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Germacrone, a major component of the essential oils extracted from *Rhizoma Curcuma*, inhibits early stages of influenza virus replication

Highly pathogenic influenza viruses pose a serious public health threat to humans. Antivirals are needed to efficiently control disease progression and virus transmission. In this study, germacrone, which is a major component of the essential oils extracted from *Rhizoma Curcuma*, was found to inhibit influenza virus replication. Germacrone showed antiviral activity against the H1N1 and H3N2 influenza A viruses and the influenza B virus in a dose-dependent manner. The viral protein expression, RNA synthesis and the production of infectious progeny viruses were decreased both in MDCK and A549 cells treated with germacrone. In a time-of-addition study, germacrone was found to exhibit an inhibitory effect on the early stages of the viral replication cycle. By a defined indirect immunofluorescent assay of the localization and quantification of HA, NP and M1 proteins of influenza virus. Germacrone was found to inhibit the fusion of virus membrane and the endosomal membrane, thereby blocked the dissociation of the vRNPs from M1 matrix proteins. Germacrone also exhibited an effective protection of mice from lethal infection and reduced the virus titres in the lung. Furthermore, the combination of germacrone and oseltamivir exhibited an additive effect on the inhibition of influenza virus infection both *in vitro* and *in vivo*. Our results suggest that germacrone may have the potential to be developed as a therapeutic agent alone or in combination with other agents for the treatment of influenza virus infection.

Biography

Xulin Chen is a Professor at Wuhan Institute of Virology, Chinese Academy of Sciences. He has obtained his PhD in Microbiology from Institute of Microbiology, CAS in 1999. He has received Postdoctoral training at University of Pennsylvania (1999-2003) and Fox Chase Cancer Center (2003-2005) in Philadelphia, USA. His lab focuses on antiviral research, which includes the development of novel antiviral and anti-inflammatory therapeutics from natural products against virus infections. He has published more than 34 papers in reputed journals and has been serving as an Editorial Board Member of *Virologica Sinica*.

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