Supplementary Figure Legends

Supplementary Fig. 1. MKP2 involvement in histone H3 dephosphorylation under oxidative stress condition is dependent on p53. SH-SY5Y cells were transfected with siRNA targeting p53 or scrambled control siRNA and cultured for 48 hours. After treatment with 200 μM H_2O_2 for indicated times, cells were harvested and lysed. Then the cell lysates were subjected to immunoblotting with the indicated antibodies.

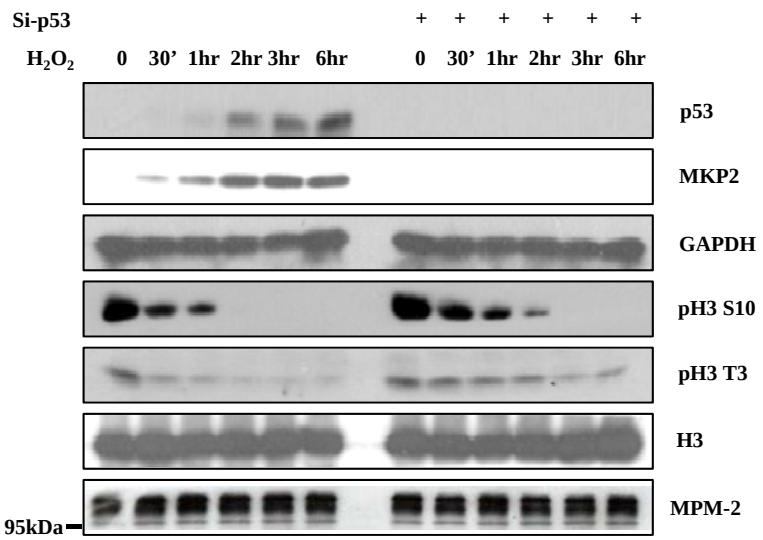
Supplementary Fig. 2. MKP2 regulates VRK1 activity regardless of its phosphatase activity. A. Indicated siRNAs were transfected into A549 cells. After 48 hours, A549 cells were harvested and the cell lysates were subjected to immunoblotting with indicated antibodies. B. Schematic diagram of MKP2. MKP2 has two important functional domains: a MAP kinase binding domain (indicated as a blue box) and a phosphatase activity domain (indicated as a pink box). In CI-MKP2, Cys280 in the phosphatase activity domain was substituted with Ser. C. MKP2 or CI-MKP2 proteins purified from PTYB2 constructs were co-incubated with pERK proteins in a phosphatase reaction condition for 30 minutes. The *in vitro* phosphatase activities of MKP2 and CI-MKP2 proteins were confirmed by immunoblotting using a pERK antibody. The amounts of MKP2, CI-MKP2, and ERK were determined by immunoblotting using MKP2 and ERK antibodies, respectively. D. Purified GST**,** GST-VRK1, MKP2, or CI-MKP2 proteins were co-incubated with BAF as a substrate for VRK1 in kinase reaction condition for 30 minutes as indicated. Purified MKP2 or CI-MKP2 proteins were used with following conditions: 250 ng for lane 2 and 4, 500 ng for lane 3 and 5. VRK1 autophosphorylation and BAF phosphorylation were determined by autoradiography. The protein quantities were determined by SYPRO-RUBY stain.

Supplementary Fig. 3. MKP2 overexpression induces decreased histone H3 phosphorylation. A-B. A549 cells were transfected with EGFP-N1 or EGFP-MKP2. After 12 hours expression, cells were synchronized to M phase by nocodazole treatments for 12 hours. Synchronized cells were released by 2-times washing with PBS and adding normal growth media as indicated times. Harvested cells were subjected to immunoblotting with indicated antibodies. Ratios of histone H3 phosphorylations against total histone H3 protein were quantified in B.

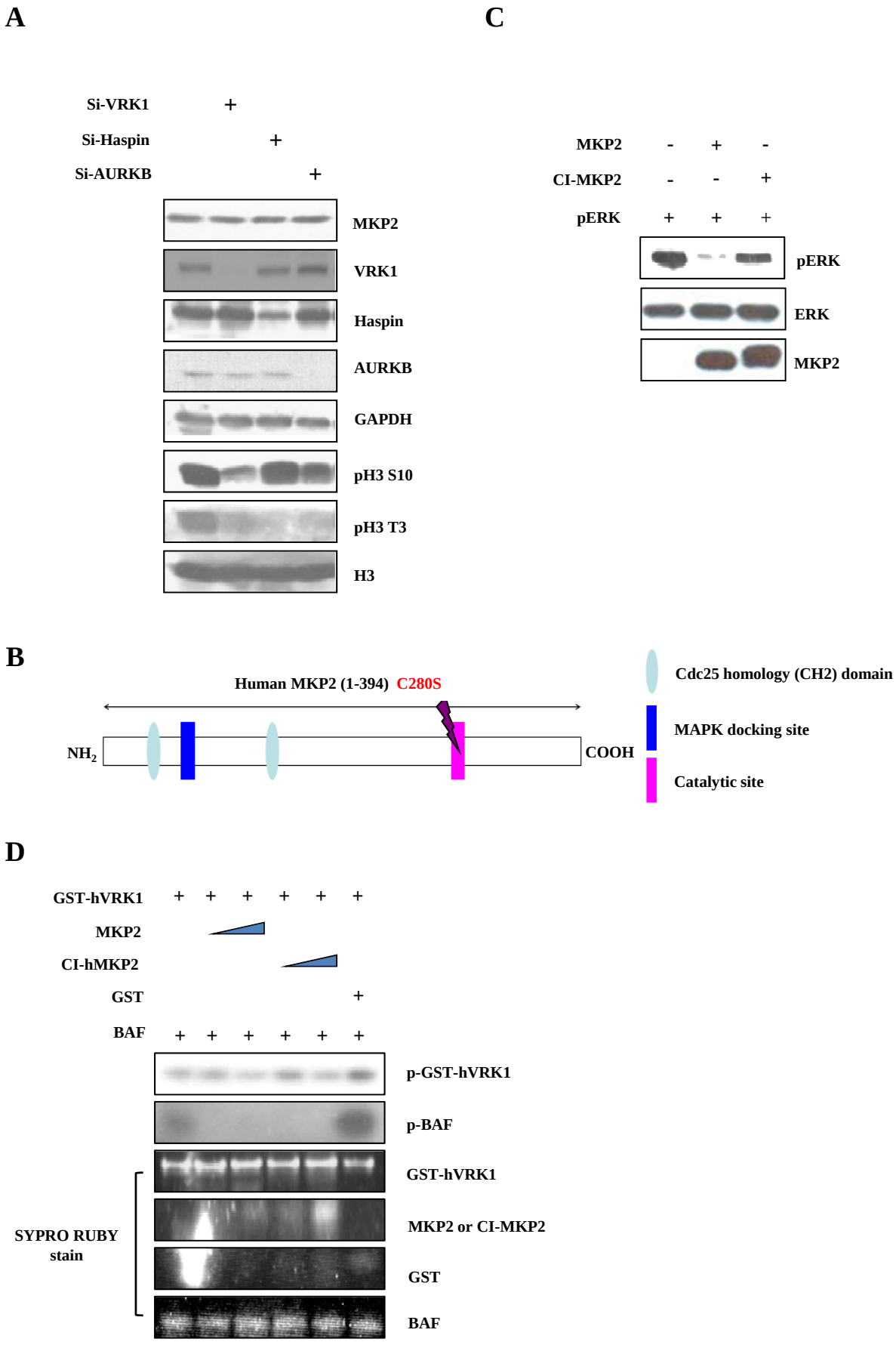
Supplementary Fig. 4. MKP2 interaction with VRK1 is independent on its phosphatase activity. A-B. HeLa cells were transfected with Flag-MKP2 (A) or Flag-CI-MKP2 (B). After 24 hours expression, HeLa cells were harvested and the cell lysates were subjected to GST pull-down assay with GST or GST-VRK1 proteins and immunoblotting with indicated

antibodies sequentially. C-D. Histone H3, MKP2 (C), or CI-MKP2 (D) proteins were pulled down with GST or GST-VRK1. The interaction was analyzed by immunoblotting with indicated antibodies.

Supplementary FIG. 1. Jeong et al.

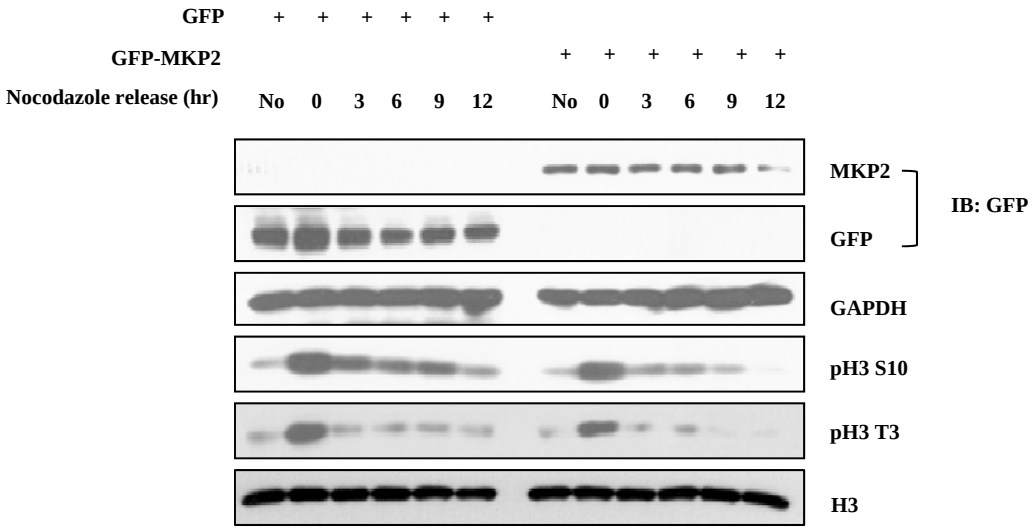


Supplementary FIG. 2. Jeong et al.

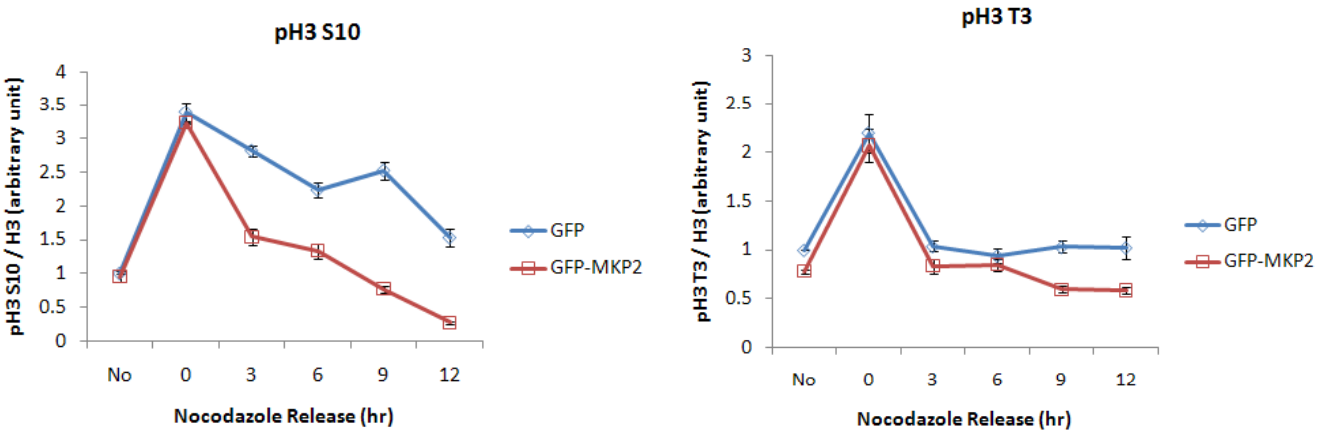


Supplementary FIG. 3. Jeong et al.

A



B



Supplementary FIG. 4. Jeong et al.