

Title of Project: *In vitro* activity of the Chinese Medicinal Herb, Nao Xin Qing for the treatment of stroke

(FOR Code/s): 1104

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Location of Project: Campbelltown

Project Background

An aqueous extract of the leaf of the Persimmon tree (*Diospyros kaki*) prepared as a tea, has featured in the practice of traditional Chinese medicine for centuries [1]. Its widespread use has resulted in the commercial development of Nao Xin Qing (NXQ) tablet containing a standardised extract of the herb. NXQ is widely prescribed for the management of diseases induced by atherosclerosis such as ischemia stroke and coronary heart disease.

NXQ extract is reported to possess various pharmacological properties including microbial inhibition, radical scavenging, neuroprotection, blood pressure lowering, as a vasorelaxant, in reducing blood lipids and in thrombosis inhibition. These activities may be at least partially due to the high levels of flavonoids in the herb [2].

Synergism underpins the therapeutic actions of herbal medicine, where patients are generally treated with herbal preparations containing multiple bioactive components or multiple herbs. There is preliminary evidence that complex chemical mixtures enhance therapeutic efficacy by facilitating synergistic action and/or ameliorating/preventing potential side effects [3].

Aim of Study:

To assess the antioxidant activity and effect on endothelial dysfunction of the components of the standardised herbal extract, NXQ.

To determine the synergistic or additive nature of these components.

Methods:

In vitro biochemical assays will be used to investigate antioxidant activities of NXQ extract and its key flavonoids components (quercetin and kaempferol) [4]. Total antioxidant activity, free radical and superoxide anion radical scavenging will be determined using. Interactions among the key bioactive components of NXQ will be assessed using the above *in vitro* assays to assess their synergistic or additive effect mathematically by applying an isobole method [3]. The effect of NXQ on endothelial dysfunction will also be assessed in human endothelial cell line EA.hy926 (Zhou et al., 2012).

Ethics Application Requirements:

N/A

Key References:

1. Xue, Y.-L., T. Miyakawa, Y. Hayashi, K. Okamoto, F. Hu, N. Mitani, K. Furihata, Y. Sawano, and M. Tanokura, *Isolation and Tyrosinase Inhibitory Effects of Polyphenols from the Leaves of Persimmon, Diospyros kaki*. Journal of Agricultural and Food Chemistry, 2011. **59**(11): p. 6011-6017.

2. Xue, Y.L., T. Miyakawa, Y. Hayashi, K. Okamoto, F. Hu, N. Mitani, K. Furihata, Y. Sawano, and M. Tanokura, *Isolation and tyrosinase inhibitory effects of polyphenols from the leaves of persimmon, Diospyros kaki*. Journal of agricultural and food chemistry, 2011. **59**(11): p. 6011-7.
3. Wagner, H., *Synergy research: Approaching a new generation of phytopharmaceuticals*. Fitoterapia, 2011. **82**(1): p. 34-37.
4. Yang, J., J. Guo, and J. Yuan, *In vitro antioxidant properties of rutin*. LWT - Food Science and Technology, 2008. **41**(6): p. 1060-1066.