p-Coumaric Acid Has Protective Effects against Mutant Copper–Zinc Superoxide Dismutase 1 *via* the Activation of Autophagy

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Amyotrophic lateral sclerosis (ALS) is a neurodegenerative disease characterized by the selective death of motor neurons. In previous our study, an ethanol extract of Brazilian green propolis (EBGP) prevented mutant copper–zinc superoxide dismutase 1 ($SOD1^{mut}$)-induced neurotoxicity. This paper aims to reveal the effects of p-coumaric acid (p-CA), an active ingredient contained in EBGP, against $SOD1^{mut}$-induced neurotoxicity. We found that p-CA reduced the accumulation of $SOD1^{mut}$ subcellular aggregation and prevented $SOD1^{mut}$-associated neurotoxicity. Moreover, p-CA attenuated $SOD1^{mut}$-induced oxidative stress and endoplasmic reticulum stress, which are significant features in ALS pathology. To examine the mechanism of neuroprotective effects, we focused on autophagy, and we found that p-CA induced autophagy. Additionally, the neuroprotective effects of p-CA were inhibited by chloroquine, an autophagy inhibiter. Therefore, these results obtained in this paper suggest that p-CA prevents $SOD1^{mut}$-induced neurotoxicity through the activation of autophagy and provides a potential therapeutic approach for ALS.