

# Anti-Enteroviruses 71 Activities of the Aqueous Extracts from *Salvia Miltiorrhiza*

Ching-Yi Chuang, Ching-Ting Lin, Tzyy-Rong Jinn\*

*School of Chinese Medicine, China Medical University*

## Abstract

### Background and Aims:

The *Salvia miltiorrhiza* (Danshen) is a well known traditional Chinese medicine; it has been used for the treatment of many diseases, such as coronary heart disease, cerebrovascular disease, hepatitis, liver cirrhosis, chronic renal failure, dysmenorrhea, and insomnia. On the other side, the crude extracts of Danshen have also been demonstrated the potential for anti-virus in vitro. As reports, the aqueous extracts of the dry roots of Danshen, this provides the inhibitive effects of atherosclerosis and restenosis. In addition, previous reports also indicated that the aqueous extracts of the dry roots of Danshen possesses the antioxidative, antibacterial and antiviral activities. Thus, there is great interest to assess the activity of the aqueous extracts from Danshen against enteroviruses71 virus.

### Materials and Methods:

Enterovirus 71 were kindly supplied by Dr. Cheng-Wen Lin. Cell lines, including N<sub>2</sub>A and COS1, were respectively maintained in Modified Eagle's medium (MEM) and Dulbecco's modified Eagle's medium (DMEM), supplemented with 10% FBS, penicillin (100U/ml), and streptomycin (100ug/ml). Two cell lines were maintained in 37°C incubator containing 5% CO<sub>2</sub>. The dried roots of *Salvia miltiorrhiza* (8.8 kg) were extracted with 50 L methanol under reflux for 8 h and concentrated to brown syrup. The syrup was suspended in H<sub>2</sub>O and partitioned with chloroform. Plaque reduction neutralization test: The medium with agarose were removed after 48 hours post infection (h.p.i.). The cells were fixed with 10% formaldehyde and subsequently stained with 1% crystal violet. The plaque forming unit (pfu) was quantified and recorded.

### Results and Conclusions:

In this study, we demonstrated that the aqueous extracts of Danshen have dose-dependent effect on the inhibition of enteroviruses 71 virus replication via inhibiting the pathway of internal ribosome entry site (IRES).

**Keywords:** Anti-enterovirus 71; Danshen; Neutralization test