

## Atropine: The Sagacious Molecule

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### Short Communication

The atropine is an alkaloid obtained from the plant *Atropa belladonna*, known commonly as deadly nightshade [1]. The word “Atropa” in the scientific name of the plant is, on the name of a Greek Goddess Atropa. In Greek mythology, the goddess Atropa was supposed to cut the thread of life of a person, without any regards to his age, sex or quality. The literary meaning of Atropa is unmovable, which appropriately describes the unmovable person, whose thread of life is cut by goddess Atropa. The mention of atropine in the extract of *Atropa belladonna* plant is available in the Ebers papyrus way back to 1550 BC. Its long history of use as poison is referred by authors such as Pliny to Shakespeare.

The term belladonna means “beautiful women”. This term is with reference to its use, by beautiful women, to dilate their pupil, by doing so; they were supposed to look more seductive and supposedly beautiful. The plant extract contains two main alkaloid atropine and scopolamine. Its name was given by Linnaeus in 1753 due to its toxic and para-sympatholytic properties. Atropine itself was discovered in 1809 by Vacquelin and isolated in 1831 by Mein [2]. The atropine and scopolamine are muscarinic receptor antagonist. Preparations of belladonna were known to the ancient Hindus and have long been used by physicians [3-6].

Solanaceae is the family of flowering plants (order solanales). It is having 102 genera and nearly 2,500 species. The Potato, tomato, chilli peppers, tobacco, is its close relatives. The deadly nightshade or plant of *Atropa belladonna* is well known for its toxic and medicinal properties (Figure 1). One leaf or 2-4 berries can kill an adult man; the root of it contains the maximum amount to toxic alkaloid. Atropine and scopolamine (Hyoscine) are widely used in pharmaceutical and medical industry [1].

The actions of the atropine can be predicted from knowledge of parasympathetic responses. It blocks all types of muscarinic receptors.

The main pharmacological actions are listed below:

1. Central nervous system: Atropine as such is a CNS stimulant; most of these actions are due to blockade of muscarinic receptors in the brain. In low doses, the effect is not significant because of its restricted entry to the brain; on the other hand, Hyoscine produces its effect even at low doses. Atropine stimulates vagal, respiratory and vasomotor centres in the medulla. It is used in the treatment of, Parkinsonism because it blocks the cholinergic over-activity of basal ganglia [7]. High doses of it can cause cortical excitation, disorientation, hallucination, delirium and coma [8].

2. Cardiovascular system: The most prominent action of atropine on the heart is to cause tachycardia. This response is maximum in young adult as compared to children and elderly. It does not have any consistent or marked effect on blood pressure [8].

3. Eye: Topical instillation of atropine causes Mydriasis, the abolition of light reflex and cycloplegia. The action is prolonged and may last 7-10 days. The intraocular tension also rises, especially in narrow-angle glaucoma [9].

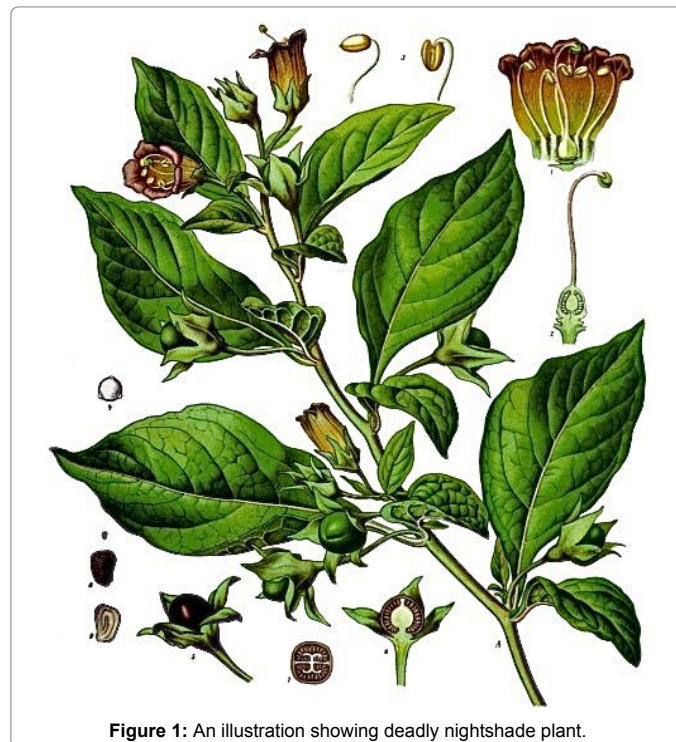


Figure 1: An illustration showing deadly nightshade plant.

4. Smooth muscles: All visceral smooth muscles that receive parasympathetic motor innervations are relaxed by atropine. It causes relaxation of stomach and intestines. It has relaxing action on ureter and urinary bladder also [10].

5. Respiratory system: Atropine causes broncho-dilatation and reduces airway resistance, especially in COPD and asthma patients [11].

6. Miscellaneous: It markedly decreases sweat, salivary, trachea-bronchial and lacrimal secretions. The rise in body temperature occurs in high doses [12]. Deadly nightshade was used in ancient time to prepare poisonous arrows. Romans were using this to eliminate enemy troops. According to legend, witches were preparing ointment made of belladonna and opium poppy to lubricate brooms and facilitate flying.

The deadly nightshades are an attractive and interesting plant, equally interesting and useful is its alkaloids (Atropine and

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Hyoscine), but they need to be treated with a great deal of respect. You can admire and photograph this attractive plant but keep a distance.

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