Bug of the Month:  *Pseudomonas aeruginosa*

*Pseudomonas aeruginosa* is an aerobic gram negative rod shaped micro-organism. It is well adapted to grow in relatively pure water and has minimal nutritional requirements. It commonly inhabits soil, water and vegetation. *P. aeruginosa* has been a well-known human pathogen since the 1960s. Infections with *P. aeruginosa* occur in many different health care settings.

*P. aeruginosa* infects a variety of body sites such as the blood stream, the urinary tract, the respiratory system, burn wounds, endocardium, GI tract, meninges, eye, ear, joints, musculoskeletal tissues and surgical sites. Although not in all instances, purulent material may be blue or green in color due to pigment produced by the organism and may have a sweet smell.

Pneumonia, urinary tract infections, bloodstream infections, endocarditis, wound and burn infections are commonly caused by *P. aeruginosa*. It causes less than 10% of surgical site infections. It also is a common cause of “swimmer’s ear”. Persons with diabetes are prone to otitis caused by this organism. *Pseudomonas* infections can be serious and are feared because of their resistance to antimicrobial treatment.

Virulence factors are numerous. Pili and adhesins favor adherence to tissues. The organism has flagella which provide motility, it’s a good swimmer. It produces alginate slime and can exist in biofilms. It produces substances that aid tissue invasion. It produces toxins that are responsible for tissue damage and in the blood stream, symptoms related to gram negative septicemia such as fever, hypotension and intravascular coagulation. This organism resists phagocytosis and is naturally resistant to many antibiotics.
Reservoirs can include moist health care environments and once contaminated disinfectants, medication vials, respiratory equipment, food such as fruits and vegetables, sinks, taps, toilets, ice machines, showers and mops become reservoirs. Some persons are colonized in their stool, and non-transient skin carriage can occur.

_P. aeruginosa_ tends to be an opportunistic pathogen and it takes advantage of altered host defenses. Transmission can occur by hands or contact with contaminated substances. Susceptibility to infection is related to immune compromise, age, surgery, device use, chemotherapy, and compromised tissues. Infection by the organism from endogenous sources such as the GI tract may occur. Colonization usually precedes infection. Invasion of the tissues is favored by the production of toxins and enzymes which also favor dissemination.

_P. aeruginosa_ can be cultured and grows easily in lab media

Antibiotics for treatment include fluoroquinolones, aminoglycoside antibiotics, anti-pseudomonal cephalosporins, anti-pseudomonal penicillins, and carbapenems.

Prevention: Handwashing is an important means of prevention. Aseptic technique, appropriate management and handling of devices are essential.

**Resources:**

1. Todar’s Online Textbook of Bacteriology  
   [http://textbookofbacteriology.net/pseudomonas_4.html](http://textbookofbacteriology.net/pseudomonas_4.html)
2. APIC Text of Infection Control and Epidemiology 3rd Edition; Chapter 73, Environmental Gram Negative Bacilli