大阪府立大学

第 103 回 生物科学フロンティアセミナー
第 3 回フロンティア生命科学プロジェクトセミナー

Control of Protein Function Through Oxidation and Reduction of Persulfidated States

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令和元年 ７ 月２６ 日（金） 午後 ３ 時 ００ 分より

大阪府立大学　中百舌鳥キャンパス　Ａ１２棟サイエンスホール

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In the field of Redox Biology, protein cysteine persulfidation (P-Cys-SSH) and polysulfidation (P-Cys-SS_xH) is gaining increasing attention as an important regulatory element of protein functions. Initially it was proposed to be mainly the result of hydrogen sulfide's biological actions, but recently the Akaike laboratory demonstrated that these modifications can be produced enzymatically via pathways that does not require H_2S.

We demonstrated that protein Cys per/polysulfidation is highly regulated via the NADPH-dependent reducing machineries, the thioredoxin and glutathione systems.

We have shown that persulfidation has a regulatory role on a number of protein functions and recently we also obtained evidence that these modifications have important protein protecting functions in cells and *in vivo*. In cellular systems a substantial fraction of important thiol proteins (such as peroxiredoxins, PTP1B, PTEN, KEAP1 or Hsp90) are present in their persulfidated state, which we propose is a preemptive mechanism to prevent them from overoxidation during oxidative stress. We demonstrated that protection is due to formation of perthio-sulfenic, sulfinic and sulfonic acid derivatives (Cys-$SSO_{1\text{-}3}H$), which can be reduced back by the thioredoxin system to the corresponding functional native thiol forms when the stress is over.

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