Clotrimazole
PRODUCT DATA SHEET

issue date 01/06/2020

Product Name:	Clotrimazole
Product Number:	C037
CAS Number:	23593-75-1
Molecular Formula:	$C_{22}H_{17}ClN_2$
Molecular Weight:	344.84
Form:	Powder
Appearance:	White crystalline powder
Solubility:	freely soluble in water (30 mg/mL)
Source:	Synthetic
Melting Point:	141- 145°C
Storage Conditions:	2-8°C
Description:	Clotrimazole is a broad-spectrum antifungal. It falls into the imidazole subclass of azole compounds, which interfere with the biosynthesis of ergosterol, a major membrane component of the fungal cytoplasmic membrane. It was discovered in 1969 and was developed by Schering Plough. It inhibits $Ca2^+$-activated potassium channels. The compound has promising anti-cancer effects. It is an CYP450 enzyme inhibitor. It is freely soluble in water.
Mechanism of Action:	Clotrimazole increases fungal cell permeability by inhibiting ergosterol synthesis, a major cell membrane component found exclusively in fungi, thus is fungistatic and inhibits fungal growth. Specifically, it inhibits the microsomal cytochrome P450-dependent 14α-demethylase, which is critical to ergosterol biosynthesis.
Spectrum:	Clotrimazole is broad-spectrum, targeting a broad range of fungi including *Candida* and *Aspergillus* species.
Cancer Applications	Clotrimazole has promising anti-cancer effects, interfering with glycolytic enzymes, specifically their cellular distribution and their activity. Cell lines from human breast tissue (MCF10A, MCF-7 and MDA-MB-231) were used, and Clotrimazole induced a dose-dependent decrease in glucose uptake in all three cell lines, affecting the metabolism, growth, and migration of human breast cancer cell lines. It was non-toxic to non-tumor human breast cell lines (Furtado et al, 2012).

References:

Crowley PD and Gallagher HC (2014) Clotrimazole as a pharmaceutical: Past, present, and future. J. Appl. Microbiol. 117(3):611-617

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Jensen BS, Strøbaek D, Olesen SP, Christophersen P (2001) The Ca2+-activated K+ channel of intermediate conductance: a molecular target for novel treatments? Curr Drug Targets. 2(4):401-422 PMID 11732639

Rice LB and Ghannoum MA (1999) Antifungal agents: Mode of action, mechanisms of resistance, and correlation of these mechanisms with bacterial resistance. Clin. Microbiol. Rev. 12(4):501-517 PMID 10515900

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