

PCA, A Key NMF Component, Enhances Micro Blood Circulation by Modulating Constitutive NO Production

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Abstract :

This study revealed an intrinsic biological function of 2-pyrrolidone-5-carboxylic acid (**L-PCA**) **to enhance micro blood circulation** by modulating constitutive nitric oxide (NO) production. It is well known that NO, generated from L-arginine (L-Arg) by the action of NO synthase (NOS), plays a key role in the control of **vascular tone and peripheral blood flow**.

In these studies we found a dose-dependent enhancement of constitutive NO production by L-PCA in human aortic endothelial cells. In contrast, D-PCA had no influence on NO production. Furthermore, L-PCA stimulated L-Arg uptake into human aortic endothelial cells in a dose-dependent manner while D-PCA had no effect, similar to its effect on NO production. L-Arg uptake and its stimulation by L-PCA to human aortic endothelial cells were suppressed with the cationic amino acid transporter. This result suggests that the enhancement of the NO production by L-PCA is due to the increase of L-Arg uptake via cationic amino acid transporter pathway.

In conclusion, we found that L-PCA enhances micro blood circulation via a modulation of constitutive NO production. This intrinsic biological effect of L-PCA could lead to the development of innovative cosmetic products to care for problematic skin, such as **dark circles under the eyes** where a reduced micro blood circulation is one of the underlying causes.

