

Studies on Blackcurrants and Cardiovascular Health

Title: Orally Administered Delphinidin 3-Rutinoside and Cyanidin 3-Rutinoside are Directly Absorbed in Rats and Humans and Appear in the Blood as the Intact Forms

Authors: Hitoshi Matsumoto, Hiromi Inaba, Mitsuo Kishi, Shigeru Tominaga, Masao Hirayama, and Takanori Tsuda

Study: The four components of the blackcurrant anthocyanins were used in this study including delphinidin 3-*O*- β -rutinoside (D3G), cyanidin 3-*O*- β -rutinoside (C3G), delphinidin *O*- β -glucoside, and cyanidin *O*- β -glucoside. Both a rat study and a human study were conducted with oral administration of the four anthocyanin components, to detect their status in the blood stream.

Results: In the rat study, following the oral administration of D3R, C3R and C3G, the anthocyanins were detected in the plasma for 0.5-2.0 hours after administration. In the human study, the mixture of BCA was orally ingested in eight volunteers, and all components of D3R, C3R, D3G, and C3R were detected in the plasma and urine.

Conclusion: These results confirm that 3-*O*- β -rutinosyl anthocyanins were directly absorbed and distributed to the blood.

Title: Gamma-linolenic acid, blackcurrant seed and evening primrose oil in the prevention of cardiac arrhythmia in aged rats

Authors: PhD. DS John, S Charnock, PhD Gayle L Crozier, and BS Julie Woodhouse

Study: Cardiac Arrhythmia frequently develops as a consequence of reduced blood flow to the heart. In a rat model of cardiac ischemia, the susceptibility to develop sustained ventricular fibrillation is increased with the age of the animal, but this increased susceptibility can be diminished by inclusion of polyunsaturated fatty acids (PUFA) in the diet. We have examined this possibility by feeding either evening primrose oil (9%) or blackcurrant seed oil (17%) to already mature rats for 48 weeks prior to occlusion of their coronary artery and measurement of the incidence and severity of induced arrhythmias.

Results: All PUFA enriched diets were effective with a trend towards diminished arrhythmia with enhanced GLA in the diet. Blackcurrant seed oil had a significant benefit over evening primrose oil and sunflower seed oil in these experiments.

Conclusion: Since blackcurrant seed oil contains less LA and more ALA than either sunflower seed oil or evening primrose oil, this could lead to the enhanced metabolism of dietary n-3 PUFA rather than n-6 PUFA. This is believed to be the reason for

blackcurrant seed oil's improvement on blood flow to the heart, which showed better results than both evening primrose and sunflower seed oil.

Title: Screening of selected flavonoids and phenolic acids in 19 berries

Authors: S. Häkkinen, M. Heinonen, S. Kärelampi, H. Mykkänen, J. Ruuskanen, and R. Törrönen

Study: Select flavonoids were simultaneously detected from 19 berries using a simple High Performance Liquid Chromatograph method. This study worked to identify the specific flavonoids in specific berries.

Results: These phenolics have been proposed to have beneficial effects on health as antioxidants and anti-carcinogens. Marked differences were observed in the phenolic profiles among the berries, with certain similarities within the families and genera. In the genus *Ribes*, Quercetin was the main compound in blackcurrant, redcurrant and gooseberry.

Conclusion: Our data suggests that berries have potential as good dietary sources of Quercetin or ellagic acid, which may offer anti-carcinogenic health benefits.

Title: Resting blood pressure and cardiovascular reactivity to mental arithmetic in mild hypertensive males supplemented with blackcurrant seed oil

Authors: Deferne JL, Leeds AR

Study: The objective was to test the effects of the supplement of blackcurrant seed oil (BSO) on the resting blood pressure (BP) and cardiovascular reactivity to a psychological stress in borderline hypertensive individuals. Twenty-seven male volunteers with BP were randomly placed in two groups for this 4-week study.

Results: BSO inhibited BP reactivity by over 40%. The decrease in DBP for the subjects on BSO was significantly different from the slight changes observed in the safflower group.

Conclusion: We conclude that gamma-linolenic-rich fatty acid preparations are likely to influence cardiovascular control, by mechanisms yet to be clarified.