

Antioxidants

How Korean Red Ginseng upregulates antioxidant enzyme activity

Background

Theory

The beneficial effect of Korean red ginseng (KRG) on antioxidant enzyme activity:
 Oxidative stress describes a set of intracellular or extracellular conditions that lead to the chemical or metabolic generation of reactive oxygen/nitrogen species. The reported health benefits of Korean red ginseng (KRG) include antioxidant, antitumor, antimutagenic, and immunomodulatory activities; however, the effects on oxidative stress have not yet been evaluated. Therefore, we assessed the effect of KRG on antioxidant enzymes and oxidative stress markers in humans.

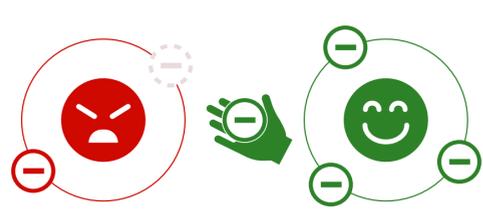
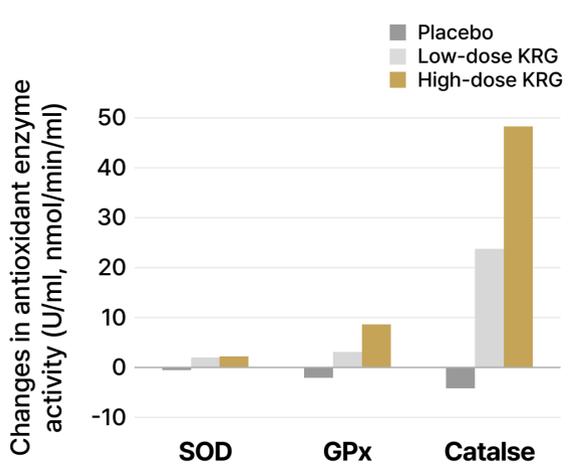
Method

A randomized, double-blind, placebo-controlled trial:
 69 healthy subjects were randomly assigned to placebo (n=23), KRG low dose 3 g/day (n=24) and KRG high-dose 6 g/day (n=22). All subjects were asked to take 10 capsules in total per day immediately after any main meals. Lymphocyte DNA damage, antioxidative enzyme activity, and lipid peroxidation were assessed before and after 8-week supplementation.

Outcome

With 69 healthy subjects (23 taking placebo, 24 taking KRG 3 g/day, 22 taking KRG 6 g/day) for 8 weeks

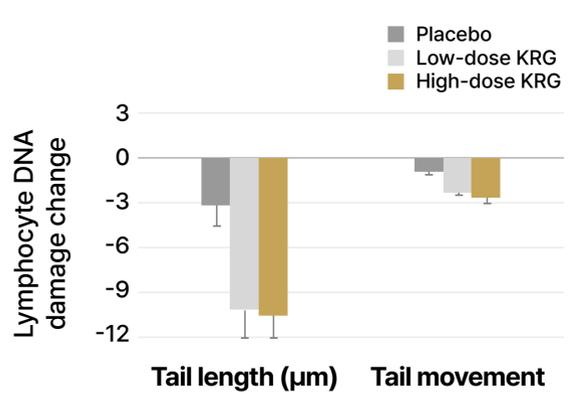
Antioxidant enzyme activities – Plasma SOD, GPx, Catalase activities



Plasma SOD, GPx and catalase activities after 8-week KRG supplementation were significantly higher than baseline activity in the KRG groups.

- The antioxidant enzyme SOD (superoxide dismutase) eliminates superoxide anions as the first line of defense against reactive oxygen species toxicity.
- The enzymes catalase and GPx (glutathione peroxidase) convert harmful H₂O₂ to harmless H₂O.

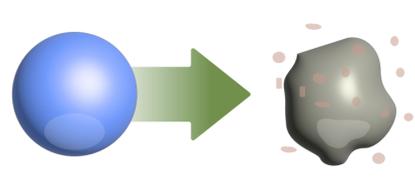
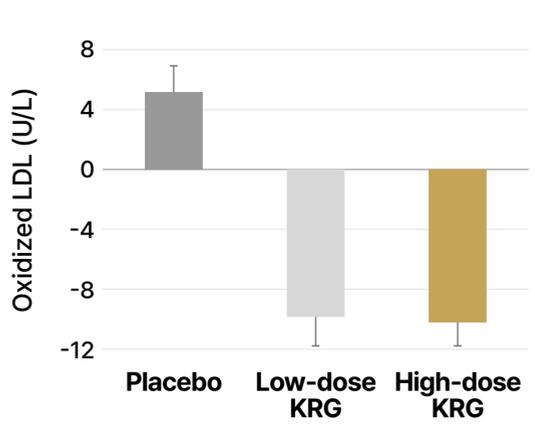
DNA Damage – DNA tail length and movement



DNA tail length and moment were significantly reduced compared to baseline after KRG supplementation.

DNA tail length and movement are indicators of lymphocyte DNA damage.

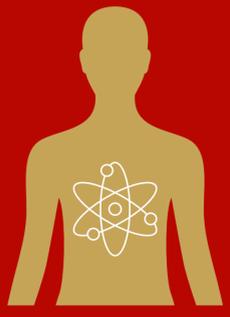
Oxidative stress biomarkers - Oxidized LDL



The plasma oxidized LDL levels decreased in the low-dose and high-dose groups after 8 weeks.

Oxidized LDL (low-density lipoprotein) induces the generation of more reactive oxygen species.

Impact



Attenuation of lymphocyte DNA damage and oxidative stress markers

KRG supplementation improved biomarkers of oxidative stress, as evidenced by decrease plasma oxidized LDL, attenuated lymphocyte DNA damage and increase plasma antioxidant enzyme activity in healthy participants.

Conclusion

The benefit of Korean Red Ginseng on oxidative stress

KRG supplementation may attenuate lymphocyte DNA damage and LDL oxidation by upregulating antioxidant enzyme activity.