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Antiviral activity and possible mechanisms of action of *Aristolochia* bracteolata against influenza A virus

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We investigated the anti-influenza virus activity of *Aristolochia bracteolate* and possible mechanism(s) of action in vitro. We found that *Aristolochia bracteolate* has anti-influenza-virus activity, and both pre-incubation of virus prior to infection and post-exposure of infected cells with *Aristolochia bracteolate* extract significantly inhibited virus yields. Influenza-virus-induced hemagglutination of chicken red blood cells was inhibited by *Aristolochia bracteolate* extract treatment, suggesting that *Aristolochia bracteolate* can inhibit influenza A virus infection by interacting with the viral hemagglutinin. Furthermore, *Aristolochia bracteolate* extract significantly affect nuclear transport of viral nucleoprotein (NP). To best of our knowledge, this study revealed for the first time that *Aristolochia bracteolate* extract can inhibit both viral attachment and replication and offers new insights into its underlying mechanisms of antiviral action. The whole plant of *Aristolochia bracteolate* collected from Sudan and extracted with70% methanol. The crude extract was screened for its cytotoxicity against MDCK cell line by WST-1 assay. Antiviral properties of the plant extract were determined by cytopathic effect inhibition assay and virus yield reduction assay (plaque assay). Time of addition assay, and nuclear export mechanism were also performed.

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