

〈Regular Article〉

## Hydrolyzed Keratin Derived from Feathers Enhances Cellular Tolerance to Oxidative Stress by Activating the ERK MAP Kinase Pathway

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### Abstract

The physiological activity of hydrolyzed keratin derived from feathers was previously unclear. We examined the physiological activity of hydrolyzed keratin and the underlying mechanisms involved. When hydrolyzed keratin was administered to cultured mammalian cells, it exhibited low toxicity and enhanced resistance to oxidative stress. It was determined that hydrolyzed keratin does not directly scavenge reactive oxygen species. Instead, it activates cells and upregulates the expression of antioxidant enzymes and glutathione. Furthermore, biochemical experiments using cultured cells revealed that the increase in antioxidant activity occurs *via* the ERK MAP kinase pathway. Additionally, experiments with the model organism *Caenorhabditis elegans* demonstrated that hydrolyzed keratin boosts antioxidant enzyme expression and extends both overall and healthspan. These results suggest that hydrolyzed keratin can enhance endogenous antioxidant activity. Hydrolyzed keratin is expected to be used in cosmetics such as hair care and skin care products, and it is also expected to improve the value of feathers.

**Key words:** bioactive peptides, keratin, oxidative stress, MAP kinase, signal transduction.