

Medically Important Gram Positive Bacteria: Non-Spore Forming

Staphylococcus

- *Staphylococcus* is a class of Gram-positive, **cocci** bacteria of the **Staphylococcaceae** family
 - These can then be divided up into **~40 species**
 - They are usually found in **grape-like clusters**
- Most species of *Staphylococcus* are harmless and reside normally on the **skin and mucous membranes** of humans and other organisms, some more virulent strains include:
 - ***S. aureus***
 - This is one of the more virulent strains of the genus
 - It can cause a **variety of conditions** depending on the site of infection
 - **15-35% of people actually harbour *S. aureus*** on their skin
 - The species is **spread by direct contact** and can often be found in the nose and on the skin
 - ***S. epidermidis***
 - This species is part of the **normal skin and, less commonly, mucosal flora of humans**
 - It can however become **pathogenic during times of immunocompromising**
 - The species can reside off the body on **plastic containers** etc. such as **IV lines and catheters**
 - This makes infection of *S. epidermidis* become associated with artificial implants and prosthetics
- *Staphylococcus* is a **non-motile genus** of bacteria due to their **lack of flagellum or pili for movement**
 - The genus is also part of a family of **facultative anaerobes**
 - This means that the bacteria **utilise oxygen to produce ATP**, however, it can switch to **anaerobic respiration when oxygen is absent**
 - *Staphylococcus* are opportunistic pathogens, meaning they infect a host when their immune system is compromised. An example of this is during AIDS
- The structure of this particular genus of bacteria is interesting as it can be quite dangerous with its products:
 - ***Staphylococcus* have the ability to synthesize the enzyme catalase.** This will catalyse the breakdown of hydrogen peroxide to oxygen and water
 - This is useful to scientists as it allows the **differentiation between *Streptococcus*, a genus of bacteria that does not produce H₂O₂**
 - The bacteria are also **salt tolerant** and so are able to live comfortably on human skin
 - **They can tolerate intense radiation and heat** and so can be quite hard to destroy
- Pathogenicity of a microorganism results from 3 features:
 - **The production of enzymes**
 - **An ability or structure that enables the organism to evade phagocytosis**
 - *Staphylococcus* does this by producing **coagulase**. This **allows the bacteria to hide in blood clots**
 - It can also hide from them by **producing slime layers** which enable them to remain unseen
 - **The production of toxins**
- *Staphylococcus* can cause a number of diseases such as:
 - **Food poisoning** by the ingestion of enterotoxin-containing food
 - **Scalded skin syndrome**
 - **Impetigo**
 - **Toxic shock syndrome**
 - Caused by the **TSS toxin** which is absorbed into the blood
- A separate table shows the diagnosis, treatment and prevention of this bacteria