

SPECIFIC PROPERTIES OF ATROPINE SULFATE IN THE HUMAN BODY**Axmedov Shamshod Jamshidovich**

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Abstract. *Atropine sulfate is a widely used anticholinergic drug that affects the parasympathetic nervous system by blocking muscarinic receptors. This article reviews its pharmacological properties, mechanism of action, and its specific physiological effects on various systems of the human body.*

Keywords: *Atropine sulfate, belladonna, bradyarrhythmia, muscarinic receptors.*

Introduction

Atropine sulfate is a tropane alkaloid extracted from plants of the Solanaceae family, such as *Atropa belladonna*. It is commonly used in medicine for its antimuscarinic properties. By competitively inhibiting acetylcholine at muscarinic receptors, atropine sulfate influences several organ systems, making it an essential drug in anesthesia, cardiology, and toxicology.

Pharmacological Properties

Atropine sulfate is a tertiary amine, which allows it to cross the blood-brain barrier. It is well absorbed from the gastrointestinal tract and mucous membranes. After administration, it is distributed throughout the body and metabolized in the liver. Its half-life ranges from 2 to 4 hours in adults.

Mechanism of Action

Atropine sulfate works by blocking the action of acetylcholine on muscarinic receptors in the parasympathetic nervous system. There are five subtypes of muscarinic receptors (M1–M5), and atropine has a non-selective action on all of them. The result is reduced parasympathetic tone, leading to a variety of physiological effects.

Specific Effects on the Body**1. Cardiovascular System**

At low doses, atropine may cause temporary bradycardia due to central vagal stimulation. However, at therapeutic doses, it increases heart rate by inhibiting vagal tone. It is used to treat bradyarrhythmias and in cardiac arrest protocols.

2. Respiratory System

Atropine reduces secretions in the airways, making it useful before surgery to prevent aspiration. It also causes bronchodilation, which is beneficial in some obstructive pulmonary conditions.

3. Ocular System

Topical application of atropine dilates the pupils (mydriasis) and paralyzes the ciliary muscle (cycloplegia), which is useful in ophthalmologic examinations but may cause blurred vision and photophobia.

4. Gastrointestinal System

Atropine decreases gastrointestinal motility and secretion. It is sometimes used to treat irritable bowel syndrome and other hypermotility disorders.

5. Urinary System

It causes relaxation of the smooth muscles in the urinary bladder, which may lead to urinary retention, especially in elderly patients.

6. Central Nervous System

In high doses, atropine can cross the blood-brain barrier and cause CNS effects such as restlessness, hallucinations, and, in toxic doses, coma. These effects are more prominent in children and the elderly.

Clinical Uses

Pre-anesthetic medication

Treatment of bradycardia

Antidote for organophosphate poisoning

Management of peptic ulcers (historically)

Ophthalmologic examinations

Conclusion

Atropine sulfate plays a critical role in modern medicine due to its broad range of actions on the muscarinic receptors throughout the body. Understanding its specific physiological effects is essential for safe and effective clinical use.

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