Silver sulfadiazine

**CAS Number**: 22199-08-2  
**Molecular Weight**: 357.137 g/mol  
**Molecular Formula**: C_{10}H_{9}AgN_{4}O_{2}S  
**Systematic (IUPAC)**: silver(1+) ion 4-{{[(pyrimidin-2-yl)azanidyl]sulfonyl}aniline

**Type**: small molecule

**Description**
Silver sulfadiazine is a sulfa derivative topical antibacterial used primarily on second- and third-degree burns.
Categories
Topical Antibiotic
Anti-Infective Agents, Local
Sulfonamides
Antibacterial Agents

Taxonomy

Kingdom: Organic

Classes
Benzenesulfonamides
Sulfanilamides

Substructures
Anions
Sulfonyls
Aliphatic and Aryl Amines
Benzene and Derivatives
Benzenesulfonamides
Pyrimidines and Derivatives
Heterocyclic compounds
Aromatic compounds
Sulfanilamides
Sulfonamides
Cyanamides
Anilines
Cations
**Pharmacology**

**Indication**: Indicated as an adjunct for the prevention and treatment of wound sepsis in patients with second- and third-degree burns.

**Pharmacodynamics**: Silver sulfadiazine has broad antimicrobial activity. It is bactericidal for many gram-negative and gram-positive bacteria as well as being effective against yeast. Silver sulfadiazine is not a carbonic anhydrase inhibitor and may be useful in situations where such agents are contraindicated.

**Mechanism of action**: Studies utilizing radioactive micronized silver sulfadiazine, electron microscopy, and biochemical techniques have revealed that the mechanism of action of silver sulfadiazine on bacteria differs from silver nitrate and sodium sulfadiazine. Silver sulfadiazine acts only on the cell membrane and cell wall to produce its bactericidal effect. A specific mechanism of action has not been determined, but silver sulfadiazine's effectiveness may possibly be from a synergistic interaction, or the action of each component. Silver is a biocide, which binds to a broad range of targets. Silver ions bind to nucleophilic amino acids, as well as sulphhydryl, amino, imidazole, phosphate, and carboxyl groups in proteins, causing protein denaturation and enzyme inhibition. Silver binds to surface membranes and proteins, causing proton leaks in the membrane, leading to cell death. Sulfadiazine is a competitive inhibitor of bacterial para-aminobenzoic acid (PABA), a substrate of the enzyme dihydropteroate...
synthetase. The inhibited reaction is necessary in these organisms for the synthesis of folic acid.

**Absorption**: Very limited penetration through the skin. Only when applied to very large area burns is absorption into the body generally an issue.

**Toxicity**: Acute oral toxicity (LD50) in rat is 10001 mg/kg.

**Affected organisms**: Yeast and other fungi
Various gram-negative and gram-positive eubacteria

**Uses**
This medication is used with other treatments to help prevent and treat wound infections in patients with serious burns. Silver sulfadiazine works by stopping the growth of bacteria that may infect an open wound. This helps to decrease the risk of the bacteria spreading to surrounding skin, or to the blood where it can cause a serious blood infection (sepsis). Silver sulfadiazine belongs to a class of drugs known as sulfonamides. Silver sulfadiazine must not be used on premature babies or on newborns during the first 2 months of life because of the risk of serious side effects. **OTHER** This section contains uses of this drug that are not listed in the approved professional labeling for the drug but that may be prescribed by your health care professional. Use this drug for a condition that is listed in this section only if it has been so prescribed by your health care professional. This drug may also be used
to help prevent and treat other skin and wound infections (such as skin ulcers).

**How To Use?**
This medication is for use on the skin only. Your health care professional will clean and remove the dead tissue from the wound to help the healing process. Apply this medication to the wound using sterile technique (such as wearing sterile gloves and using sterile application tools), as directed by your doctor, usually 1 to 2 times daily. The layer of medication should be about one-sixteenth of an inch (1-2 millimeters) thick or as directed. The wound should be covered with the cream at all times. Dressings may be applied over the cream, but only if needed. If some of the cream rubs off the wound, reapply it immediately. The cream should also be reapplied immediately after hydrotherapy. Treatment usually continues until the wound is completely healed or until the site is ready for skin grafting. Use this medication regularly to get the most benefit from it. To help you remember, use it at the same time(s) each day. Tell your doctor if your condition persists or if it worsens.

**Drug Interactions**
The effects of some drugs can change if you take other drugs or herbal products at the same time. This can increase your risk for serious side effects or may cause your medications not to work correctly. These drug interactions are possible, but do not always occur. Your doctor or pharmacist can often prevent or manage interactions by changing how you use your medications or by close monitoring. To help your doctor and
pharmacist give you the best care, be sure to tell your 
doctor and pharmacist about all the products you use 
(including prescription drugs, nonprescription drugs, 
and herbal products) before starting treatment with this 
product. While using this product, do not start, stop, or 
change the dosage of any other medicines you are using 
without your doctor's approval. Some products that may 
interact with this drug include: cimetidine, certain drugs 
used to treat diabetes (sulfonylureas such as glipizide, 
glyburide), phenytoin, skin products containing sodium 
sulfacetamide, enzyme products used to break down and 
remove dead skin/tissue from burns and wounds (such 
as collagenase, papain, trypsin). An inactive ingredient in 
some brands of this medication (propylene glycol) may 
be absorbed and may interfere with certain laboratory 
tests, possibly causing false test results. Make sure 
laboratory personnel and all your doctors know you use 
this drug. This document does not contain all possible 
drug interactions. Keep a list of all the products you use. 
Share this list with your doctor and pharmacist to lessen 
your risk for serious medication problems.

**Why is this medication prescribed?**
Silver sulfadiazine, a sulfa drug, is used to prevent and 
treat infections of second- and third-degree burns. It 
kills a wide variety of bacteria. This medication is sometimes prescribed for other uses; 
ask your doctor or pharmacist for more information.

**How should this medicine be used?**
Silver sulfadiazine comes in a cream. Silver sulfadiazine 
usually is applied once or twice a day. Follow the 
directions on your prescription label carefully, and ask
your doctor or pharmacist to explain any part you do not understand. Use silver sulfadiazine exactly as directed. Do not use more or less of it or use it more often than prescribed by your doctor. Do not apply this drug to infants less than 2 months of age. Do not stop using silver sulfadiazine until your doctor tells you to do so. Your burn must be healed so that infection is no longer a problem. Gently wash the burned skin area daily to help remove dead skin. If your burn becomes infected or if your infection worsens, call your doctor.

Before applying the medication, clean the burned area and remove any dead or burned skin. Always wear a sterile, disposable glove when you apply silver sulfadiazine. Cover the cleaned burned area with a 1/16-inch (0.2-centimeter) thickness of cream. Keep the burned area covered with cream at all times; reapply the cream to any area that becomes uncovered.

**What special precautions should I follow?**

Before using silver sulfadiazine, tell your doctor and pharmacist if you are allergic to silver sulfadiazine, sulfa drugs, or any other drugs. Tell your doctor and pharmacist what prescription and nonprescription medications you are taking, including vitamins.

tell your doctor if you have or have ever had liver or kidney disease.

tell your doctor if you are pregnant, plan to become pregnant, or are breast-feeding. If you become pregnant while using silver sulfadiazine, call your doctor.
What should I do if I forget a dose?
Apply the missed dose as soon as you remember it. However, if it is almost time for the next dose, skip the missed dose and continue your regular dosing schedule. Do not apply a double dose to make up for a missed one.

What side effects can this medication cause?
Silver sulfadiazine may cause side effects. Tell your doctor if any of these symptoms are severe or do not go away:
- pain
- burning
- itching
If you experience any of the following symptoms, call your doctor immediately:
- unusual bleeding or bruising
- fever
- sore throat
- yellowing of the skin or eyes
- blood in urine
- aching joints
- unusual weakness or tiredness
- skin rash

What storage conditions are needed for this medicine?
Keep this medication in the container it came in, tightly closed, and out of reach of children. Store it at room temperature and away from excess heat and moisture (not in the bathroom). Throw away any medication that is outdated or no longer needed. Talk to your pharmacist about the proper disposal of your medication.
What other information should I know?

Keep all appointments with your doctor. Silver sulfadiazine is for external use only. Do not let silver sulfadiazine get into your eyes, nose, or mouth, and do not swallow it. Do not apply dressings, bandages, cosmetics, lotions, or other skin medications to the area being treated unless your doctor tells you. Do not let anyone else use your medication. Ask your pharmacist any questions you have about refilling your prescription.

Tell your doctor if your skin condition gets worse or does not go away.

It is important for you to keep a written list of all of the prescription and nonprescription (over-the-counter) medicines you are taking, as well as any products such as vitamins, minerals, or other dietary supplements. You should bring this list with you each time you visit a doctor or if you are admitted to a hospital. It is also important information to carry with you in case of emergencies.
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