

Activity 1

Medication Monograph

Medication Name: ALPRAZOLAM

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Historical story:

Alprazolam was discovered by a team led by Dr. Leo Sternbach at Upjohn Laboratories (now a part of Pfizer) in the late 1960s. It was patented in 1971 and approved for medical use in the United States in 1981, Alprazolam, marketed under the trade name Xanax among others, is a medication primarily used for the treatment of anxiety disorders and panic disorders, Xanax was introduced as a medication for anxiety disorders and panic disorders. It belongs to the class of benzodiazepines, which are central nervous system depressants,

Over time, Xanax gained significant popularity due to its effectiveness in managing anxiety and panic disorders. It became one of the most prescribed psychiatric medications in the United States, Due to its potential for abuse and dependence, medical authorities and regulatory bodies have issued guidelines for the safe prescribing and use of alprazolam, emphasizing caution in prescribing it for extended periods and recommending gradual tapering when discontinuing its use, Research into the pharmacology and clinical use of alprazolam continues, with ongoing efforts to develop safer alternatives with reduced potential for abuse and dependence, such as novel anxiolytic medications and non-pharmacological interventions.

Routes of administration in the Egyptian market for this medication

<u>Brand name</u>	<u>Route of administration</u>
Niravam	ORAL
Xycalm	ORAL
Xanax	ORAL
Gabazolamine-05	ORAL

Alprax	ORAL
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Pharmacokinetics

<u>Absorption</u>	Alprazolam is well-absorbed after oral administration, with peak plasma concentrations typically achieved within 1 to 2 hours. The absorption of alprazolam is relatively rapid and complete, with approximately 80-90% of the administered dose being absorbed into the bloodstream. Food can delay the absorption of alprazolam, particularly high-fat meals, but it does not significantly affect the extent of absorption.
<u>Distribution</u>	Alprazolam has a relatively high volume of distribution, indicating that it distributes widely throughout the body's tissues. It crosses the blood-brain barrier and readily distributes into the central nervous system, where it exerts its pharmacological effects. Alprazolam is highly lipophilic, which contributes to its rapid distribution into tissues.
<u>Metabolism</u>	Alprazolam undergoes extensive metabolism in the liver, primarily via the cytochrome P450 enzyme system, with the main enzyme involved being CYP3A4. The primary metabolite formed is α -hydroxyalprazolam, which possesses pharmacological activity similar to that of alprazolam. Other metabolites include 4-hydroxyalprazolam and benzophenone derivatives. These metabolites are then further metabolized and eventually excreted from the body.
<u>Excretion</u>	The elimination half-life of alprazolam is typically around 11 hours in healthy adults. However, this can vary depending on individual factors such as age, liver function, and the presence of other medications. Alprazolam and its metabolites are primarily eliminated through hepatic metabolism, with less than 1% of the dose excreted unchanged in the urine. Drug interactions. (Mention an example to each of the following if present)

IV admixture incompatibility	One example of an IV admixture incompatibility involving alprazolam could be if it were mixed with a solution containing drugs that have a significantly different pH or chemical composition, leading to precipitation, degradation, or other adverse reactions. For instance: 1- <u>Incompatibility with Acidic Solutions</u>: Alprazolam is stable at physiological pH, but mixing it with acidic solutions could potentially lead to degradation or reduced potency. 2- <u>Incompatibility with Basic Solutions</u>: Similarly, mixing alprazolam with basic solutions could also lead to degradation or reduced potency. Incompatibility with Certain Drugs: Alprazolam may interact adversely with certain drugs if combined in an IV admixture. 3- For example, if alprazolam were mixed with another benzodiazepine or a drug that affects the central nervous system, it could potentiate sedation and respiratory
Drug-Drug interaction	When fluconazole is taken concurrently with alprazolam, it can result in prolonged sedation, dizziness, confusion, and impaired coordination. This interaction can potentially increase the risk of accidents or injuries, particularly in tasks requiring mental alertness, such as driving or operating machinery. Patients who are prescribed both alprazolam and fluconazole should be monitored closely for signs of excessive sedation or other adverse effects. Healthcare providers may need to adjust the dosage of alprazolam or consider alternative medications to minimize the risk of adverse reactions.

Drug food interaction	- Grapefruit and grapefruit juice are examples of food items that can interact with <u>alprazolam</u>. Grapefruit contains compounds known as furanocoumarins, which inhibit the activity of the enzyme CYP3A4 in the liver. This enzyme is responsible for metabolizing many medications, including alprazolam. When the activity of CYP3A4 is inhibited, the metabolism of alprazolam slows down, leading to increased blood levels of the drug. - To minimize the risk of interactions, individuals taking alprazolam should avoid consuming grapefruit or grapefruit juice. If someone regularly consumes grapefruit or grapefruit juice and is prescribed alprazolam, they should discuss this with their healthcare provider to determine if any adjustments to their medication regimen are necessary. In some cases, healthcare providers may recommend alternative medications that are not affected by grapefruit interactions.
Drug lab test interaction	- Urine Drug Screening: Alprazolam can produce positive results in urine drug screening tests designed to detect benzodiazepines. Since these tests typically target specific drug metabolites or chemical structures common to benzodiazepines, alprazolam may cross-react with the assay and produce a false-positive result for benzodiazepines. It's essential for healthcare providers and laboratory personnel to be aware of the medications a patient is taking, including alprazolam, to accurately interpret the results of urine drug screening tests. False-positive results can occur due to cross-reactivity, leading to unnecessary concerns or interventions. If alprazolam use is known or suspected, confirmatory testing using more specific methods, such as gas chromatography-mass spectrometry (GC-MS) or liquid chromatography-tandem mass spectrometry (LC-MS/MS), may be necessary to differentiate alprazolam from other benzodiazepines and confirm its presence in the sample.

Pharmacodynamics

Main mechanism of action	Side effects
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ALPRAZOLAM is a medication that target the central nervous system (CNS) to produce calming effects. While they may have slightly different applications, their mechanism of action often overlaps.	• Sleepiness • not feel pain • Nausea, weight gain • Sleep problems • Headache • Constipation • Difficult to focus and think • Addiction

References

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3 Nakajima R, Hattori C, Nagawa Y. Structure-activity relationship of s-triazolo-1,4-benzodiazepines in central nervous depressant action. *Jpn J Pharmacol.* 1971; **21**: 489–95.

4 Nakajima R, Take Y, Moriya R *et al.* Pharmacological studies on new potent central depressants, 8-chloro-6-phenyl-4H-s-triazolo(4,3-a) (1,4)benzodiazepine (D-40TA) and its 1-methyl analogue (D-65MT). *Jpn J Pharmacol.* 1971; **21**: 497–519.