

## Anti-inflammatory Actions of Anthocyanins

Anthocyanins are a class of flavonoid phytochemicals. They are found in fruits and vegetables. Berries—like blackberries, raspberries, bilberries, and hawthorn berries—are particularly rich in anthocyanins. Anthocyanin pigments are the compounds that give plants their red, blue and purple colors.

Anthocyanins protect many body systems. Among other potential health benefits, anthocyanins have antioxidant and anti-inflammatory properties.<sup>1</sup> A recent study investigated the anti-inflammatory properties of anthocyanins. Researchers in Norway have shown that anthocyanins from bilberries and black currants reduced levels of transcription factor nuclear factor-kappa B (NF-κB), a compound that is activated when the body is exposed to stimuli including free radicals, ultraviolet irradiation, stress, and bacteria and viruses.

NF-κB is a type of transcription factor. A transcription factor controls when genes are switched on or off. It is involved in the process of making RNA from a cell's DNA—a process called transcription and one of the steps in making proteins. Without transcription factors, cells would not be able to effectively regulate the rate at which genes are expressed.

NF-κB is involved in a number of normal cellular processes. NF-κB controls the expression of genes that play a role in the body's inflammatory response. Because NF-κB controls many genes involved in inflammation, it is not surprising that NF-κB is found to be persistently active in many inflammatory diseases. Researchers have theorized that if NF-κB can be "calmed down," inflammation can be reduced. This action could potentially prevent chronic inflammatory diseases.

In the bilberry and black currant study, researchers tested the anthocyanins *in vitro* and in a clinical trial. The *in vitro* study showed that the anthocyanin mixture reduced NF-κB activation by 26.7 percent when exposed to an inflammation stimulus, compared to the control.<sup>2</sup>

In a clinical trial involving 120 men and women, those taking 300 mg of the bilberry and black currant anthocyanin extract daily for three weeks had a reduction of between 25 and 60 percent in various inflammatory mediators.<sup>2</sup>

How anthocyanins reduce inflammation isn't completely understood. One possible mechanism is that they act as buffers that are able to suppress oxidative stress, which in turn does not allow the inflammatory response to start in the first place.

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<sup>1</sup> Jellin JM, Gregory PJ, Batz F, Hitchens K, et al. *Natural Medicines Comprehensive Database. 9th Ed.* Stockton, CA: Therapeutic Research Faculty, 2007.

<sup>2</sup> Karlsen, A., Retterstol, L., Laake, P., et al. "Anthocyanins Inhibit Nuclear Factor-B Activation in Monocytes and Reduce Plasma Concentrations of Pro-Inflammatory Mediators in Healthy Adults." *Journal of Nutrition* 137 (2007): 1951-1954.