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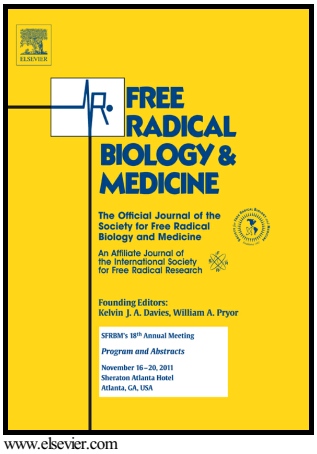

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Sulfonation of the Resolving Cysteine in Human Peroxiredoxin 1: A Comprehensive Analysis by Mass Spectrometry

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Abstract

Peroxiredoxin 1 (Prx1) is an essential peroxidase that reduces cellular peroxides. It holds 2 indispensable cysteines for its activity: a peroxidatic cysteine (C_P) for peroxide reduction and a resolving cysteine (C_R) for C_P regeneration. C_P can be readily sulfonated to C_P–SO_3H by protracted oxidative stress, which inactivates Prx1 as a peroxidase. By comparison, sulfonation of C_R to C_R–SO_3H in mammalian cells has only been reported once. The rare report of C_R sulfonation prompts the following questions: "can C_R–SO_3H be detected more readily with the current high sensitivity mass spectrometers (MS)?" and "do C_P and C_R have distinct propensities to sulfonation?" Answers to these questions could shed light on how differential sulfonation of C_P and C_R regulates Prx1 functions in cells. We used a sensitive Orbitrap MS to analyze both basal and H_2O_2-induced sulfonation of C_R and C_P in either recombinant human Prx1 (rPrx1) or

[1] Equal contribution.