

Review

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## Molecular biology of cantharidin in cancer cells

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### Abstract

Herbal medicine is one of the forms of traditional medical practice. Traditional Chinese medicine (TCM) and traditional Vietnamese medicine (TVM) are well-known for their long-standing tradition of herbal medicine.

Secreted by many species of blister beetle, most notably by the 'Spanish fly' (*Lytta vesicatoria*), cantharidin inhibits protein phosphatases 1 and 2A (PPI, PP2A). Blister beetle has been used in Asian traditional medicine to treat *Molluscum contagiosum* virus (MCV) infections and associated warts, and is now also used for cancer treatment. A combination of both genomic and postgenomic techniques was used in our studies to identify candidate genes affecting sensitivity or resistance to cantharidin. Cantharidin was not found to be related to multidrug resistance phenotype, suggesting its potential usefulness for the treatment of refractory tumors. Oxidative stress response genes diminish the activity of cantharidin by inducing DNA strand breaks which may be subject to base excision repair and induce apoptosis in a p53- and Bcl2-dependent manner.

Cantharidin is one of many natural products used in traditional Chinese medicine and traditional Vietnamese medicine for cancer treatment. Combined methods of pharmaceutical biology and molecular biology can help elucidate modes of action of these natural products.