



Streptomycin and its Role in Fighting Antibiotic-Resistant Bacteria

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DESCRIPTION

Streptomycin is a broad-spectrum antibiotic used to treat a variety of bacterial infections. It was first discovered in 1943 by Selman Waksman and his team at Rutgers University, who isolated it from the soil bacterium *Streptomyces griseus*. Streptomycin was the first antibiotic effective against tuberculosis, and it played a significant role in the treatment of this disease until the development of more effective drugs.

Streptomycin works by inhibiting protein synthesis in bacteria. It binds to the 30S ribosomal subunit, which prevents the initiation of protein synthesis and the elongation of polypeptide chains. This ultimately leads to the death of the bacterial cell. Streptomycin is effective against a wide range of Gram-negative and Gram-positive bacteria, including *Mycobacterium tuberculosis*, the causative agent of tuberculosis.

Streptomycin is primarily used to treat tuberculosis, particularly when other drugs have failed or the bacteria are resistant to other antibiotics. It is also used to treat other infections, such as plague, tularemia, and brucellosis. Streptomycin is sometimes used in combination with other antibiotics to treat bacterial infections, particularly those caused by multi-drug resistant strains.

Streptomycin is administered *via* injection, either intramuscularly or intravenously. The dosage and duration of treatment depend on the type and severity of the infection, as well as the patient's age, weight, and medical history. In general, the recommended dosage for adults is 15 mg/kg per day, given in two to three divided doses. The maximum daily dose is usually 1 g. For children, the dosage is usually 20 to 40 mg/kg per day, given in two to three divided doses.

Like all antibiotics, streptomycin can cause side effects. The most common side effects include:

- Nausea and vomiting
- Dizziness
- Headache

- Loss of appetite
- Abdominal pain
- Rash
- Fever
- Chills
- Blurred vision
- Tinnitus (ringing in the ears)
- Hearing loss

Streptomycin has been shown to be highly effective in treating tuberculosis when used in combination with other antibiotics and its overuse can contribute to the development of antibiotic-resistant bacteria.

Long-term use of streptomycin can cause kidney damage and hearing loss, particularly in elderly patients or those with pre-existing kidney problems. It can also cause allergic reactions, including anaphylaxis, in some patients.

Streptomycin should be used with caution in patients with pre-existing kidney problems or hearing loss. Patients with a history of allergies to antibiotics should also be monitored closely for allergic reactions. Streptomycin is not recommended for use during pregnancy, as it can cross the placenta and cause hearing loss in the developing fetus. It is also not recommended for use in breastfeeding mothers, as it can be excreted in breast milk and cause hearing loss in the infant.

Streptomycin can interact with other drugs, particularly those that affect the kidneys or the auditory system. Patients taking other antibiotics, diuretics, or medications that can cause hearing loss should be monitored closely for side effects. Streptomycin can also enhance the effects of muscle relaxants and anesthetics, so caution should be used when administering these drugs together.

While streptomycin has been an important tool in the treatment of tuberculosis and other bacterial infections, its use should be carefully monitored to prevent the development of antibiotic resistance and minimize potential side effects.

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