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Investigation of therapeutic efficacy and mechanisms of polysaccharide of dendrobium officinale in alleviating cigarette-induced pulmonary inflammation

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Dendrobium officinale is a medicinal plant from the Orchidaceae family. It has been listed in the latest edition of the Chinese Pharmacopoeia as medicinal material Dendrobii Officinalis Caulis (Tiepishihu) because of its treatment efficacy. According to the Pharmacopoeia it benefits the stomach, promotes the production of body fluid, nourishes yin and eliminates evil-heat. Consequently it commands high prices and is frequently adulterated. Our recent study revealed that a compound, the polysaccharides, from Dendrobium officinale can upregulate the expression of AQP5 in molecular level from smoking cells and the lungs of C57 mouse which have been damaged by exposure to cigarette smoke.

In this study, we hypothesize that patients who have been smoking for years exhibit pulmonary inflammation and the precipitation of cigarette dust particles within the tracheal wall and the lungs and thus a downregulated expression of aquaporin 5 (AQP5) and an increased gene expression of MUC5AC (a protein that stimulates phlegm formation), resulting in excessive phlegm secretion in the lungs. Dendrobium officinale polysaccharides could promote AQP5 expression in the lungs of smokers and thereby inhibit expression of MUC5AC. Finally, the cigarette smoke-induced tracheal and pulmonary inflammation could be alleviated.

Our research group has 10 years of experience in studying the medicinal plants of genus Dendrobium. Since 2006, we have conducted investigations on the effect of Dendrobium species in promoting the expression of AQP5 gene. Based on the results of the investigations, four papers have been published in international journals.

Eventually, this study will elucidate the mechanisms and pathway with which Dendrobium officinale polysaccharides alleviates cigarette smoke-induced pulmonary inflammation. The results of this study could facilitate the establishment of a platform for the screening of more drugs from Chinese medicine and the provision of early intervention and therapy to patients with cigarette smoke-induced pulmonary inflammation.