

# DRUGBANK

Open Data Drug & Drug Target Database



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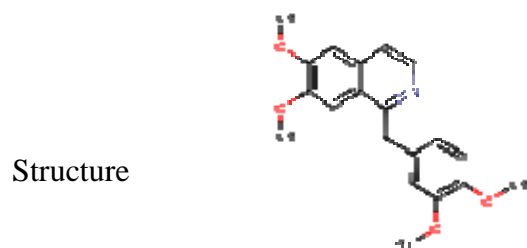
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## Identification

Name **Papaverine**  
Accession Number **DB01113** (APRD00628, DB07725)

Type small molecule  
 Groups approved  
 Description An alkaloid found in opium but not closely related to the other opium alkaloids in its structure or pharmacological actions. It is a direct-acting smooth muscle relaxant used in the treatment of impotence and as a vasodilator, especially for cerebral vasodilation. The mechanism of its pharmacological actions is not clear, but it apparently can inhibit phosphodiesterases and it may have direct actions on calcium channels. [PubChem]



Download: [MOL](#) | [SDF](#) | [SMILES](#) | [InChI](#)  
 Display: [2D Structure](#) | [3D Structure](#)

- Synonyms
- Chlorhydrate de Papaverine
  - Papavarine Chlorhydrate
  - Papaverin
  - Papaverine Chlorohydrate
  - Papaverine Hcl
  - Papaverine Hydrochloride
  - Papaverine Monohydrochloride
  - Papaverinium Chloride

- Synonyms
- Chlorhydrate de Papaverine
  - Papavarine Chlorhydrate
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  - Papaverine Hcl
  - Papaverine Hydrochloride
  - Papaverine Monohydrochloride
  - Papaverinium Chloride

Salts Not Available

- | Name        | Company |
|-------------|---------|
| Alapav      |         |
| Artegodan   |         |
| Cardiospan  |         |
| Cardoverina |         |
| Cepaverin   |         |
| Cerebid     |         |
| Cerespan    |         |
| Delapav     |         |

Dilaves  
Dispamil



Brand mixtures Not Available

Categories

- Vasodilator Agents
- Phosphodiesterase Inhibitors

CAS number 61-25-6

Weight Average: 339.385  
Monoisotopic: 339.147058165

Chemical Formula C<sub>20</sub>H<sub>21</sub>NO<sub>4</sub>

InChI Key InChIKey=XQYZDYMELSDJRZ-UHFFFAOYSA-N

InChI InChI=1S/C20H21NO4/c1-22-17-6-5-13(10-18(17)23-2)9-16-15-12-20(25-4)19(24-3)11-14(15)7-8-21-16/h5-8,10-12H,9H2,1-4H3

[Plain Text](#)

IUPAC Name 1-[(3,4-dimethoxyphenyl)methyl]-6,7-dimethoxyisoquinoline

SMILES COC1=C(OC)C=C(CC2=NC=CC3=CC(OC)=C(OC)C=C23)C=C1

[Plain Text](#)

Mass Spec Not Available

### Taxonomy

Kingdom Organic

Classes

- Benzylisoquinolines

Substructures

- Phenols and Derivatives
- Benzylisoquinolines
- Pyridines and Derivatives
- Ethers
- Benzene and Derivatives
- Catechols
- Heterocyclic compounds
- Aromatic compounds
- Anisoles
- Imines
- (Iso)quinolines and Derivatives
- Phenyl Esters

### Pharmacology

Indication For the treatment of impotence and vasospasms.

Pharmacodynamics Papaverine is a nonxanthine phosphodiesterase inhibitor for the relief of cerebral and peripheral ischemia associated with arterial spasm and myocardial ischemia complicated by arrhythmias. The main actions of Papaverine are exerted on cardiac and smooth muscle. Like qathidine, Papaverine acts directly on the heart muscle to depress conduction and prolong the refractory period. Papaverine relaxes various smooth muscles. This relaxation may be prominent if spasm exists. The muscle

cell is not paralyzed by Papaverine and still responds to drugs and other stimuli causing contraction. The antispasmodic effect is a direct one, and unrelated to muscle innervation. Papaverine is practically devoid of effects on the central nervous system. Papaverine relaxes the smooth musculature of the larger blood vessels, especially coronary, systemic peripheral, and pulmonary arteries.

Perhaps by its direct vasodilating action on cerebral blood vessels, Papaverine increases cerebral blood flow and decreases cerebral vascular resistance in normal subjects; oxygen consumption is unaltered. These effects may explain the benefit reported from the drug in cerebral vascular encephalopathy.

Mechanism of action

Absorption

Not Available

Volume of distribution

Not Available

Protein binding

~90%

Metabolism

Not Available

Route of elimination

Not Available

Half life

0.5-2 hours

Clearance

Not Available

Toxicity

Not Available

Affected organisms

- Humans and other mammals

Pathways

Not Available

### Pharmacoeconomics

Manufacturers

Not Available

- [Allergy Laboratories Inc.](#)
- Amend
- [American Regent](#)
- [A-S Medication Solutions LLC](#)
- [Ben Venue Laboratories Inc.](#)
- C.O. Truxton Inc.
- [Claris Lifesciences Inc.](#)
- [Dispensing Solutions](#)
- [Ebewe Pharma](#)
- Eon Labs
- [Hope Pharmaceuticals](#)
- Kaiser Foundation Hospital
- [Luitpold Pharmaceuticals Inc.](#)
- [Major Pharmaceuticals](#)
- [Meridian Medical Technologies Inc.](#)
- [Physicians Total Care Inc.](#)
- [Qualitest](#)
- Taylor Pharmaceuticals
- [Time-Cap Labs](#)

Packagers

Dosage forms	<b>Form</b>	<b>Route</b>	<b>Strength</b>
	Liquid	Intravenous	
Prices	<b>Unit description</b>	<b>Cost</b>	<b>Unit</b>
	Papaverine 150 mg capsule sa	1.86 USD	capsule
	Papaverine 60 mg/2 ml vial	1.68 USD	ml
	Papaverine hcl powder	0.76 USD	g
	Para-time 150 mg capsule sa	0.23 USD	capsule

Patents Not Available

### Properties

State solid

Melting point Not Available

Experimental Properties	Property	Value	Source
	logP	3	<a href="#">PhysProp</a>

	Property	Value	Source
	water solubility	1.29e-02 g/l	<a href="#">ALOGPS</a>
	logP	4.19	<a href="#">ALOGPS</a>
	logP	3.08	<a href="#">ChemAxon</a> <a href="#">Molconvert</a>
	logS	-4.4	<a href="#">ALOGPS</a>
	pKa	0	<a href="#">ChemAxon</a> <a href="#">Molconvert</a>
Predicted Properties	hydrogen acceptor count	5	<a href="#">ChemAxon</a> <a href="#">Molconvert</a>
	hydrogen donor count	0	<a href="#">ChemAxon</a> <a href="#">Molconvert</a>
	polar surface area	49.81	<a href="#">ChemAxon</a> <a href="#">Molconvert</a>
	rotatable bond count	6	<a href="#">ChemAxon</a> <a href="#">Molconvert</a>
	refractivity	95.52	<a href="#">ChemAxon</a> <a href="#">Molconvert</a>
	polarizability	36.57	<a href="#">ChemAxon</a> <a href="#">Molconvert</a>













### References

Synthesis Reference Not Available

1. Tang Y, Luan J, Zhang X: Accelerating tissue expansion by application of topical papaverine cream. *Plast Reconstr Surg.* 2004 Oct;114(5):1166-9. [Pubmed](#)
2. Liu JK, Couldwell WT: Intra-arterial papaverine infusions for the treatment of cerebral vasospasm induced by aneurysmal subarachnoid hemorrhage. *Neurocrit Care.* 2005;2(2):124-32. [Pubmed](#)

General Reference

3. Takeuchi K, Sakamoto S, Nagayoshi Y, Nishizawa H, Matsubara J: Reactivity of the human internal thoracic artery to vasodilators in coronary artery bypass grafting. Eur J Cardiothorac Surg. 2004 Nov;26(5):956-9. [Pubmed](#)

	<b>Resource</b>	<b>Link</b>
External Links	KEGG Compound	<a href="#">C06533</a> 
	PubChem Compound	<a href="#">4680</a> 
	PubChem Substance	<a href="#">46508003</a> 
	ChemSpider	<a href="#">4518</a> 
	BindingDB	<a href="#">14754</a> 
	Therapeutic Targets Database	<a href="#">DAP000959</a> 
	PharmGKB	<a href="#">PA450779</a> 
	HET	<a href="#">EV1</a> 
	Drug Product Database	<a href="#">9881</a> 
	RxList	<a href="http://www.rxlist.com/cgi/generic/papaverine.htm">http://www.rxlist.com/cgi/generic/papaverine.htm</a> 
Drugs.com	<a href="http://www.drugs.com/cdi/papaverine.html">http://www.drugs.com/cdi/papaverine.html</a> 	
Wikipedia	<a href="http://en.wikipedia.org/wiki/Papaverine">http://en.wikipedia.org/wiki/Papaverine</a> 	
ATC Codes	<ul style="list-style-type: none"> <li>• A03AD01</li> <li>• G04BE02</li> </ul>	
	AHFS Codes	<ul style="list-style-type: none"> <li>• 24:12.92</li> </ul>
PDB Entries	Not Available	
FDA label	Not Available	
MSDS	<a href="#">show</a> (74.4 KB)	

#### Interactions

	<b>Drug</b>	<b>Interaction</b>
Drug Interactions	<a href="#">Treprostinil</a>	Additive hypotensive effect. Monitor antihypertensive therapy during concomitant use.
Food Interactions	Not Available	




#### Targets

##### 1. [cAMP-specific 3',5'-cyclic phosphodiesterase 4B](#)

Pharmacological action: **yes**

Actions: **inhibitor**

May be involved in mediating central nervous system effects of therapeutic agents ranging from antidepressants to antiasthmatic and anti-inflammatory agents

Organism class: **human**  
UniProt ID: [Q07343](#)   
Gene: [PDE4B](#)   
Protein Sequence: [FASTA](#)  
Gene Sequence: [FASTA](#)  
SNPs: [SNPJam Report](#) 




References:

1. Overington JP, Al-Lazikani B, Hopkins AL: How many drug targets are there? Nat Rev Drug Discov. 2006 Dec;5(12):993-6. [Pubmed](#)
2. Imming P, Sinning C, Meyer A: Drugs, their targets and the nature and number of drug targets. Nat Rev Drug Discov. 2006 Oct;5(10):821-34. [Pubmed](#)
3. Xin ZC, Kim EK, Lin CS, Liu WJ, Tian L, Yuan YM, Fu J: Effects of icariin on cGMP-specific PDE5 and cAMP-specific PDE4 activities. Asian J Androl. 2003 Mar;5(1):15-8. [Pubmed](#)
4. Zhu S, Gan Z, Li Z, Liu Y, Yang X, Deng P, Xie Y, Yu M, Liao H, Zhao Y, Zhao L, Liao F: The measurement of cyclic nucleotide phosphodiesterase 4 activities via the quantification of inorganic phosphate with malachite green. Anal Chim Acta. 2009 Mar 16;636(1):105-10. Epub 2009 Jan 22. [Pubmed](#)

## **[2. cAMP and cAMP-inhibited cGMP 3',5'-cyclic phosphodiesterase 10A](#)**

Pharmacological action: **unknown**  
Actions: **inhibitor**

Plays a role in signal transduction by regulating the intracellular concentration of cyclic nucleotides. This enzyme can hydrolyze both cAMP and cGMP, having a higher affinity for cAMP

Organism class: **human**  
UniProt ID: [Q9Y233](#)   
Gene: [PDE10A](#)   
Protein Sequence: [FASTA](#)  
Gene Sequence: [FASTA](#)  
SNPs: [SNPJam Report](#) 

References:

1. Weber M, Breier M, Ko D, Thangaraj N, Marzan DE, Swerdlow NR: Evaluating the antipsychotic profile of the preferential PDE10A inhibitor, papaverine. Psychopharmacology (Berl). 2009 May;203(4):723-35. Epub 2008 Dec 9. [Pubmed](#)