

Staphylococcus aureus Disease

Staphylococcus aureus is a gram-positive cocci that literally means "golden grape cluster berry"; due to its clustered appearance on gram stain. It is frequently found as normal flora on the skin and nasal passages but can cause a wide range of illnesses from minor skin infections to life-threatening diseases like pneumonia, osteomyelitis, and endocarditis. Staph aureus can cause a variety of skin infections including pimples, impetigo, furuncles, cellulitis, and abscesses. It can also cause severe pneumonia. Individuals are particularly susceptible to pneumonia caused by Staph aureus following viral influenza. This bacteria can also cause disease mediated by toxins. Some strains produce the exotoxin TSST-1, which causes toxic shock syndrome. This toxin acts as a super antigen which simultaneously binds MHC II and T cell receptors causing polyclonal T cell activation. Some strains produce an enterotoxin causing food poisoning. Staph aureus food poisoning presents as a rapid onset of symptoms due to ingestion of preformed toxins. Some produce exfoliative toxin, which are proteases that cleave desmoglein-1, which can cause detachment of the granulosum and spinosum layers in the epidermis. Staph aureus can also cause a life threatening acute bacterial endocarditis and osteomyelitis.



PLAY PICMONIC

Skin Infections

Skin-suit with Infectious-bacteria

Staph aureus can cause a variety of skin infections including pimples, impetigo, furuncles, cellulitis, and abscesses.

Impetigo

Emperor-tiger

This acute, highly contagious infection of the superficial layers of the epidermis is primarily caused by Staphylococcus aureus (or Streptococcus pyogenes). Patients typically display red sores around the nose and mouth with yellow-brown crusting.

Abscesses

Abscess-guy

Staph aureus is a common pathogen isolated in skin abscesses.

Exfoliative Toxin

Exfoliating-skin with Toxic-green-glow

Some strains produce exfoliative toxin, which are proteases that cleave desmoglein-1. This can cause detachment of the granulosum layer in the epidermis. The stratum spinosum and stratum basale skin layers are protected by desmoglein-3 attachments that the toxin proteases are unable to cleave.

Scalded Skin Syndrome

Scalded skin

Scalded skin syndrome is a syndrome caused by exfoliative toxin released by Staph aureus. This toxin causes detachment within the epidermal skin layer, causing widespread formation of fluid filled blisters that easily rupture on the skin. This syndrome is commonly seen in newborns or children.

Toxic Shock Syndrome (TSST 1)

Toxic-green Shocked Tampon

Some strains produce the exotoxin TSST 1, which causes toxic shock syndrome. Individuals with toxic shock syndrome commonly present with high fever, low blood pressure, and confusion and can rapidly progress to stupor and coma. There is often a characteristic rash that resembles a sunburn early in the course of illness. Toxic shock syndrome is commonly associated with tampon use in menstruating females, especially when the tampon is left in the vaginal canal for too long.

Binds to MHC II and T Cell Receptor

MHC-complex with (2) Tutu and Tennis-balls

The toxin TSST 1 acts as a super antigen, which simultaneously binds MHC II and T cell receptors, causing polyclonal T cell activation.

Food Poisoning

Food Poison-bottle

Some strains produce an enterotoxin causing food poisoning. Staph aureus food poisoning presents as a rapid onset of symptoms due to ingestion of preformed toxins.

Acute Bacterial Endocarditis

[Bacteria-guy with In-donut-heart-cards](#)

Staphylococcus is the most common cause of acute bacterial endocarditis. The bacterium can enter the bloodstream from skin in patients who inject illicit drugs or have an intravenous catheter. Patients become ill very quickly and the bacterium can rapidly destroy an infected heart valve, causing murmurs and heart failure.

Pneumonia

[Nude-Mona](#)

Staph aureus can cause severe pneumonia. Individuals are particularly susceptible to pneumonia caused by Staph aureus following viral influenza.

Osteomyelitis

[Skeleton-in-flames](#)

Osteomyelitis is an infection of the bone or bone marrow. Staphylococcus aureus is the most common causative agent of osteomyelitis in previously healthy individuals.