

Product Information

Strychnine hydrochloride

Product Number **S 8753**
Store at Room Temperature

Product Description

Molecular Formula: $C_{21}H_{22}N_2O_2 \text{ HCl}$

Molecular Weight: 370.9

CAS Number: 1421-86-9

λ_{max} : 254 nm

Extinction Coefficient: $E^{\text{mM}} = 12.59$ (ethanol)¹

Rotation: - 28.3 (water, 7 mg/ml, 25 °C)¹

pK_A : 2.3, 8.0 (25 °C)²

Strychnine is a poisonous alkaloid extract obtained from the dried ripe seeds of *Strychnos nux vomica*, a small tree of the East Indies. It is obtained as a white crystalline substance, having a very bitter acrid taste, and is used in research as a powerful neurostimulant.

Strychnine is rapidly absorbed from the gastrointestinal tract (mainly from the intestine), nasal passages, or from injection sites and exerts its effects on the central nervous system.³ This compound causes deepened respiration and decreased stroke volume of the heart through excitation of the vagal center.⁴ The olfactory cortex, auditory cortex, somatosensory cortex, and visual cortex are rendered more acute by stimulation of strychnine, respectively on the frontal, temporal, parietal, and occipital lobes of the brain. The action of strychnine also raises epinephrine levels and thus increases systemic blood pressure by direct stimulation of the sympathetic nervous system on the smooth muscle of the arterioles. This action can be of great value in reducing cardiac failure. The most direct symptoms caused by strychnine are violent convulsions due to the simultaneous stimulation of the motor or sensory ganglia of the spinal cord. This can be of value during chronic lead poisoning and during surgical shock. Strychnine can also be used as an antidote in chloroform poisoning. It has also been shown to diminish the motile power of leukocytes and may even stop their motion.⁵

Strychnine has been shown to be an inhibitory neurotransmitter at strychnine sensitive ionotropic glycine_A receptors, classifying this drug as a glycine antagonist. This effect was first demonstrated in spinal cord membranes and results in the muscular contractions and tetany as a result of glycinergic

disinhibition and overexcitation.⁶ In addition, strychnine has been shown to antagonize the response of retinal ganglion cells to glycine. In all ganglion cells, 10⁻⁵ M strychnine was shown to eliminate the transient inhibitory events which occur at the onset and termination of a light stimulus.⁷

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

This product is soluble in water (25 mg/ml).^{3,8}

References

1. CRC Handbook of Chemistry and Physics, 69th ed., Lide, D. R., ed., CRC press (Boca Raton, FL: 1988) p. C-498.
2. Clarke's Isolation and Identification of Drugs, 2nd ed., Moffat, A. C., et al., eds, The Pharmaceutical Press (London, GB: 1986), p. 977.
3. Martindale The Extra Pharmacopoeia, 30th ed., Reynolds, J. E. F., ed., The Pharmaceutical Press (London, England: 1993), p. 1557.
4. St-John, W. M., and Leiter, J. C., Gasping is elicited by briefer hypoxia or ischemia following blockade of glycinergic transmission. *Respir. Physiol. Neurobiol.*, **133(1-2)**, 167-171 (2002).
5. Wheeler, M., et al., Glycine-gated chloride channels in neutrophils attenuate calcium influx and superoxide production. *FASEB J.*, **14(3)**, 476-84 (2000).
6. Breiting, H. G., and Becker, C. M., The inhibitory glycine receptor-simple views of a complicated channel. *ChemBioChem*, **3(11)**, 1042-1052 (2002).
7. Belgum, J. H., et al., Strychnine blocks transient but not sustained inhibition in mudpuppy retinal ganglion cells, *The Journal of Physiology*, **354**, 273-286 (1984).
8. Data for Biochemical Research, 3rd ed., Dawson, R. M. C., et al., Oxford University Press (New York, NY: 1986), p. 348.

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