

# Vasodilators

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## Introduction

- ❖ Vasodilators are a group of medicines that dilate blood vessels, which allows blood to flow more easily.
- ❖ These drugs increase the blood flow without increasing the work of the heart.
- ❖ They're used to treat or prevent: High blood pressure (hypertension) Heart failure.
- ❖ They are also used for the treatment of the diseases of coronary artery called angina pectoris.

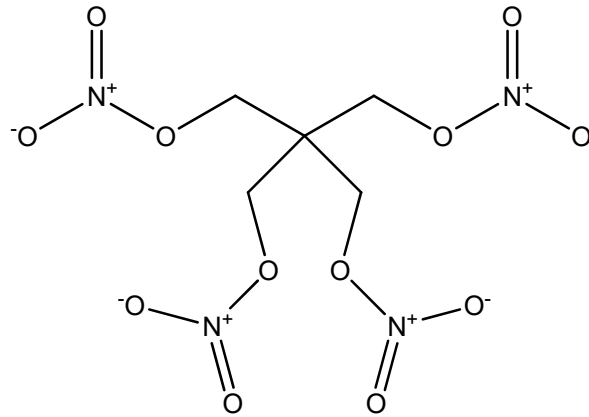
## Amyl nitrite



**MOA:** It is converted to nitric oxide (NO). Nitric oxide binds reversibly to the ferrous-heme center of *guanylate cyclase*, causing conformational change and activating the enzyme. This enzyme activation results in increased cellular concentrations of cyclic guanosine monophosphate (cGMP) within the vascular smooth muscle, resulting in vasodilation mediated by cGMP-dependent protein kinases. This process eventually leads to increased blood flow in veins, arteries and cardiac tissue.

**Uses:** Amyl nitrite is employed medically to treat heart diseases such as angina and to treat cyanide poisoning.

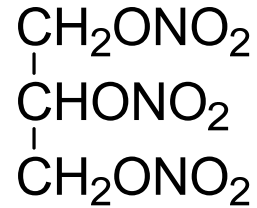
## Pentaerythritol tetranitrate



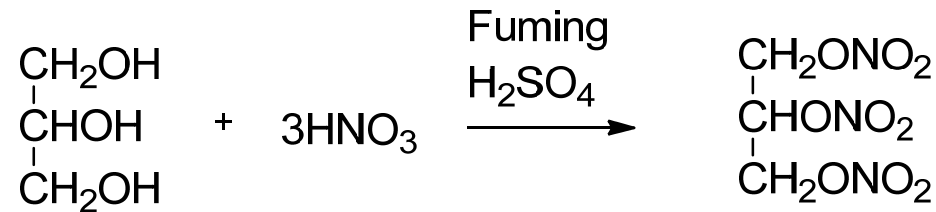
**MOA:** Pentaerythritol tetranitrate is the lipid soluble polyol ester of nitric acid belonging to the family of *nitro-vasodilators*. Pentaerythritol tetranitrate releases free nitric oxide (NO) after the denitration reaction. Nitric oxide binds reversibly to the ferrous-heme center of *guanylate cyclase*, causing conformational change and activating the enzyme. This enzyme activation results in increased cellular concentrations of cyclic guanosine monophosphate (cGMP) within the vascular smooth muscle, resulting in vasodilation mediated by cGMP-dependent protein kinases. This process eventually leads increased blood flow in veins, arteries and cardiac tissue.

**Uses:** Used for the treatment of angina pectoris.

# Nitroglycerin



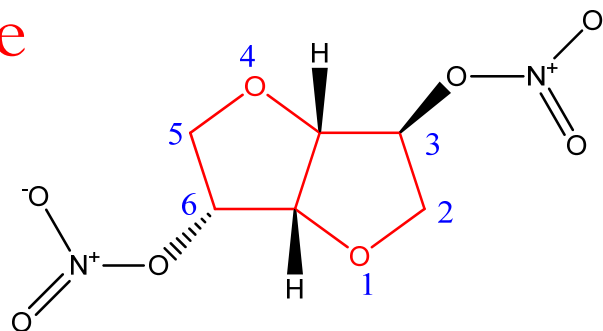
IUPAC: 1,2,3-propantrinitrate



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**Uses:** It is indicated to prevent and treat angina or chest pain due to cardiovascular disease, as well as to treat peri-operative hypertension or induce intra-operative hypotension. It is also indicated to treat acute heart failure in patients with myocardial infarction.

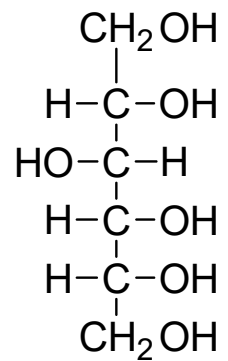
## Isosorbide dinitrite



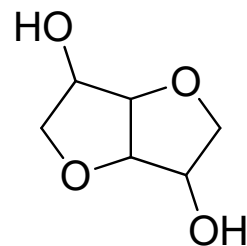
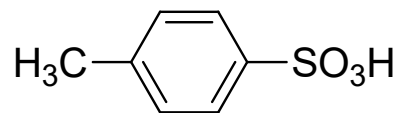
IUPAC: 6-nitrooxyhexahydrofuro[2,3-d]furan-3-yl] nitrate

MOA: It is converted to nitric oxide (NO). Nitric oxide binds reversibly to the ferrous-heme center of *guanylate cyclase*, causing conformational change and activating the enzyme. This enzyme activation results in increased cellular concentrations of cyclic guanosine monophosphate (cGMP) within the vascular smooth muscle, resulting in vasodilation mediated by cGMP-dependent protein kinases. This process eventually leads to increased blood flow in veins, arteries and cardiac tissue.

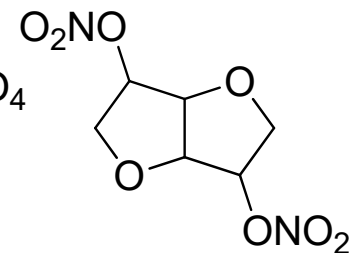
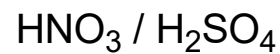
Uses: For the prevention of angina pectoris due to coronary artery disease.



D-sorbite

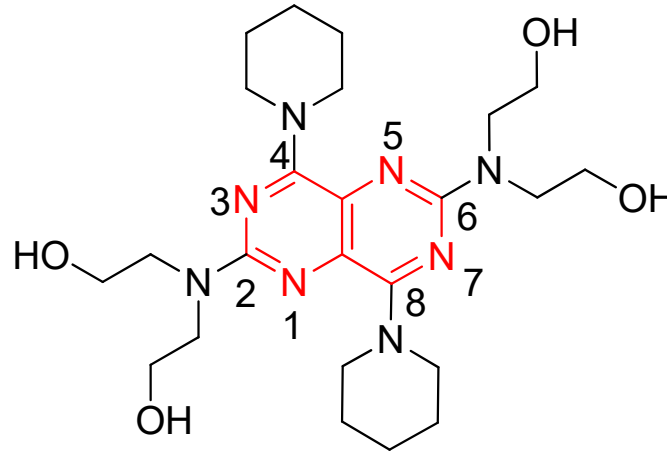


isosorbide





## Dipyridamole



IUPAC: 2-( {6-[bis(2-hydroxyethyl)amino]-4,8-bis(piperidin-1-yl)-[1,3] diazino[5,4-d]pyrimidin-2-yl} (2-hydroxyethyl)amino)ethan-1-ol

MOA: Dipyridamole likely inhibits both adenosine deaminase and phosphodiesterase, preventing the degradation of cAMP, an inhibitor of platelet function. This elevation in cAMP blocks the release of arachidonic acid from membrane phospholipids and reduces thromboxane A<sub>2</sub> activity. Dipyridamole also directly stimulates the release of prostacyclin, which induces adenylate cyclase activity, thereby raising the intraplatelet concentration of cAMP and further inhibiting platelet aggregation.

Uses: Used in the prevention of postoperative thromboembolic complications of cardiac valve replacement and also used in prevention of angina.