Piperazine

CAS Number: 110-85-0
Molecular Formula: C₄H₁₀N₂
Molecular Weight: 86.135 g/mol
Systematic (IUPAC): piperazine

Type: small molecule

Categories
Anthelmintics
Antinematodal Agents
Taxonomy

Kingdom: Organic

Classes
Piperazines

Substructures
Aliphatic and Aryl Amines
Piperazines
Heterocyclic compounds

Pharmacology

Indication: Used as alternative treatment for ascariasis caused by Ascaris lumbricoides (roundworm) and enterobiasis (oxyuriasis) caused by Enterobius vermicularis (pinworm). It is also used to treat partial intestinal obstruction by the common roundworm, a condition primarily occurring in children.

Pharmacodynamics: Piperazine is an anthelmintic especially useful in the treatment of partial intestinal obstruction caused by Ascaris worms, which is a condition primarily seen in children. Piperazine hydrate and piperazine citrate are the main anthelmintic piperazines.

Mechanism of action: Piperazine is a GABA receptor agonist. Piperzine binds directly and selectively to muscle membrane GABA receptors, presumably causing
hyperpolarization of nerve endings, resulting in flaccid paralysis of the worm. While the worm is paralyzed, it is dislodged from the intestinal lumen and expelled live from the body by normal intestinal peristalsis.

**Absorption** : Rapidly absorbed from the gastrointestinal tract

**Protein binding** : 60-70%

**Metabolism** : About 25% is metabolized in the liver. Piperazine is nitrosated to form N-mononitrosopiperazine (MNPz) in gastric juice, which is then metabolized to N-nitroso-3-hydroxypyrrolidine (NHPYR).

**Toxicity** : LD₅₀ = 5 g/kg (Human, oral). Symptoms of overdose include muscle fatigue, seizures, and difficulty breathing.

**Affected organisms** : Parasitic nematodes and other roundworms

**Description**

Piperazine belongs to the family of medicines called anthelmintics. Anthelmintics are used in the treatment of worm infections. Piperazine is used to treat: common roundworms (ascariasis) and pinworms (enterobiasis; oxyuriasis). Piperazine works by paralyzing the worms. They are then passed in the stool.
Piperazine is available only with your doctor's prescription.

**Proper Use**
No special preparations or other steps (for example, special diet, fasting, other medicines, laxatives, or enemas) are necessary before, during, or immediately after you take piperazine. Piperazine may be taken with or without food or on a full or empty stomach. However, if your doctor tells you to take the medicine a certain way, take it exactly as directed.

For patients taking the granules for oral solution form of piperazine:
Dissolve the contents of 1 packet of granules in 57 mL (about 2 ounces) of water, milk, or fruit juice. Be sure to drink all of the liquid to get the full dose of medicine.
Take this medicine only as directed. Do not take more of it and do not take it more often than your doctor ordered. To do so may increase the chance of serious side effects.

To help clear up your infection completely, take this medicine in regularly spaced doses as ordered by your doctor. In some infections, a second treatment with this medicine may be required to clear up the infection completely. Do not miss any doses.

For patients taking piperazine for pinworms:
Pinworms may be easily passed from one person to another, especially among persons in the same household. Therefore, all household members may have to be treated at the same time to prevent their infection or reinfection.
**Dosing**
The dose of this medicine will be different for different patients. Follow your doctor's orders or the directions on the label. The following information includes only the average doses of this medicine. If your dose is different, do not change it unless your doctor tells you to do so. The amount of medicine that you take depends on the strength of the medicine. Also, the number of doses you take each day, the time allowed between doses, and the length of time you take the medicine depend on the medical problem for which you are using the medicine.

**Before Using piperazine**
In deciding to use a medicine, the risks of taking the medicine must be weighed against the good it will do. This is a decision you and your doctor will make. For piperazine, the following should be considered:

**Allergies**
Tell your doctor if you have ever had any unusual or allergic reaction to piperazine or any other medicines. Also tell your health care professional if you have any other types of allergies, such as to foods, dyes, preservatives, or animals. For non-prescription products, read the label or package ingredients carefully.

**Pediatric**
Children may be especially sensitive to the effects of piperazine. This may increase the chance of side effects during treatment.
**Geriatric**

Many medicines have not been studied specifically in older people. Therefore, it may not be known whether they work exactly the same way they do in younger adults or if they cause different side effects or problems in older people. There is no specific information comparing use of piperazine in the elderly with use in other age groups.

**Interactions with Medicines**

Although certain medicines should not be used together at all, in other cases two different medicines may be used together even if an interaction might occur. In these cases, your doctor may want to change the dose, or other precautions may be necessary. Tell your healthcare professional if you are taking any other prescription or nonprescription (over-the-counter [OTC]) medicine.

**Interactions with Food/Tobacco/Alcohol**

Certain medicines should not be used at or around the time of eating food or eating certain types of food since interactions may occur. Using alcohol or tobacco with certain medicines may also cause interactions to occur. Discuss with your healthcare professional the use of your medicine with food, alcohol, or tobacco.

**Other Medical Problems**

The presence of other medical problems may affect the use of piperazine. Make sure you tell your doctor if you have any other medical problems, especially:

- Kidney disease or
- Liver disease—Patients with kidney or liver disease may have an increased chance of side effects
Seizure disorder, especially a history of epilepsy—Piperazine may make the condition worse

**Missed Dose**
If you miss a dose of this medicine, take it as soon as possible. However, if it is almost time for your next dose, skip the missed dose and go back to your regular dosing schedule. Do not double doses.

**Storage**
Store the medicine in a closed container at room temperature, away from heat, moisture, and direct light. Keep from freezing. Keep out of the reach of children. Do not keep outdated medicine or medicine no longer needed.

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