

## G418 Sulfate

G418 is an aminoglycoside active against aerobic and facultative aerobic gram-negative bacilli, as well as some gram-positive bacteria. In general, this antibiotic is used for selection of transformants expressing an aminoglycoside-modifying enzyme. The structure of G418 consists of the dibasic cyclitol ring, 2-deoxystreptamine, linked to aminated sugars through a glycosidic bond.

Aminoglycosides bind irreversibly to ribosomes and inhibit protein synthesis by disrupting their proofreading capability, leading for pre-termination or mistranslation.<sup>3</sup> Inhibition of synthesis is most effective on actively growing cells.

The structural uniqueness of G418 stems from a hydroxyl function rather than an amino function at the C-6's position.<sup>1</sup> This difference enables specific binding to the 80S ribosome complex and thereby makes G418 a more effective inhibitor of eukaryotic protein synthesis as compared to other aminoglycosides that bind non-specifically to eukaryotic cells.<sup>2</sup>

G418 inhibitors include a class of aminoglycoside-modifying enzymes, the aminoglycoside phosphotransferases (APH), that covalently modify the antibiotic's amino or hydroxyl functions to weaken the drug-ribosome interaction.<sup>4</sup> Aminoglycoside-modifying enzymes are associated with plasmids and transposons; in aph(3) gene is a common resistance marker associated with Tn5.

The effective killing concentration of the antibiotic will vary as to cell type, media, growth conditions, density, and the cell's metabolic rate and position in the cell cycle. When using G418 Sulfate in a new cell system, a full dose curve is suggested, and with each new lot of G418 Sulfate, several points on that curve should be retested.

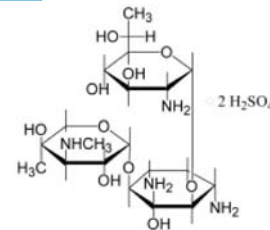
### Molecular Weight:

692.7

### Molecular Formula:

$C_{20}H_{40}N_4O_{10} \cdot 2H_2SO_4$

### Molecular Structure:



### Mode of Action:

Binds to the 30S ribosomal subunit and affects the fidelity of translation.

### Conferred Resistance:

Aminoglycoside-modifying enzymes, and change in cell permeability, or a change in ribosomal structure.

### Spectrum:

Gram (+)

Gram (-) bacilli aerobes and facultative anaerobes, only.

### Microbiological Potency:

Liquid:  $\geq 700$  mg/mg - powder

Powder: 50 +/- Mg/ml - Liquid

G418 is soluble in water (50 mg/ml)

### Common Effectiveness Range:

100-5,000 mg/mL

### Appearance:

Liquid: Colorless

Powder: White to off-white powder

### Storage:

Liquid: 2°C to 8°C

Powder: 2°C to 8°C, protected from light

### G418 Sulfate

Powder	61-234-RF	1 x 1 g
	61-234-RG	1 x 5 g
	61-234-RK	1 x 50 g
50 mg/mL	30-234-CR	1 x 20 mL

### References:

<sup>1</sup>Mingeot-Leclercq et al. "Aminoglycosides: Activity and Resistance" Antimicrobial Agents and Chemotherapy. 42 (2): 727 (April 1999)

<sup>2</sup>Mingeot-Leclercq et al. 42 (4) 727

<sup>3</sup>Mingeot-Leclercq et al. 42 (4) 727

<sup>4</sup>Mingeot-Leclercq et al. 42 (4) 727