

## General Principles of Microbiology

micro= small

bio= life

logy= study of science

Immunology= study of our protection from foreign macromolecules or invading organisms and our responses to them

### Diff classes of organisms

Viruses- grow only in living cells

- nucleic acid (DNA or RNA)
- surrounded by protein shell (capsid)
- attach and inject nucleic acid into host

Mycoplasma- grow on non-living media

Bacteria- no separate nucleus; unicellular

- DNA usually packaged by chromosome (contains DNA and RNA)
- no nucleus (prokaryotic)
- rigid cell wall keeps things in place
- binary fission for reproduction
- some bacteria lack cell wall and are more fragile
- can potentially be good or bad- can depend on host

Parasites

Fungi

Eukaryotes (possess nucleus)

### 'Normal' Flora

-Considered harmless as long as we are in the state we are supposed to be and it depends what area of the body it resides in

-Where should there be no bacteria? CNS, circulatory system, urine

**-Transient flora**- something that we are exposed to everyday

-Babies do not have a normal flora, they must develop one- adults have the highest normal flora and highest immune system function

**-Resident flora**- find suitable environment to live and they will stay in your body for a long duration of time

-E Coli is normal flora and helps fight off infection

### What protects us from the bad guys?

-mechanical barriers are constantly there

-most bacteria do not like living on the skin because it is dry and sweat is antibacterial

### How do the bad guys get in?

pathogen= microbe that causes disease

Bacteraemia- bacteria getting into the blood

Septicaemia- any organism has gotten into the blood and caused disease (more general)

### Microbial Disease

-Infection has to have symptoms

-Contamination is only used when bacteria has landed on an object, if bacteria has landed on a human we use the word colonization

How do we measure how dangerous a bacteria/virus/parasite is? \*\* important words

-**Pathogenicity**: measure of likelihood you'll get sick

-**Virulence**: how damaging it will be to the body

-**Opportunistic**: host becomes compromised and get infected when they shouldn't have

\*pathogenicity and virulence are body used to describe illnesses

Ex. Rhinovirus- high pathogenicity but low virulence

Pathogenesis of infectious diseases

-most common method is inhalation, second is ingestion

-direct deposit- deep wound that exposes deep tissue ex. gunshot

#### Toxigenicity

Exotoxins- usually produced by actively multiplying bacteria

-very specific to where it acts- specific receptor

-proteins are very heat sensitive- easily denatured

Endotoxins- it is integrated directly into the cell wall structure, the cell can not rid of it

-only time endotoxin is released is when cell dies and the cell breaks down and releases it

-can tolerate heat