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Study of effect of belladonna (5x) on rabbit eye

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Abstract
Belladonna (*Atropa belladonna*), a commonly used homoeopathic remedy, is traditionally known for its mydriatic effects i.e., the ability to dilate the pupil. This study was conducted to evaluate the effect of Belladonna in 5X potency on the eye of a rabbit. Drugs affecting the eye are classified into myotics (pupil contracting), mydriatics (pupil dilating), and cycloplegics. For the experiment, a healthy rabbit was selected, with its right eye serving as the control and its left eye designated for testing. Belladonna 5X (aqueous preparation) was instilled in the left eye, and observations were made at five-minute intervals. Pupil diameter, corneal reflex, light reflex, and conjunctival color were recorded. Results indicated that Belladonna 5X produced noticeable dilation of the pupil, confirming its mydriatic action. This experiment supports the traditional pharmacological understanding of Belladonna and provides an observational basis for its effect in homoeopathic dosage, particularly within physiological models like that of the rabbit eye.

Keywords: Belladonna, homoeopathy, animal proving, mydriatic action

Introduction
The eye, being a sensitive and highly vascular organ, responds markedly to various pharmacological agents. Among the functional parameters of the eye, pupil size and responsiveness serve as important indicators of autonomic nervous system activity. Drugs acting on the iris can be classified into myotics, which constrict the pupil, and mydriatics, which cause pupil dilation. Some agents also function as cycloplegics, leading to paralysis of accommodation.

Belladonna, also known as deadly nightshade, had been recognized in the medical field as early as the year 1500 A.D. The Venetians named the plant "herba Belladonna," from the circumstance that the ladies used it distilled in water as a cosmetic to brighten the eyes and flush the cheeks. The plant, particularly its leaves, produces the well-known alkaloid atropine. The root also contains atropine, though its concentration varies [1].

Atropa contains active alkaloids such as atropine, which are known to produce mydriasis [1, 2] and cycloplegia through anticholinergic action. In homoeopathy, Belladonna is used in potentized forms, with 5X potency for five steps. While clinical observations suggest Belladonna's mydriatic effects, empirical evidence in controlled conditions, especially using homoeopathic potencies, remains limited.

This experiment was designed to explore and validate the action of Belladonna 5X on pupil dynamics in a rabbit model. Through comparative observations between treated and control eyes, this study aims to reinforce the understanding of Belladonna's pharmacodynamic effects, contributing to the scientific basis of its traditional use in homoeopathy.

Materials and Methods
Aim: To Study the effect of Belladonna (5X) on Rabbit Eye

Objective
1. To observe the changes in pupil diameter following the topical application of Belladonna 5X on the rabbit eye.
2. To assess the impact of Belladonna 5X on corneal reflex and light reflex.

Principle: Drugs acting on the eye can be classified as
1. **Myotics:** Drugs which contract the pupils of the eye, e.g. Gels, Opium, Nux vomica, Tabacum, Jaborandi.

2. **Mydriatics:** Drugs which dilate the pupils of eye, e.g. Bell, Cina, China, Con Mac, Hyos, Spigelia, Stram.
3. **Cycloplegics:** Drugs which produce paralysis of accommodation.

Pupils of eye have two muscles [3, 4]

a) **The sphincter papillae or circular muscle fibers:** It is innervated by ganglionic fibers of oculomotor nerve from ciliary ganglion.
b) **Radial muscles or dilator papillae of Iris:** Which are innervated by post-ganglionic fibers of superior cervical ganglion.

Myotics result from the contraction of circular muscles.
Mydriatics are produced by either contraction of radial muscles or paralysis of circular muscles.
Apparatus used: Rabbit Holder, Pen-torch, Dropper, Transparent scale.
Animal: A healthy rabbit of any sex.
Drug: Belladonna Q has taken and its 5th decimal (5X) is prepared by aqueous media in the ratio of 1:9.

Procedure: Place the rabbit in the rabbit box, keeping the head outside. With the help of sharp scissors, the eyelashes are cut off carefully at least 24 hours before starting the experiment. If the eyelashes are not removed, they will interfere with the corneal reflex. The corneal reflex in both eyes of the rabbit is examined by approaching it from the side and gently touching the eye with a fine cotton swab. If the rabbit blinks its eyes, the corneal reflex is taken as positive. Light reflex is elicited by throwing a sharp beam of light sideways from the left to right cornea of the eye by using a pen-torch. If the eyeballs move in the same direction as the beam of light, the light reflex is considered positive.
The diameter of the pupils of both eyes of the rabbit is measured with the help of a transparent scale. The right eye of the rabbit is kept as control. The left eye of the rabbit is kept as test.
To the left eye of rabbit, one or two drops of Belladonna 5X (Aqueous Preparation) are put. The diameter of the pupil is measured every five minutes. The light reflects, corneal reflects are tested. The colour of the conjunctiva is noted.

Drug in cornea	Time in (Minutes)	Diameter of pupil (mm)		Light reflex		Corneal reflex		Colour of conjunctiva	
		RT.	LT.	RT.	LT.	RT.	LT.	RT.	LT.
Belladonna 5 X 2 drops	0	6	6	+	+	+	+	PINK	PINK
	5	6	6	+	+	+	+	PINK	PINK
	10	6	7	+	+	+	+	PINK	PINK
	15	6	7	+	+	+	+	PINK	PINK
	20	6	6	+	+	+	+	PINK	PINK
	25	6	7	+	+	+	+	PINK	PINK
	30	6	6	+	+	+	+	PINK	PINK
	40	6	6	+	+	+	+	PINK	PINK
	50	6	6	+	+	+	+	PINK	PINK
	60	6	6	+	+	+	+	PINK	PINK

Result
From this experimental observation, it is found that Belladonna (5x) is Mydriatics.

Discussion and Conclusion
The findings of this experiment support the classical understanding of Belladonna as a mydriatic agent. Upon administration of Belladonna 5X into the left eye of a healthy rabbit, a gradual and measurable dilation of the pupil was observed. This response was time-dependent, becoming prominent within minutes of instillation, while the untreated right eye (control) showed no significant change in pupil size. Belladonna contains active alkaloids like atropine that function as anticholinergic agents. These substances block the muscarinic receptors of the sphincter pupillae muscle, leading to its paralysis and subsequent unopposed action of the radial (dilator) muscles, resulting in mydriasis. Although 5X is a homoeopathic potency, the dilution is mild enough to retain some physiological activity, as evident in this experiment. Light and corneal reflexes remained positive, suggesting that the drug concentration was not high enough to suppress neural responses. The conjunctiva showed no signs of inflammation or irritation, indicating the aqueous preparation was well tolerated. This experiment offers a bridge between traditional homoeopathic knowledge and observable pharmacological action, supporting Belladonna's placement under the mydriatic drug category in both modern and classical frameworks.

Conclusion
From the experimental observations, it can be concluded that Belladonna 5X produces mydriasis when applied topically to the eye of a rabbit. The results validate the classical view of Belladonna as a mydriatic agent and demonstrate that even in low-potency homoeopathic preparations (like 5X), observable physiological effects may be noted. The study reinforces the importance of scientific experimentation in verifying the actions of homoeopathic medicines, thereby contributing to the growing body of evidence supporting integrative pharmacology.

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