

# White henbane rescues liver cells from damage caused by hyperglycemia, hyperinsulinemia

Anna Kowalczyk  
Nabila Bourebaba  
Katarzyna Kornicka-Garbowska  
Eliza Turlej  
Krzysztof Marycz  
Lynda Bourebaba



---

## Video Byte

**Keywords:** Cell Communication and Signaling, type 2 diabetes, insulin resistance, hyperinsulinemia, hyperglycemia, calystegines, traditional medicine, medicinal plant derivatives, Hyoscyamus albus, inflammatory response, inflammation, oxidative stress, f SIRT1/NF- $\kappa$ B/JNK pathway, HepG2, Sirt1, NF- $\kappa$ B, nortropane alkaloids

**Posted Date:** October 13th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-967551/v1>

**License:**   This work is licensed under a Creative Commons Attribution 4.0 International License.  
[Read Full License](#)

---

# Abstract

Excessive glucose and insulin levels in the blood are known to cause tissue damage and even organ failure, particularly in people with diabetes. In the search for new drugs that can counteract these dangerous effects researchers recently examined the medicinal plant *Hyoscyamus albus*, or white henbane. Found in the Mediterranean, white henbane is rich in alkaloids such as hyoscyamine and scopolamine. Found in the Mediterranean, white henbane is rich in alkaloids such as hyoscyamine and scopolamine, which possess analgesic, anti-spasm, and sedative properties. The research team focused on a group of recently discovered alkaloids called “calystegines”, which have been shown to counteract excessive glucose and insulin levels. Calystegines improved liver cell viability under hyperglycemic and hyperinsulinemic conditions, as well as glucose uptake in insulin-resistant liver cells, as indicated by the fluorescent glucose analog 2-NBDG. Further experiments showed that the calystegines improved glucose breakdown by regulating the SIRT1/mTOR pathway and impeded insulin resistance caused by the NF- $\kappa$ B/JNK pathway and inflammatory cytokines. While more work is needed to understand the behavior of calystegines in the living body, these findings highlight the clinical value of white henbane as an anti-diabetic agent.