

Gelsemium: From Sir Arthur Conan Doyle's self-experiments to Russian use as a toxin

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Gelsemium is an Asian and North American genus of flowering plants and is the Latinized form of the Italian word for jasmine. The active ingredients are alkaloids, primarily gelsemine, a highly toxic compound related to strychnine. Gelsemine acts as an agonist for the amino acid neurotransmitter glycine at the glycine receptor, which is a widely distributed inhibitory receptor in the central nervous system.

It is available online in a homeopathic version at 1-800-homeopathy, where it is claimed to be useful in treating performance stress, heavy colds or "flu," for fatigue, weakness, diarrhea and headaches. Treatment is based on the homeopathic "Law of Similars." Homeopaths have long known the symptoms of gelsemium poisoning. Also available in homeopathic versions are *Nux vomica* (strychnine), *Arnica*

montana (sometimes used to treat boxers to reduce swelling after fights), and *Thuja occidentalis* (Vincent van Gogh may have suffered from thujone toxicity).



Gelsemium plant

Gelsemium is currently used in complementary and alternative medicine and there is extensive literature available on its use to reduce anxiety.¹ During the 19th century it was used to treat neuralgia, malaria, as a cardiac depressant, and to treat so-called "spasmodic affections."

Arthur Conan Doyle

Sir Arthur Conan Doyle (1859-1930) graduated from the University of Edinburgh with MB and CM degrees, having been educated there from 1876-1881. He was granted the advanced degree of MD in 1885 after writing a thesis on tabes dorsalis. Doyle studied ophthalmology in Vienna with Fuchs at the Krankenhaus and then with Landolt in Paris. He established an ophthalmological office in London near Harley Street in 1891. Doyle was a member of the Ophthalmological

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Society of the United Kingdom from 1891-1893 and was affiliated with the Royal Westminster Eye Infirmary.

His pharmacology textbook is now owned by the University of Texas and is inscribed “Arthur Conan Doyle/Edinburgh University 1878-79.” It is Alfred Baring Garrod, MD, FRS, *The Essentials of Materia Medica and Therapeutics*, 6th edition, revised and edited under the supervision of the author by E. Buchanan Baxter. London: Longmans, Green and Co., 1877. Doyle underlined portions of this book that concern gelsemium: “It has been employed in various forms of neuralgia, rheumatism, and muscular spasm, as a sedative, and added in the margin “also for Chorea and inflammation.” “Death results from apoenia, due to paralysis of the respiratory muscles.”

While still a medical student Doyle published his investigation of gelsemium as a poison.² He wrote “Some years ago, a persistent neuralgia led me to use the tincture of gelseminum [alternative spelling of gelsemium] to considerable extent. I several times overstepped the maximum doses of the text-books without suffering any ill effects. I determined to ascertain how far one might go in taking the drug, and what the primary symptoms of an overdose might be.” He described extreme giddiness and weakness of the limbs, difficulty in accommodating the eye for distant objects, severe frontal headache with diarrhea and general lassitude. He concluded “The system may learn to tolerate gelseminum, as it may opium, if it be gradually inured to it.”

In the first Sherlock Holmes story, *A Study in Scarlet*. *Beeton’s Christmas Annual*, 1887, Doyle had a character say “I could imagine his giving a friend a little pinch of the latest vegetable alkaloid, not out of malevolence, you understand, but imply out of a spirit of inquiry in order to have an accurate idea of the effects. To do him justice, I think he would take it himself with the same readiness.”

Self-experimentation has a long history in medicine. Nobel laureate self-experimenters include Werner Forssman, 1956, for cardiac catheterization; Barry Marshall, 2005, for *H pylori*; and Ralph Steinman, 2011, for work on cancer of the pancreas.

From Russia without Love, a travesty of James Bond

The case of the Russian whistleblower Alexander Perepilchnyy (1969-2012) is instructive. He fled Russia to England in fear for his life and died during his usual jog through St George’s Hill estate in a suburban, gated community that has been home to Kate Winslett, Ringo Starr, and Elton John. He was found healthy slightly earlier, during a medical examination for life insurance policies, one of which became effective eight days before his death. British detectives concluded the death was not suspicious. At an inquest review a suspect was revealed, a member of the Kiyuev organized crime group who boarded a plane for Russia the day after Perepilchnyy’s sudden death. Testing obtained by one of his life insurance companies revealed gelsemium in the stomach. An inquest report was delayed, pending toxicology studies by Professor Monique Simmonds of the Royal Botanic Gardens, Kew, an institution affiliated with the University of London.

At a pre-inquest hearing an attorney asked “Given that it is a known weapon of assassination by Chinese and Russian contract killers, why was it in his stomach?” The murder of a Chinese tycoon in 2012 had been shown to be by a business rival who placed gelsemium in his stew.

Perepilchnyy was a crucial witness in a \$200 million tax fraud case against Russian officials, police, and Russian mafia. He was expected to testify in a Swiss court and had received death threats. The Russian Interpol had linked him to organized money laundering and he became a whistleblower. The investment firm Hermitage Capital hired the attorney Sergei Magnitsky to investigate. At age 37, Magnitsky was arrested in Russia and died while under police custody. President Obama signed the Magnitsky Act in 2012, placing sanctions on a number of Russian officials involved in his detention.

This story received extensive publicity prior to the final report³⁻⁶ but very little after Professor Simmonds gave her final toxicology report. She found an unknown chemical compound that had the same molecular weight as five variants of gelsemium.^{7,8} It also had the same molecular weight as scopo-

lia, a member of the toxic nightshade family. Unfortunately, at the original post mortem examination most of the stomach contents were discarded so that Professor Simmonds could not do definitive testing.

Polonium 210

Alexander Litvinenko (1962-2006), a former KGB agent, and who had coined the term “mafia state,” died of acute radiation syndrome. A British inquiry in 2016 ruled it was probably state sponsored murder approved by Putin. Four months earlier Litvinenko published an article stating Putin was a pedophile. A close friend said Litvinenko had the mindset of a security officer who could not understand the difference between the truth and operational information.

Ricin

Georgi Markov (1929-78) was a BBC and Radio Free Europe broadcaster and journalist. He was a Bulgarian dissident writer who had defected in 1969. Markov was shot in the leg by a pellet fired from an umbrella while on a London bridge and died 4 days later.

Boris Korczak (1939-), a CIA double agent with the KGB rank of major, was shot in a kidney with a platinum iridium pellet laced with ricin in Vienna, VA, and survived. The pellet with ricin was found.

With homage to the mysteries written by Sue Grafon, many more biologic agents are available, running through the alphabet, beginning with an A for anthrax.

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