Characterization of anti-inflammatory triterpene acids from rose hip powder (Rosa canina L.)

Saaby L.1,2, Jäger A.K.1, Moesby L.3, Hansen E.W.2, Christensen S.B.1

1Department of Medicinal Chemistry, Faculty of Pharmaceutical Sciences, University of Copenhagen
2Department of Pharmacology and Pharmacotherapy, Faculty of Pharmaceutical Sciences, University of Copenhagen

Introduction
The standardized rose hip powder LitoMove® (Rosa canina L.) is a widely used herbal remedy. Clinical trials have revealed that consumption of rose hip powder can reduce pain in patients suffering from osteoarthritis. Synovial inflammation mainly mediated by macrophages has been reported to be involved in the pathology of osteoarthritis. The aim of the present study was to investigate the immunomodulatory effect of rose hip extracts and to isolate and characterize active principles.

Methods
Cells of the monocytic cell line Mono Mac 6 (2x10⁶ cells/ml) was stimulated with lipopolysaccharide (LPS, 50 pg/ml) and incubated with test samples dissolved in 1% DMSO (tested concentrations appear from figures) or 1% DMSO (control) for 24 hours. Total volume of each well was 500 μl. Release of interleukin 6 (IL-6) was measured through sandwich immunoassay and cell viability was assessed with the MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide] assay.

Results
The inhibitory effect of the dichloromethane extract on the IL-6 release from Mono Mac 6 cells (Fig. 1) was correlated to a mixture of three triterpene acids, oleanolic, betulinic and ursolic acid (IC₅₀ 21 ± 6 μM) (Fig. 2).

Investigation of the anti-inflammatory activity of each of the three triterpene acids revealed that oleanolic and ursolic acid was able to inhibit the LPS induced release of IL-6, in contrast to betulinic acid (Fig. 3). Interestingly, combination of either oleanolic or ursolic acid with betulinic acid enhanced the anti-inflammatory effect of both oleanolic and ursolic acid (Fig. 4).

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