Cytochrome *c* catalyses the formation of pentyl radical and octanoic acid radical from linoleic acid hydroperoxide

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A reaction of 13-hydroperoxide octadecadienoic acid (13-HPODE) with cytochrome c was analyzed using electron spin resonance (ESR), high performance liquid chromatograph-electron spin resonance spectrometry (HPLC-ESR), and high performance liquid chromatograph-electron spin resonance-mass spectrometry (HPLC-ESR-MS) by the combined use of the spin trapping technique. The ESR, HPLC-ESR, and HPLC-ESR-MS analyses showed that cytochrome c catalyses formation of pentyl radical and octanoic acid radical from 13-HPODE. On the other hand, only a-(4-pyridyl-1-oxide)-N-tert-butylnitrone (4-POBN)/octanoic acid radical adduct was detected on the elution profile of the HPLC-ESR for the reaction mixture of 13-HPODE with hematin, indicating that hematin catalyses formation of octanoic acid radical. In addition, the reaction of 13-HPODE with cytochrome c was inhibited by chlorogenic acid, caffeic acid, and ferulic acid through two possible mechanisms, i.e., reducing cytochrome c (chlorogenic acid and caffeic acid) and scavenging the radical intermediates (chlorogenic acid, caffeic acid, and ferulic acid).