Encapsulated Bacteria

Encapsulated Bacteria are bacteria encased by a polysaccharide capsule. This capsule aids in evading phagocytosis and the host immune system. In healthy patients, the spleen plays a central role in opsonizing and phagocytosing encapsulated bacteria, thus removing these organisms from the bloodstream. Major encapsulated bacteria to be aware of include Streptococcus agalactiae, also known as Group B Streptococcus, Streptococcus pneumoniae, Haemophilus influenzae, Neisseria meningitidis, Escherichia coli, Salmonella species, Klebsiella, and Pseudomonas aeruginosa.



PLAY PICMONIC

Characteristics

Polysaccharide Capsule
Polly-sack Capsule
Some bacteria have an outer capsule that serves as a virulence factor, preventing phagocytosis by the host's immune system and enhancing the organisms' ability to cause disease. This capsule is composed of polysaccharides, and completely surrounds the bacterium.

Inhibits Phagocytosis
Inhibiting-chains on Mac-man
Bacterial Virulence Factors are synthesized by certain bacteria and increases their ability to infect or damage human tissues. The polysaccharide capsule is considered a virulence factor because it inhibits phagocytosis by host Macrophages and Neutrophils, allowing bacterial evasion of the host immune response. However, the immune system, with the aid of the spleen, can develop antibodies to capsular antigens. These antibodies then coat and opsonize encapsulated bacteria, allowing for their phagocytosis. Vaccines can also be generated using capsular sugars and form the basis of conjugate vaccines.

Removed by Spleen after Opsonization
Bacteria-guy with Spleen-spoon Ops-signing
The spleen plays an important role in sequestering bacteria which are not well opsonized and is key in the production of opsonizing antibodies. This organ has an abundance of lymphoid tissue, including splenic macrophages that attack foreign organisms. These phagocytic immune cells work with capsular antibodies and opsonins to phagocytose and remove encapsulated organisms from the bloodstream. In asplenic patients, the absence of these macrophages severely diminishes the patient's ability to fight off encapsulated bacteria. Asplenia can be anatomic, usually due to splenectomy, or functional (loss of splenic function). Various conditions may lead to asplenia, such as trauma, sickle cell anemia, hemolytic anemias, Thalassemias, benign hematologic conditions, benign lymphoid disorders, and some malignant cancers such as non-Hodgkin’s lymphoma.

Organisms

Streptococcus agalactiae
Stripper Agalactic
Streptococcus agalactiae, commonly referred to as Group B Streptococci, is a gram-positive cocci that can colonize the vagina of women and cause serious disease in infants that acquire the organism during passage through the birth canal.

Streptococcus pneumoniae
Stripper Nude-Mona
Streptococcus pneumoniae is an encapsulated, gram- positive, lancet-shaped diplococci that is a major cause of pneumonia, meningitis and otitis media.

Haemophilus influenzae
Heme-man in Flute
Haemophilus influenzae is an encapsulated, gram-negative coccobacilli that can cause several diseases, including meningitis, pneumonia, otitis media and epiglottitis.

Sign up for FREE at picmonic.com

Neisseria meningitidis

Knife Men-in-tights

Neisseria meningitidis, often called meningococcus, is an encapsulated gram-negative diplococci that can cause meningitis and life-threatening sepsis.

Escherichia coli

E-Coal-Eye

Escherichia coli, commonly abbreviated E. coli, is an encapsulated gram-negative bacilli often found as normal flora in the intestines. Most E. coli strains are harmless, but pathogenic strains can cause disease; including food poisoning, neonatal pneumonia and meningitis, septic shock and UTIs.

Salmonella

Salmon

Salmonella typhi, Salmonella enterica, and other Salmonella species are encapsulated gram negative bacilli. Salmonella typhi is the causative agent for typhoid fever, while Salmonella enterica causes salmonellosis. Some other clinical conditions Salmonella spp. causes include gastroenteritis, osteomyelitis in sickle cell patients, and reactive arthritis.

Klebsiella

Clubbing-sea-lion

Klebsiella is an encapsulated gram-negative, oxidase- negative bacilli with a prominent polysaccharide capsule. Infections can lead to a wide range of diseases including pneumonia and nosocomial urinary tract infections.

Pseudomonas aeruginosa

Sumo-Mona

Pseudomonas aeruginosa is an encapsulated gram negative, aerobic bacilli that has been increasingly recognized as an opportunistic human pathogen that can cause infections in burn patients, osteomyelitis, endocarditis, pneumonia, and urinary tract infections.

Sign up for FREE at picmonic.com