

REVIEW **OPEN ACCESS**

# Ashwagandha: Is It Safe? Part 2: A Preclinical Evidence Review

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## ABSTRACT

The preclinical evidence for the safety of ashwagandha (*Withania somnifera* (L.) Dunal, AS) is reviewed, and its preparations (extracts) and constituents, from the general toxicity in animal models to in vitro and cell culture studies, which may elucidate mechanisms of action and explain clinical case reports. Most studies and reviews conclude that AS is a remarkably safe herb, but cases of liver toxicity, mainly reversible cholestasis or severe jaundice and pruritus, have been reported without being predicted by preclinical evidence. Further work is needed to clarify the constituents responsible and patient-related issues surrounding them. Several constituents, such as withaferin-A, have demonstrable antitumorigenic effects in animal models of liver cancer and injury induced by ischemia, cytotoxic drugs, and radiotherapy. AS has not shown genotoxicity or mutagenicity in standard tests; on the contrary, it was protective against chromosome abnormalities or micronuclei formation induced by known clastogenic agents. A folkloric reputation for inducing abortion or sterility is not borne out of preclinical experiments, and rare reports

