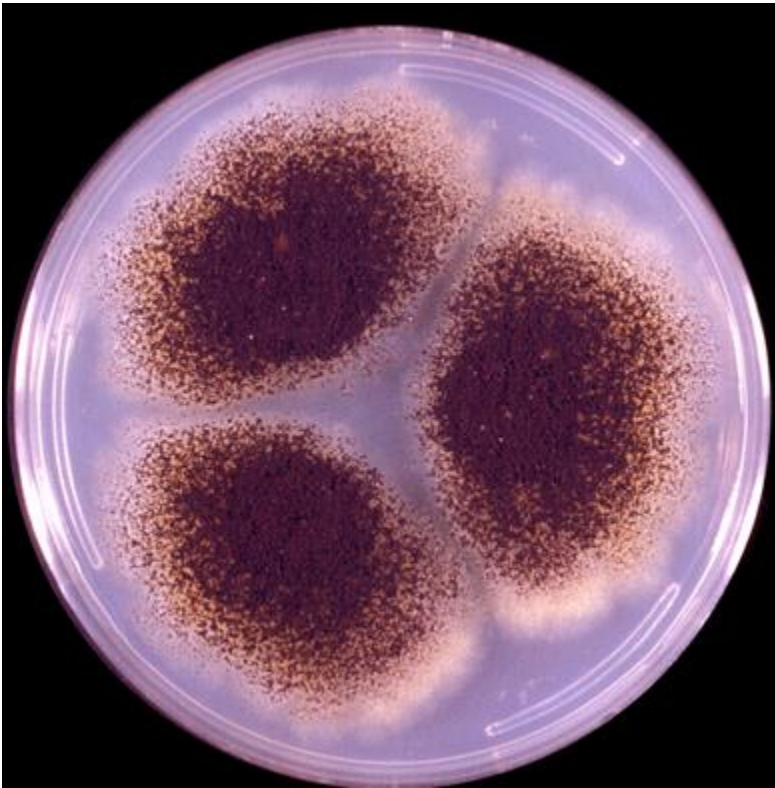
Bacterial Culture



Fungi

- Types:
 - Mushrooms – produce a fruiting-body that releases spores
 - Moulds – produce filaments and also release airborne spores to reproduce.
 - Yeasts – single cells, reproduce by budding

Fungi can also be cultured



Protozoa (first animals)

Free living single cell organisms with complex internal structures Classified on their mode of movement:

- Amoeboid
- Cilia
- Non-motile
- Flagella



Viruses

- Smallest infectious agents
- Generic material either DNA or RNA
- Only replicates in living cells of other organisms

DNA



Transcription



RNA



Translation

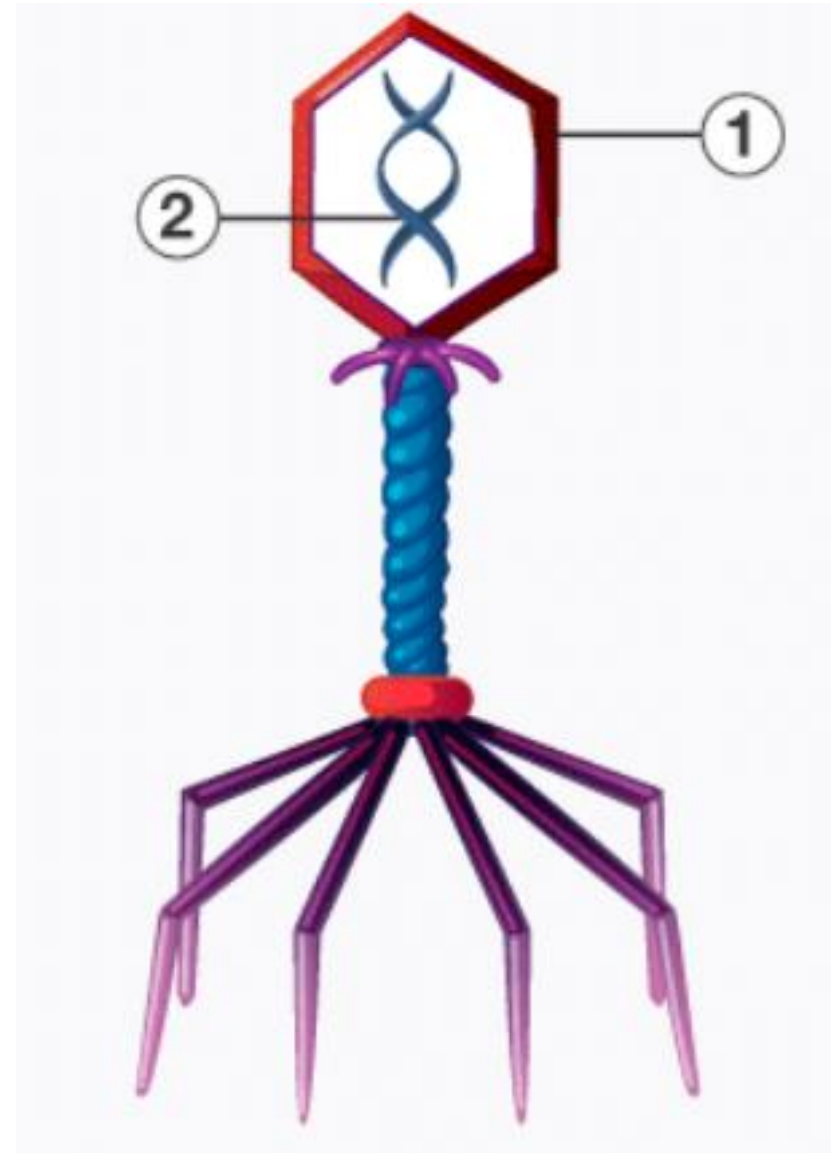


Protein

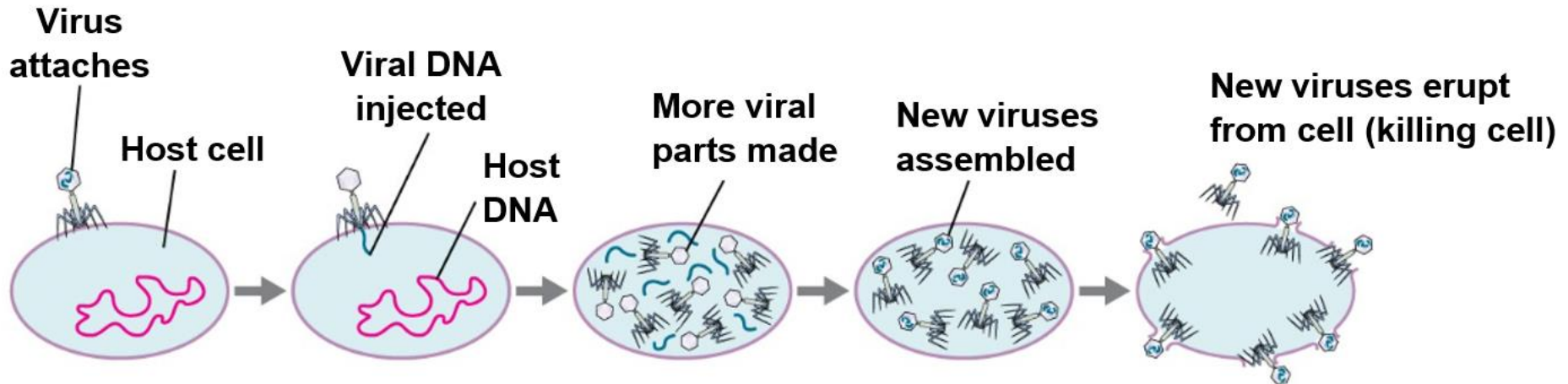


Virus structure

1. Protective capsid
2. Genetic material (RNA or DNA)

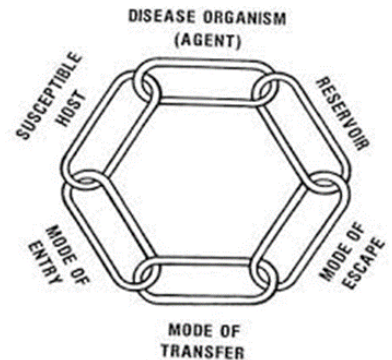


Viral Life Cycle:

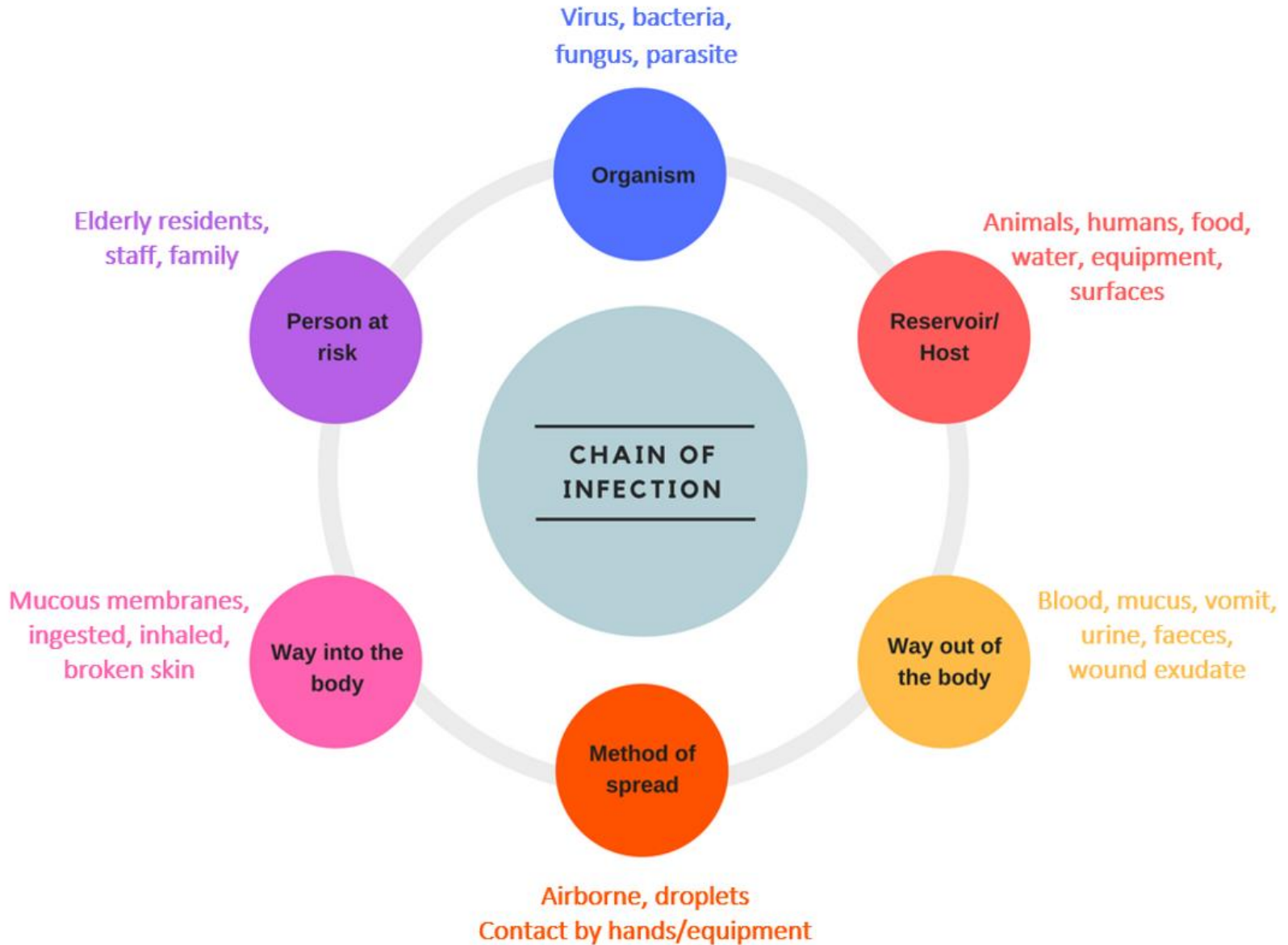


Infection Control

- When considering how to control infection risks, it may be useful to compare them to a series of links.
- Breaking one of the links can break the chain of infection
- Good funeral practice reduces the risk of infection!



Chain of Infection:



Managing Infection Control

- Use of SICPs or TBPs
- Standard Infection Control Precautions (SICPs)
- Basic infection control measures that should be used at all times
- Examples?

Managing Infection Control

- Transmission Based Precautions (TBPs)
- Infection control measures based on the route of transmission of the microorganism:
 - **Airborne** (e.g. local ventilation, respiratory protective equipment)
 - **Droplet** (e.g. avoidance of aerosols or splashing)
 - **Physical contact** (e.g. use of leak proof body bags, single use equipment)



ANY QUESTIONS?

More information: module 3