

**Product Name**

Name: Penicillin-Streptomycin Nystatin Solution  
10000 units/mL Penicillin G Sodium Salt  
10 mg/mL Streptomycin Sulfate, 1250 units/mL Nystatin

Cat. No.: C3422-0100

Size: 100 mL

**Product Description**

Penicillin-Streptomycin-Nystatin is an antibiotic combination solution composed of aminoglycoside- $\beta$  lactam moieties and Nystatin. The aminoglycoside- $\beta$  lactam combination accords broad-spectrum bacteriocidal activity against both gram-positive and gram-negative bacteria. The mode of action (MOA) of Penicillin G interferes with the final stage of bacterial cell wall synthesis causing disruption of the osmotic pressure gradient across the cell wall with ensuing lysis and cell death, whereas the MOA of streptomycin sulfate modifies the permeability of the cell wall, interferes with protein synthesis and cellular respiration by irreversibly binding to the 30S ribosome subunit to cause a misreading/miscoding of mRNA. In essence, this activity freezes the 30S initiation complex (i.e., 30S-mRNA-tRNA) and interrupts any further progress in the initiation phase to chain-elongating ribosome. Both antibiotics, penicillin combined with streptomycin, synergistically enhance their range of activities and increase their effectiveness as opposed to when they are utilized on an individual basis.

Nystatin is a mixture of anti-mycotic polyenes, like amphotericin B, and is used in cell culture for the control of fungi, yeasts and molds. This polyene macrolide antimycotic, generally termed nystatins, like many other antifungals and antibiotics are of bacterial origin. Nystatin has been isolated from the soil actinomycete, *Streptomyces noursei*. The mode of action (MOA) of this family is exhibited by its ability to bind to steroidal alcohols (e.g., cholesterol, cholestanol), specifically ergosterol, in the cell membrane of susceptible fungi by creating transmembrane channels in the cell membrane per se thereby increasing membrane permeability.

The resultant loss of cations (e.g.,  $K^+$ ,  $Na^+$ ,  $H^+$ ), and/or other low molecular weight substances including sugars, amino acids or nucleotides, the increase or amplification of  $Na^+/K^+$  pump activity in addition to the inhibitory effect through these channels in the extracellular space of several membrane-bound enzymes, collectively and in concert, all contribute to the demise of these types of organisms. Nystatin is primarily fungistatic at low concentrations against biphasic fungi, *Dermatophyta* and molds. It is also effective against yeasts. These intermolecular hydrogen bonding interactions among the carboxyl, hydroxyl and amino groups stabilize the channel pore causing the cytoplasmic contents to leak out. It may be toxic to some insect cell types.

The current role of this anti-mycotic selective ionophore in cell culture is multi-faceted and may be divided into several principal functions.

- Anti-mycotic spectrum only (not bactericidal or virucidal)
- Interacts with the fungal cell membranes by increasing cell-membrane permeability by providing a pathway for  $H^+$  flow
- 100% pharmacokinetic activity

On the one hand, the efficacy of the Penicillin-Streptomycin-Nystatin Solution synergistic combination is accomplished when two individual bactericidal drugs interfere with different constituents in the bacterial cellular or metabolic pathways. The result is an effect greater than individual actions. In theory, a drug affecting the permeability of the cell membrane (e.g., streptomycin) plus a drug affecting the cell wall (e.g., penicillin) used in combination may be more effective than either drug used alone. On the other, nystatin has no antibacterial activity but may be fungistatic or fungicidal based on dose concentration. In sum, VivaCell's Penicillin-Streptomycin-Nystatin Solution is an effective antimicrobial combination solution offering a wide spectrum of activity by serving as a drug of choice that is most active against potential pathogenic microorganisms or one of the least toxic alternatives available for cell culture.

**Important Note:** In some cases, some antibiotics when used in combination often exert atypical cytotoxic effects at lower concentrations than when utilized on an individual basis. Please consult other comprehensive pharmacology references regarding antibiotic properties, characteristics, interactions and possible incompatibilities.

### **Predominant Characteristics**

- Easy-to-use
- Synergistic anti-bactericidal broad-spectrum combination antibiotic
- A cationic selective anti-mycotic ionophore with fungistatic-fungicidal activity
- Frozen solution
- Sterility tested

### **Storage and Stability**

The product should be kept at **-20°C**.

The product is **light-sensitive** and therefore should not be left in the light.

Shelf life: 15 months from date of manufacture

### **Procedure**

1. Take a bottle out from the freezer and read the label.
2. Thaw to room temperature.
3. Ensure that the cap of the bottle is tight.
4. Gently swirl the solution in the bottle to ensure homogeneity.
5. Wipe the outside of the bottle with a disinfectant solution such as 70% ethanol.
6. Take out appropriate amount of the solution using aseptic/sterile technique under a laminar flow culture hood.

### **Quality Control**

Penicillin-Streptomycin Nystatin Solution is tested for sterility.

### **Precaution and Disclaimer**

For research use only, not for clinical diagnosis, and treatment.