**Recently, I read several newspaper and magazine articles pertaining to the increasing resistant to different bacteria to antibiotics. Doctors are now afraid that people will start dying again from infections that were very easily treated in the recent passed with common antibiotics. When penicillin was first invented during World War II, a new era in medicine began. Mr. Winston Churchill, the English Prime Minister of the time, developed pneumonia which in those days was frequently a fatal disease. He was treated and cured with 20,000 units of penicillin, which is the equivalent of 1/10 the amount present in one tablet today. Since then, bacteria are becoming more resistant every year and penicillin is the antibiotic of choice for very few infections today. Another article I read was about flesh-eating bacteria, which are killing people all over the world. Not many people no that this is in fact caused by a strep infection.**

**Members of the genus Streptococcus are catalase-negative gram-positive cocci. They form large quantities of lactic acid as the end product of carbohydrate metabolism and they are faculatively anaerobic. They are not only normal flora of humans, but some species are responsible for causing several devastating diseases, including pneumococcal pneumonia, meningitis, sepsis, bacterial endocarditis, streptococcal exudative pharyngitis, cellulitis, wound infection, and visceral abscesses.**

**Streptococcus pyogenes (Group A streptococci), which can cause strep throat, are almost always Beta-hemolytic. This means that they produce a clear zone of hemolysis around the colony when incubated on sheep blood agar. (Hemolysis is the complete breakdown of red blood cells.) Group A streptococci are killed in 30 minutes at 60 degrees celsius, a property that is useful in their differentiation from other groups that are more heat resistant. They are found in the respiratory tract of humans and are one of the most important human pathogens. Often times people carry the organism without showing signs of illness. However, these asymptomatic carriers show low amounts of the organism present.**

**The incidence and severity of streptococcal pharyngitis is higher in colder temperatures. Group A Beta-Hemolytic streptococci are spread from person to person or occasionally from animals to people. Infection may be spread by droplets, direct contact with skin lesions, food, milk, and contaminated water. If not treated Streptococcus pyogenes can lead to pharyngitis, scarlet fever, septicemia, erysipelas, impetigo, rheumatic fever, and even acute glomerulonephritis.The incidence of streptococcal disease diminishes during adult life as immunity develops.**

**Physicians and microbiologists use blood agar to isolate and correctly identify the type of streptococcus present. The culture plates used consist of a base containing a protein source, soybean protein digest, sodium chloride, agar, and 5% sheep blood. Certain bacteria produce extracellular enzymes that act on the red cells to lyse them completely (beta hemolysis) or to produce a greenish discoloration around the colony (alpha or incomplete hemolysis), while others have no effect (gamma hemolysis). Thus by streaking the culture on a blood agar plate and incubating at 35 degrees celsius, the bacteria can be identified in about 24 hours. Since the bacteria thrive in anaerobic conditions, a candle can be placed in the incubator to use up the oxygen and produce carbon dioxide.**

**For Streptoccocus Groups A and B it is also necessary to place a bacitracin "A" disc directly on the area of initial innoculation. The bacitracin disc prevents the growth of Beta-Strep bacteria. Along with the bacitracin disc, a trimethoprim-sulfamethoxazole disc (SXT disc) is placed on the culture plate. This SXT disc allows Beta-Strep Group A to grow, while inhibiting other bacteria. If the bacitracin disc shows a zone of inhibition greater than 10mm then there is Streptoccocus present on the culture plate, but if there is no ring showing inhibition then there is no growth of Streptococcus. Colonies of Strep. pyogenes are transparent to translucent, convex, circular, shiny, and surrounded by a rather wide zone of Beta-hemolysis.**

**If the results are positive, therapy can be initiated to prevent greater infection and the spread to others. In addition, prompt initiation of therapy with antibiotics can significantly shorten the duration of symptoms of pharyngitis. There are other tests available to detect Beta-Strep, such as rapid detection kits, as well as enzyme-linked immunosorbent assay (ELISA) technologies.**

**Penicillin is still the drug of choice for most streptococcal infections. However, some rare species of streptococci are resistant to penicillin. For penicillin-allergic patients, erythromycin or vancomycin may be used. Unfortunately, with the misuse of antibiotics, erythromycin and penicillin resistant strains have been reported. It is pertinent that humans correctly use antibiotics to ensure their effectiveness in the future.**

**In the following experiment I have attempted to show how different antibiotics effect the growth of Beta-Strep Group A. Certain antibiotics may inhibit the growth of this bacteria more effectively than others. Identifying which types of antibiotics are most effective is the purpose of my experiment.**

|  |  |
| --- | --- |
|  |  |

***This Web Site is Best viewed with 256 or more colors.***

***For More Information about Creekwatch, please contact Eric Thiel at*** [***ethiel@pleasanton.k12.ca.us***](mailto:ethiel@pleasanton.k12.ca.us)