

A Review of a Hallucinogenic Plant (*Brugmansia*) Used as Criminal Tools and Exercises

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Abstract

Scopolamine, named also hyoscine, is a tropane alkaloid drug with antimuscarinic effects. It is also a tertiary ammonium compound, so it can be easily absorbed by the gut and the most important thing is that it crosses the hematoencephalic barrier (blood-brain barrier).

This substance has many effects on the human body and it produces effects on a range of micrograms. Scopolamine itself is used as a treatment for some diseases in low doses (like kinetosis), but when it comes to use it as a weapon, it's mixed up with some other substances to produce the compost called burundanga. Burundanga is the cocktail and scopolamine is the main active principle. Regarding to its physical appearance, burundanga is a white thin dust similar to cocaine, tasteless and odourless.

Scopolamine can be found almost in all the species of the Solanaceae family. The drug is stored in the plant's flowers, leaves, and stems. Scopolamine is obtained principally from *Datura stramonium*, *Brugmansia candida*, and *Hyoscyamus albus*. There are many ways to commit a crime, but the perfect crime is not a concept easily achieved. Scopolamine is the ideal example. This substance has been utilised for a long time by humans and has been considered a gate to extra sensorial experiences with spirits. Nowadays though, it has turned into a majestic crime weapon or tool.

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Introduction

Robbery without violence is becoming too common on the streets of Nairobi. They use scopolamine powder to immobilize their victims.

Angel's trumpets, scientifically known as *Brugmansia*, is a genus of seven different species of flowering plants in the Solanaceae family. The Solanaceae family is extensively utilized by humans for food and medicine but is often rich in alkaloids that can cause life-threatening toxicity in humans. Plants causing human toxicity include *Atropa belladonna* (deadly nightshade), *Mandragora officinarum* (mandrake), *Hyoscyamus niger* (henbane), *Datura* and *Brugmansia*.³ In addition to

poisonous plants, a number of food staples, such as potato, tomato, eggplant and chili pepper belong to the Solanaceae family.



Fig. 1: Angels trumpets.

Brugmansia flowers hang downward, giving them their trumpet shape. Their flowers are usually

white, yellow or pink in colour. Angel's trumpets are native to the tropical areas of South America (Coloubia, Equador, Brazil, Peru etc.) (Fig. 1).⁵

Tropane Alkaloids

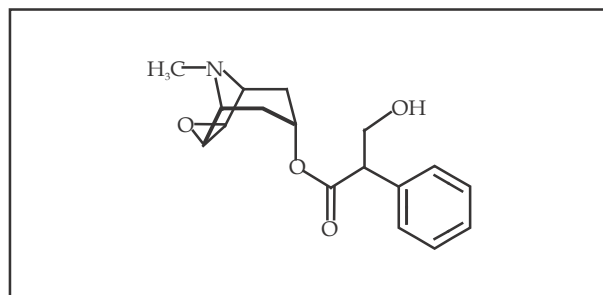
This plant contains the tropane alkaloids—scopolamine, hyoscyamine and atropine which are concentrated primarily in the seeds and flowers. These alkaloids competitively block the neuro transmitter acetylcholine at the muscarinic receptor.³⁻⁵

Tropane alkaloids (TA) are valuable secondary plant metabolites which are mostly found in high concentrations in the Solanaceae and Erythroxylaceae families. The TAs, which are characterized by their unique bicyclic tropane ring system, can be divided into three major groups: hyoscyamine and scopolamine, cocaine and calystegines. Although all TAs have the same basic structure, they differ immensely in their biological, chemical and pharmacological properties. Scopolamine, acting as an antagonist at both peripheral and central muscarinic receptors, is thought to be the primary compound responsible for the toxic effects of the plant.^{6,7}

Scopolamine, also known as hyoscine, has the largest legitimate market as a pharmacological agent due to its treatment of nausea, vomiting, motion sickness, as well as smooth muscle spasms while cocaine is the 2nd most frequently consumed illicit drug globally. Scopolamine crosses the blood-brain barrier and is responsible for central nervous system effects such as delirium, drowsiness, agitation, and dementia.^{8,9}

Atropine is a racemic mix of the R- and L-enantiomer of hyoscyamine.

Chemical Structure



Effect of Scopolamine on human health

Since the drug is instantly absorbed in your skin, its effects are nearly immediate and they include;

Drowsiness, dizziness, a dry mouth or skin, blurred vision, restlessness, confusion, hallucinations, paranoia, difficulty speaking, difficulty urinating, constipation or dry and dilated pupils. In high dosages, Scopolamine completely zonks us out and we don't remember what was going on.¹⁰

Pharmacology of scopolamine

They affect the central and peripheral nervous system as competitive, non-selective muscarinic acetylcholine receptor (mAChR) antagonists, that prevent binding of the physiological neurotransmitter acetylcholine. In humans, two acetylcholine receptor types are known: Muscarinic and nicotinic receptors, which are named after their agonists, muscarine and nicotine.¹¹

TAs are absorbed from the gastrointestinal tract, rapidly distributed into the tissues and excreted predominantly through the renal system. The short half-life in plasma and dose-dependent adverse effects limit the administration of scopolamine to transdermal application. After absorption, scopolamine experiences a significant first-pass effect, because only a minor amount (2.6%) is excreted in the urine in the pharmacologically active form. Cytochrome P450 enzymes seem to be especially involved in the metabolism of scopolamine by oxidative demethylation.^{11,12} Inhibition of CYP3A by ingestion of grapefruit juice prolonged the t_{max} and increased the AUC_{0-24h} value of scopolamine metabolization. Additionally, it has been observed that scopolamine and its apo- and nor-metabolites are conjugated to glucuronide (glucuronidation) or sulphate during phase II metabolism for excretion into urine. Scopolamine and hyoscyamine do not accumulate in the human body, nor exhibit genotoxic or chronic toxicity, an adverse effect due to long-term exposure have not been reported (EFSA, 2013).^{11,14}

Occurring side effects of anticholinergic drug substances occur from inhibition of the parasympathetic nervous system. Symptoms include decelerated heart rate, dry mouth and reduced perspiration. At higher therapeutic oral doses, increased heart rate, inhibition of the respiratory tract secretory activity as well as bronchodilation and mydriasis have been observed.^{14,15} Sweating is also inhibited which is accompanied by a consequent rise in body temperature.

Scopolamine

Scopolamine causes mydriatic, spasmolytic and local anaesthetics effects yet exhibits side effects

which can be hallucinogenic and even lethal. The most important mode of application for scopolamine is transdermal, a technology which was developed as transdermal therapeutic systems (TTS) in 1981. Scopoderm TTS® is the trade name for a scopolamine delivery system used in the treatment of motion sickness. During the Second World War, scopolamine was used to treat shell shock, psychoactive side effects and also motion sickness.^{17,18} The drawbacks of scopolamine lay in the manifold peripheral and central nervous system side effects. To overcome these issues, scopolamine derivatives have been developed, leading to its classification as a drug lead substance.

Hyoscyamine and Atropine

Hyoscyamine and atropine have similar modes of action and effects as scopolamine.

Scopolamine uses

In the 1920s, Robert House pioneered the use of scopolamine as a truth serum. House found the drug would “depress the cerebrum to such a degree as to destroy the power of reasoning” In other words, the drug turns people into zombies.^{12,17} It also blocks memories from forming, so a subject will not remember what happened under the influence.

Medicinal use

Scopolamine is used to treat motion sickness, Parkinson’s Disease, muscle spasms, irritable bowel syndrome, asthma, and depression. It is even used off-label to help stop smoking. Despite the obvious criminal uses of scopolamine, the World Health Organization lists it as one of the safest and most effective medicines. It is prescribed and available in drug store on the name of Hyscione butylbromide.^{12,17}

Use in criminal activity

More than 50,000 criminal assaults cases have been reported every year connected with scopolamine. The prime categories of criminal cases where scopolamine are largely used are: kidnapping, sexual assault and robbery.^{17,18} In its powdered form, scopolamine has no taste or smell, so it can easily be slipped into someone’s drink. Also, it can be smoked in cigarettes, blown in someone’s face, or administered in a transdermal patch. Once it enters the bloodstream, the victim loses free will and becomes suggestible. The drug delivers its action so fast, that it takes 5-10 mins to come into effect.

Nowadays, the drug is used to facilitate crimes without violence. Because of this it is gaining

popularity among criminals. Scopolamine renders us incapable of exercising our free will, leaving us vulnerable to do anything an attacker demands. Once we recover from its effects, we wouldn’t not have so much of memory of what happened and neither we can identify a perpetrator.

Common Scopolamine poisoning cases include giving out confidential details like bank PINs, passwords, ATMs, withdrawing or transferring money from bank account or even helping an attacker rob your home. In incidences of sexual assault, a victim is not able to fight back and neither do they have the will or ability to call out for help.

It is seen and proved from many crime cases, that the drug can be effective if passed through a handshake, a laced piece of paper, a business card, or blown-in your face.

In the past, many American tribes have used scopolamine in several rituals to induce visions to individuals.¹⁹ Nowadays, it is used in the same geographic zones by prostitutes to drug their clients and rob them. But it’s usually used by criminals too. A myth has been created and the media has been helping on its growth. This myth resides in the power of the drug to overturn people’s will. Any scientific study has demonstrated this fact, taking into account that this substance has been largely studied by medicine for many centuries.¹⁹ Nowadays burundanga is being used for rob and rape, but most of the cases where this drug is used is to steal without resistance. This substance has been the interest of many people throughout history, in EE. UU the CIA started the MK-ULTRA and MK-SEARCH programs between the 50s and 70s of last century to find this truth serum between different legal and illegal psychoactive.^{7,19,20} Drugs were administered to subjects without their knowledge or consent as evidenced by documents declassified a few years ago. The search for a truth serum has been an obsession for Intelligence Services during the last century without having come to find this substance. Scopolamine has been extensively studied in this regard without any success.^{19,20} The incoherent, disorganized speech and uninhibited that can produce scopolamine is not useful as a truth serum for this type of purposes.

Discussion

The degree of toxicity varies depending on the part of the plant, the season, stage of maturation and the state of hydration. Toxicity can occur via ingestion, smoking, and absorption topically, particularly

through mucous membranes. All parts (flower, seed and root) of the plant can be toxic, but most significantly the seeds. Scopolamine, sometimes called devil's breath is an antimuscarinic agent, which means it has an effect on the central nervous system. It is derived from the flower of the "borrachero" shrub, common in Colombia. It has been used for years in South America for spiritual rituals.

Conclusion

Scopolamine (Hyoscine) can render a victim unconscious for 24 hours or more depending on the doses ingested. In large doses, it can cause respiratory failure and death. It is most often administered in liquid or powder form in foods and beverages. The majority of these incidents occur in night clubs and bars, and usually men, perceived to be wealthy, are targeted by young, attractive women. To avoid becoming a victim of hyoscine (scopolamine), one should never accept food or beverages offered by strangers or new acquaintances or leave food or beverages unattended. Victims of hyoscine or other drugs should seek immediate medical attention.

Abbreviations

TA: Tropane Alkaloids, ATM: Automatic Teller machine, PIN: Personal Identification Number, CIA: Central Investigation Agency, TTS: Transdermal Therapeutic Systems.

AUC: Area Under the Plasma Concentration.

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