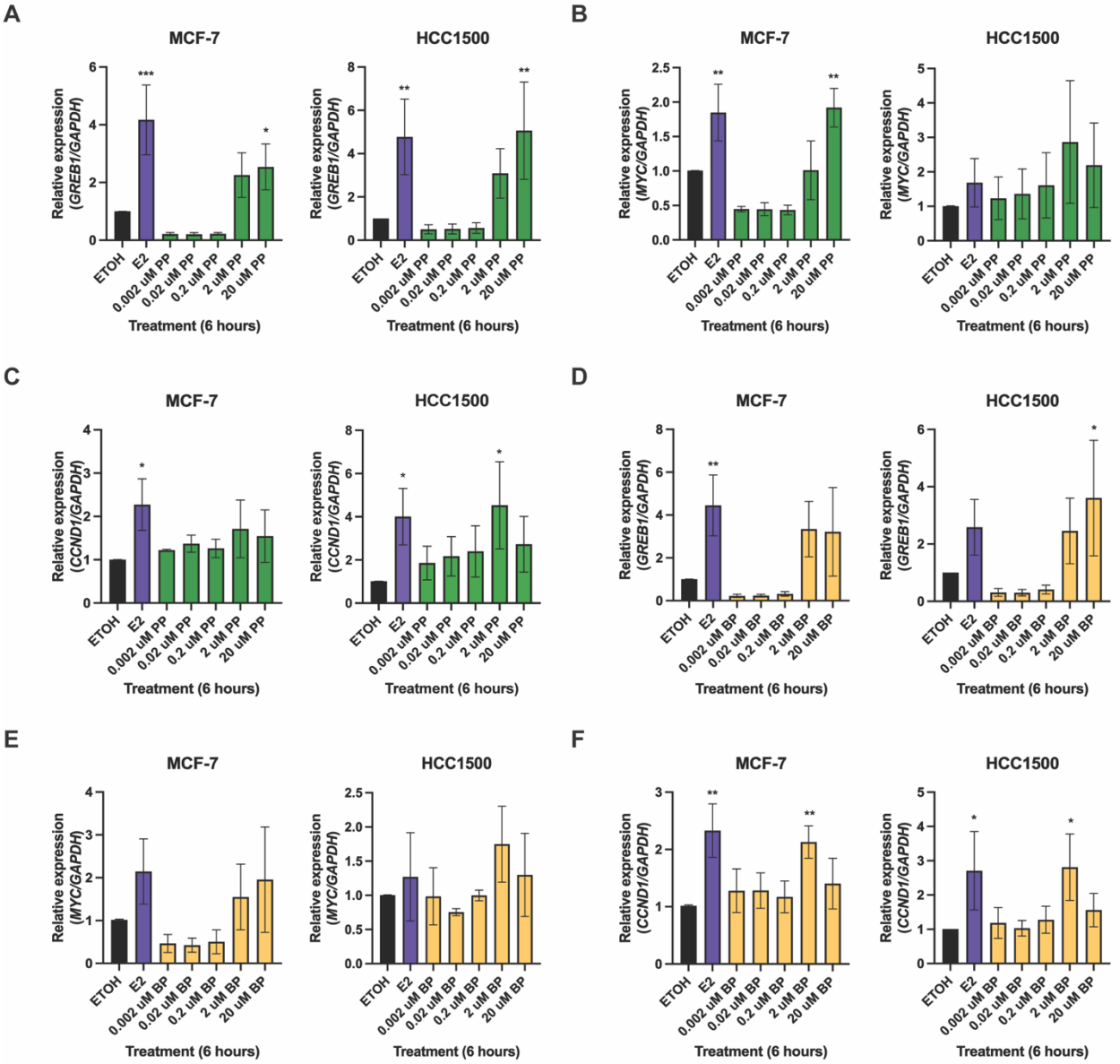
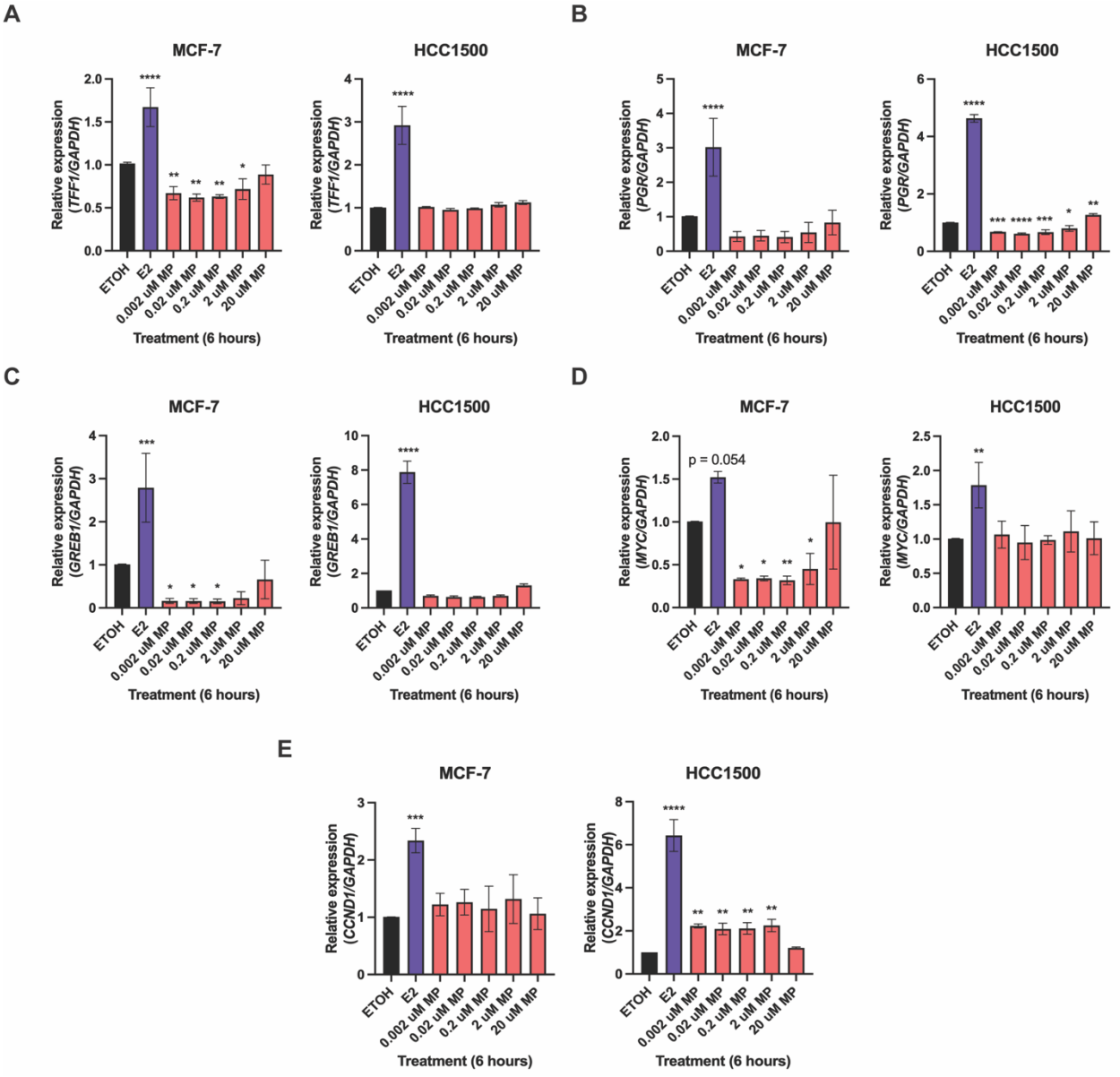
Supplemental Figure 1



Supplemental Figure 2



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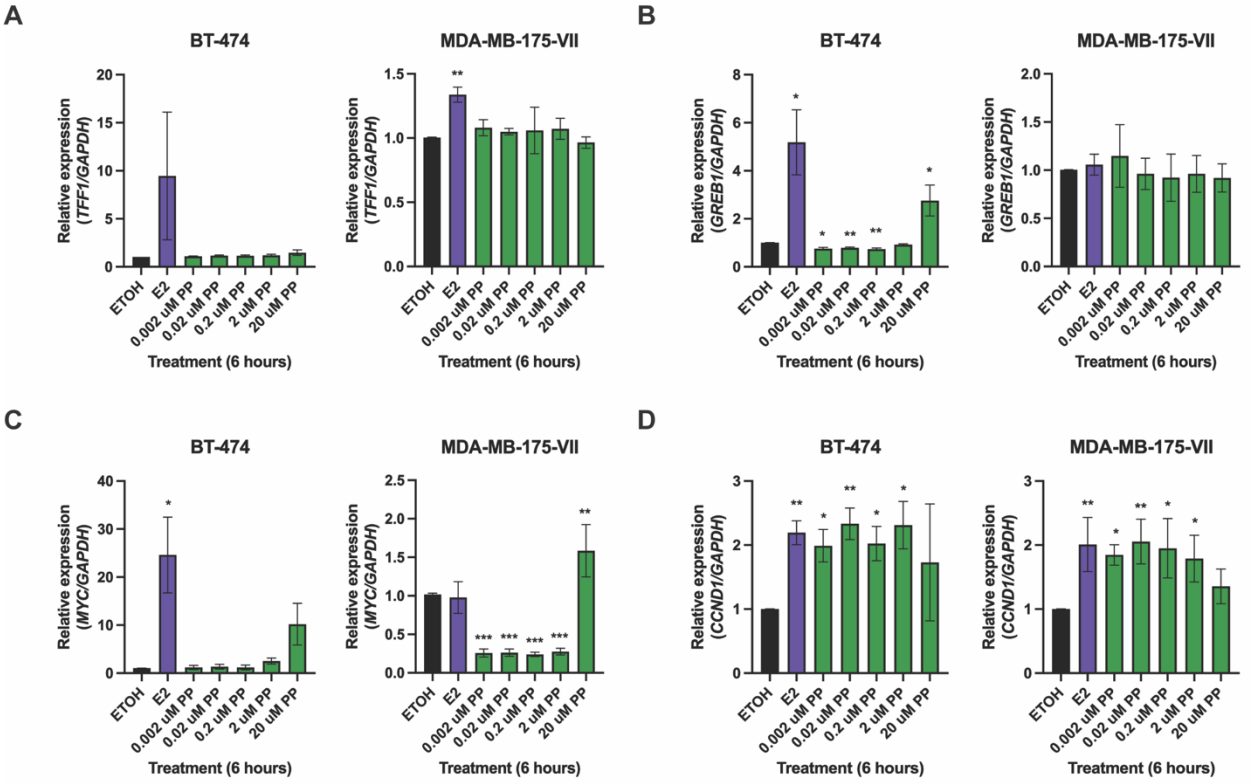
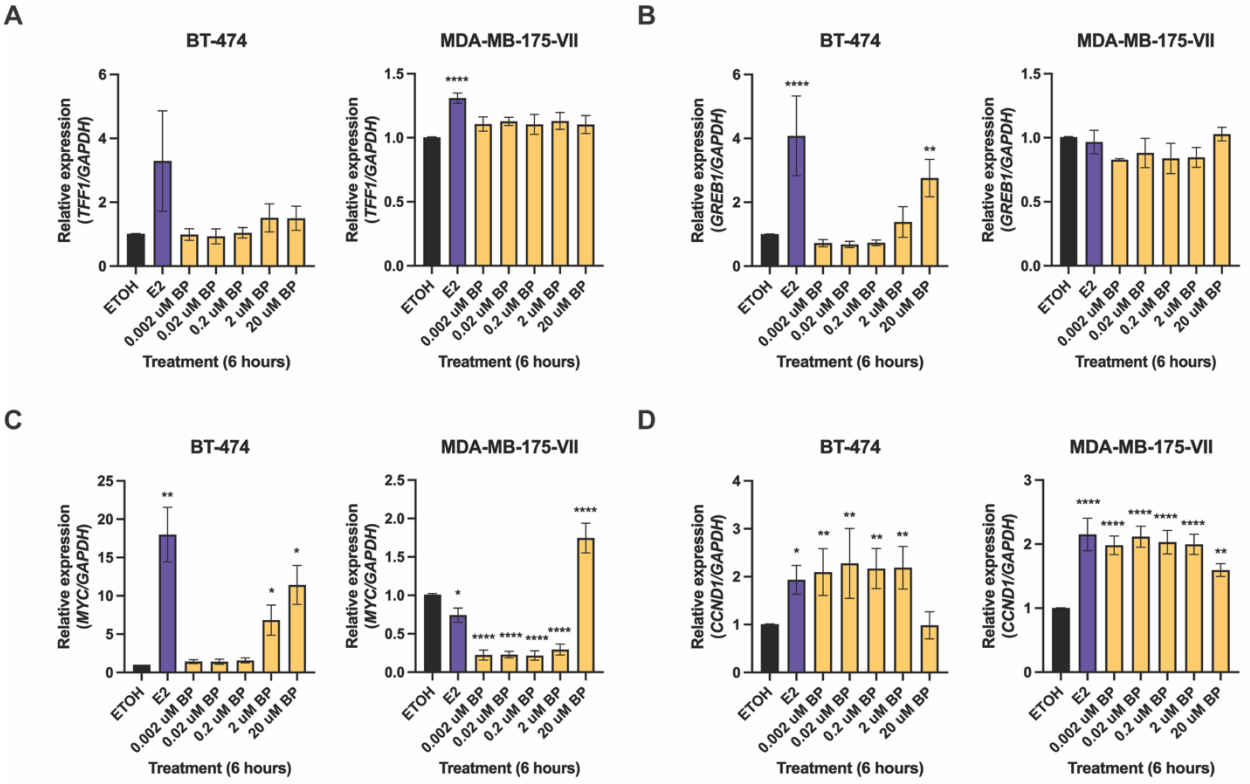
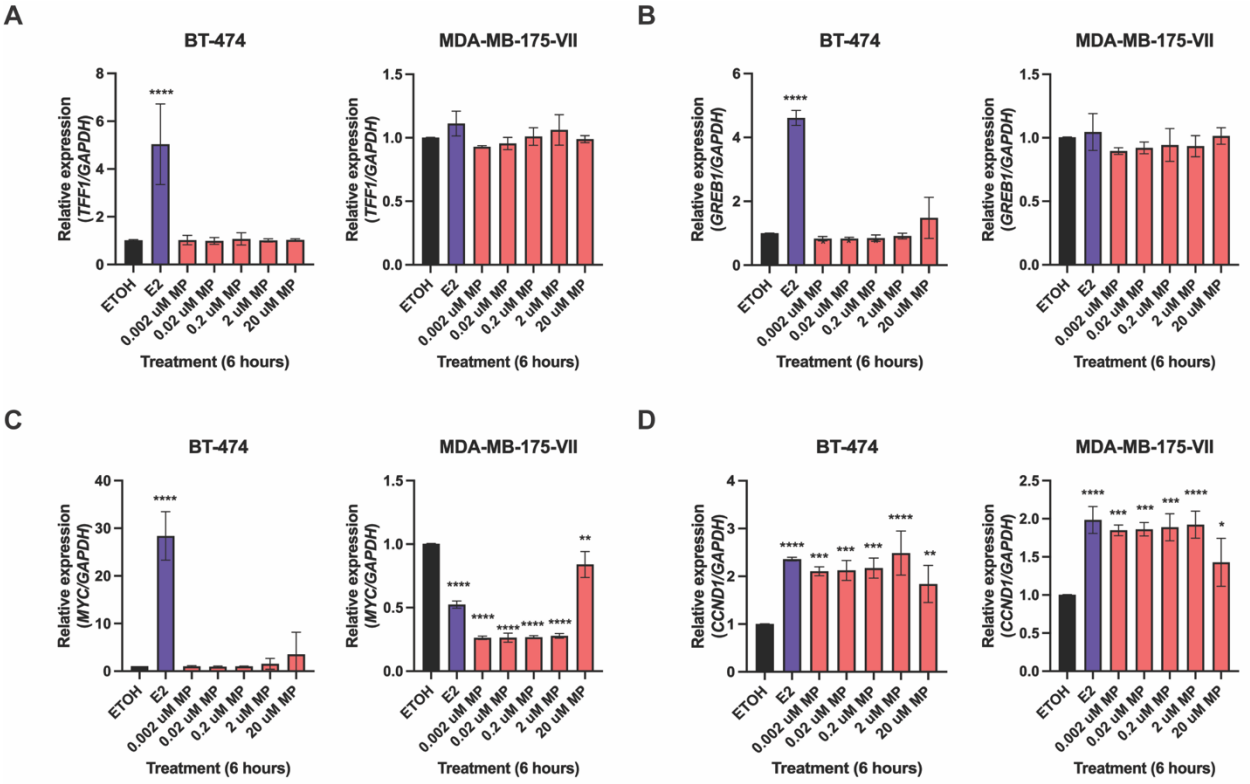


Supplemental Figure 4



Supplemental Figure 5



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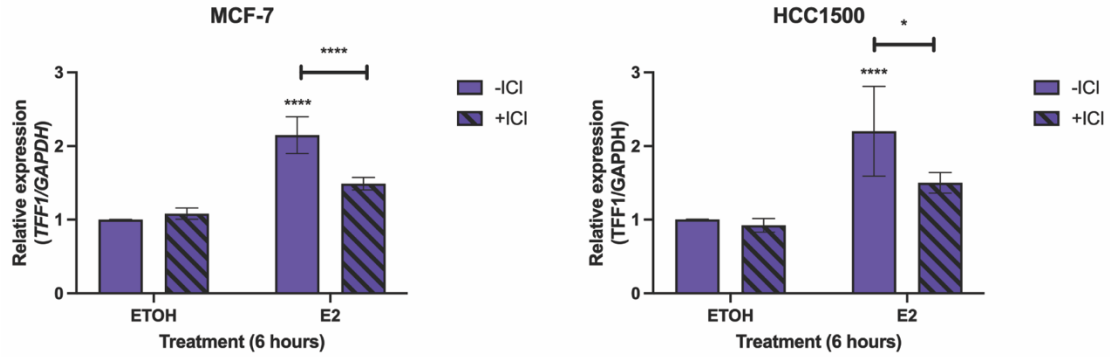
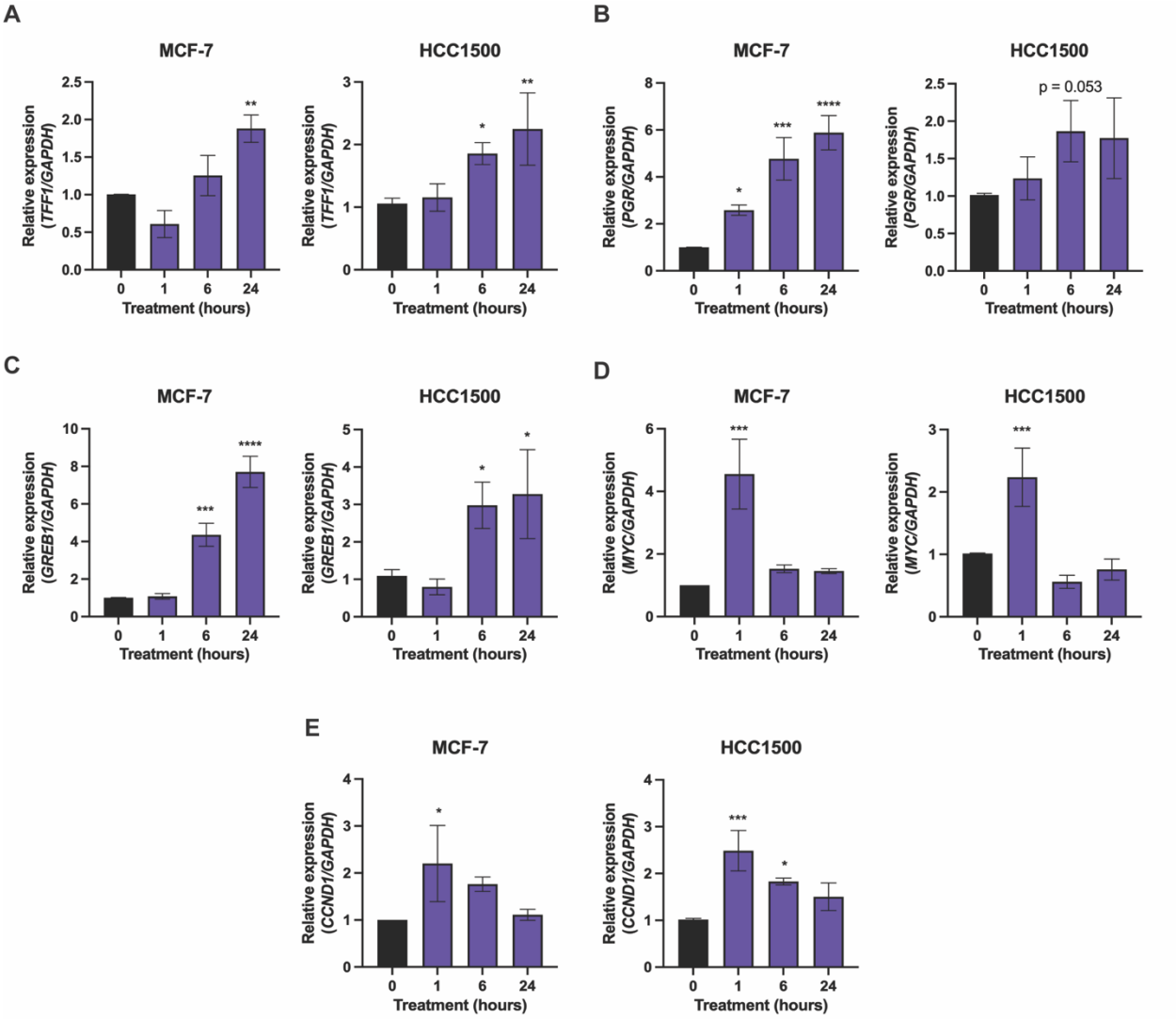
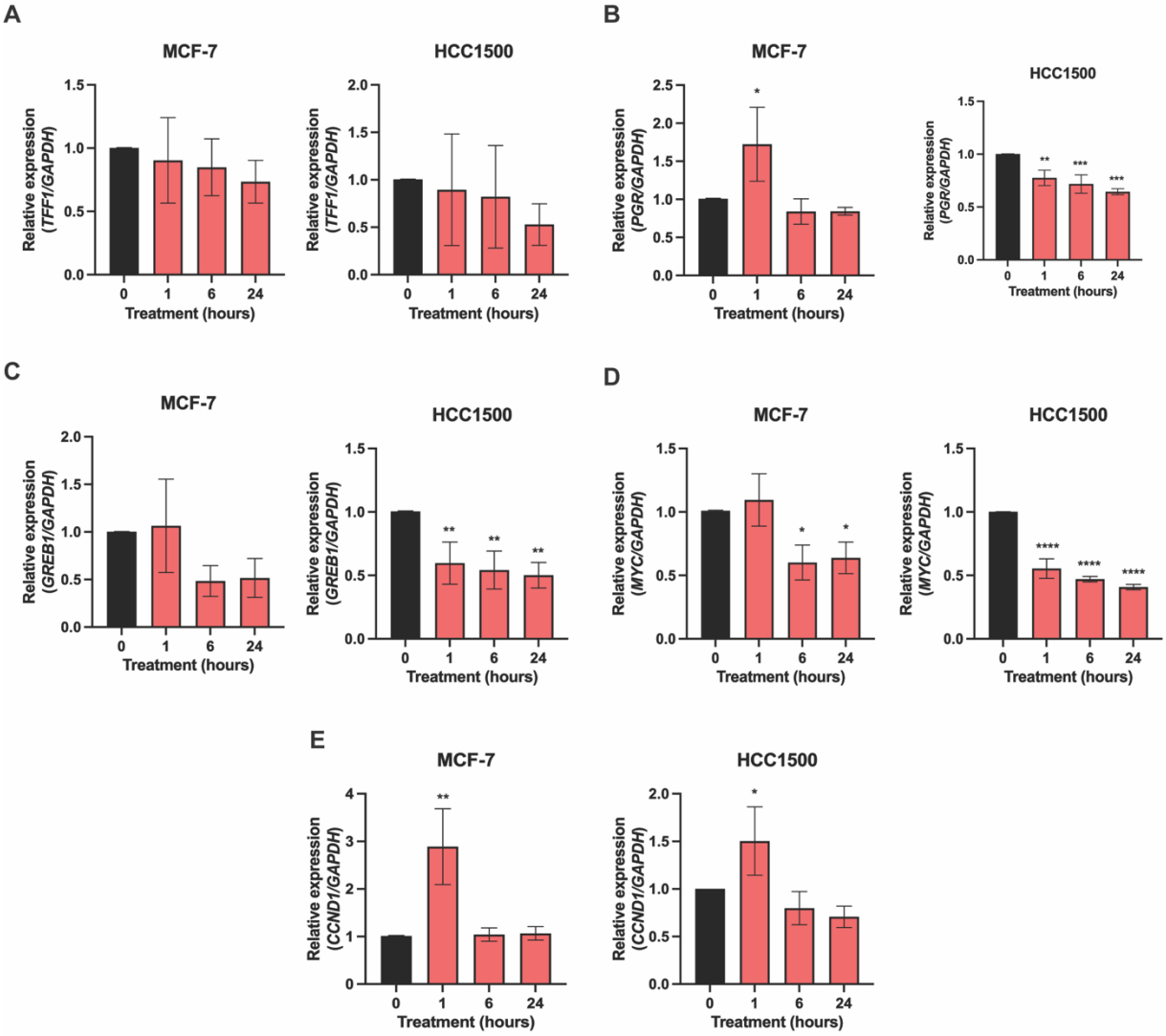


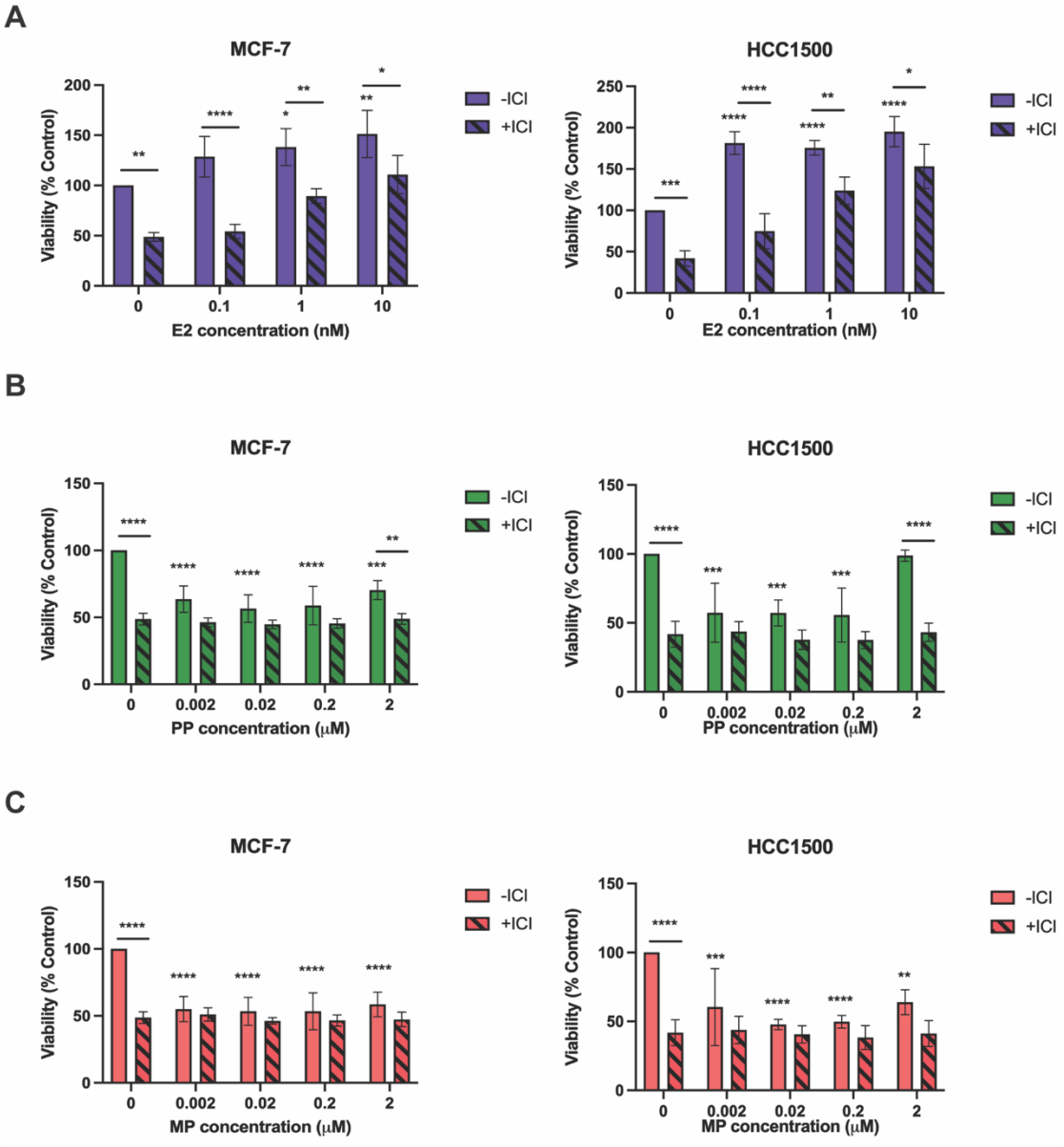
Supplemental Figure 7



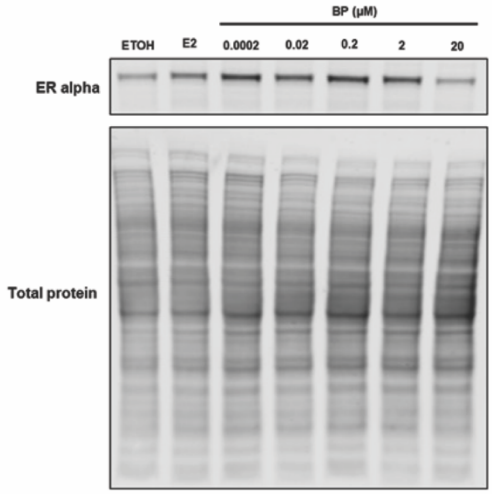
Supplemental Figure 8

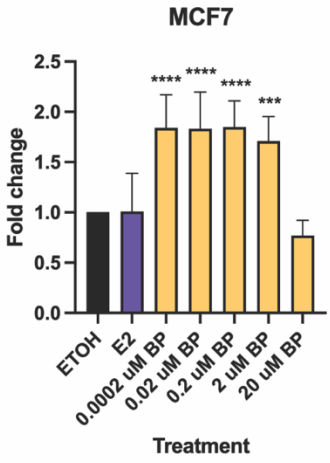


Supplemental Figure 9



Supplemental Figure 10





Supplemental Figure 1. PP- and BP-mediated regulation of ER target gene expression in MCF-7 and HCC1500 cells. MCF-7 and HCC1500 luminal A breast cancer cells were treated with the indicated doses of PP or BP for 6 hours. Quantification of **(A, D)** *GREB1*, **(B, E)** *MYC*, and **(C, F)** *CCND1* gene expression following PP or BP exposure, respectively. EtOH was used as a negative control, and E2 (10 nM) served as a positive control. GAPDH was used as a housekeeping gene. n=3, *p<0.05, **p<0.01, ***p<0.001, one-way ANOVA.

Supplemental Figure 2. MP has minimal to no effect on expression of ER target genes in MCF-7 and HCC1500 cells. MCF-7 and HCC1500 luminal A breast cancer cells were treated with the indicated doses of MP for 6 hours. Quantification of **(A)** *TFF1*, **(B)** *PGR*, **(C)** *GREB1*, **(D)** *MYC*, and **(E)** *CCND1* gene expression following MP exposure. EtOH was used as a negative control, and E2 (10 nM) served as a positive control. GAPDH was used as a housekeeping gene. n=3, *p<0.05, **p<0.01, ***p<0.001, ****p<0.0001, one-way ANOVA.

Supplemental Figure 3. PP-mediated regulation of ER target gene expression in BT-474 and MDA-MB-175-VII cells. BT-474 and MDA-MB-175-VII luminal B breast cancer cells were treated with the indicated doses of PP for 6 hours. Quantification of **(A)** *TFF1*, **(B)** *GREB1*, **(C)** *MYC*, and **(D)** *CCND1* gene expression following PP exposure. *PGR* was not expressed in the MDA-MB-175-VII cell line. EtOH was used as a negative control, and E2 (10 nM) served as a positive control. GAPDH was used as a housekeeping gene. n=3, *p<0.05, **p<0.01, ***p<0.001, one-way ANOVA.

Supplemental Figure 4. BP-mediated ER target gene expression in BT-474 and MDA-MB-175-VII cells. BT-474 and MDA-MB-175-VII luminal B breast cancer cells were treated with biologically relevant doses of BP for 6 hours. Quantification of **(A)** ***TFF1*****,** **(B)** ***GREB1*****,** **(C)** ***MYC,*** and **(D)** ***CCND1*** gene expression following BP exposure. *PGR* was not expressed in the MDA-MB-175-VII cell line. EtOH was used as a negative control, and E2 (10 nM) served as a positive control. GAPDH was used as a housekeeping gene. n=3, *p<0.05, **p<0.01, ****p<0.0001, one-way ANOVA.

Supplemental Figure 5. MP-mediated ER target gene expression in BT-474 and MDA-MB-175-VII cells. BT-474 and MDA-MB-175-VII luminal B breast cancer cells were treated with the indicated doses of MP for 6 hours. Quantification of **(A)** *TFF1*, **(B)** *GREB1*, **(C)** *MYC,* and **(D)** *CCND1* gene expression following BP exposure. *PGR* was not expressed in the MDA-MB-175-VII cell line. EtOH was used as a negative control, and E2 (10 nM) served as a positive control. GAPDH was used as a housekeeping gene. n=3, *p<0.05, **p<0.01, ***p<0.001, ****p<0.0001, one-way ANOVA.

Supplemental Figure 6. E2-mediated regulation of ER target gene expression is ER-dependent. MCF-7 and HCC1500 luminal A breast cancer cell lines were treated with 10 nM E2 for 6 hours in the presence or absence of ER-antagonist, ICI 182, 780 (10 nM). Relative gene expression of *TFF1* was assessed by real-time qualitative polymerase chain reaction. EtOH was used as a negative control. GAPDH was used as a housekeeping gene. n = 4, *p<0.05, ****p<0.0001, two-way ANOVA.

Supplemental Figure 7. E2-mediated regulation of ER target gene expression is time dependent. MCF-7 and HCC1500 luminal A breast cancer cells were treated with E2 (10 nM) for 1, 6, or 24 hours. Relative gene expression of **(A)** *TFF1*, **(B)** *PGR*, **(C)** *GREB1*, **(D)** *MYC*, and **(E)** *CCND1* was assessed by real-time qualitative polymerase chain reaction. EtOH was used as a negative control. GAPDH was used as a housekeeping gene. n=3, *p<0.05, **p<0.01, ***p<0.001, ****p<0.0001, one-way ANOVA.

Supplemental Figure 8. MP-mediated regulation of ER target gene expression is time dependent. MCF-7 and HCC1500 luminal A breast cancer cells were treated with MP (2 μM) for 1, 6, or 24 hours. Relative gene expression of **(A)** *TFF1*, **(B)** *PGR*, **(C)** *GREB1*, **(D)** *MYC*, and **(E)** *CCND1* was assessed by real-time qualitative polymerase chain reaction. EtOH was used as a negative control, and E2 (10 nM) served as a positive control. GAPDH was used as a housekeeping gene. n=3, *p<0.05, **p<0.01, ***p<0.001, ****p<0.0001, one-way ANOVA.

Supplemental Figure 9. Effect of PP or MP exposure on cell viability is not ER-dependent. MCF-7 and HCC1500 luminal A breast cancer cells were co-treated with ER-antagonist, ICI 182,780 (1 nM), and **(A)** E2, **(B)** PP, or **(C)** MP at the indicated doses for 7 days. EtOH was used as a negative control. n=4, *p<0.05, **p<0.01, ***p<0.001, ****p<0.0001, two-way ANOVA.

Supplemental Figure 10. BP-mediated effects on ER protein expression in MCF-7 cells. MCF-7 luminal A breast cancer cells were treated with the indicated doses of BP for 24 hours. **(A)**

Representative western blot image, and quantified bar graph displaying BP-mediated effect on ERα protein expression in the MCF-7 cell line. EtOH was used as a negative control, and E2 (10 nM) served as a positive control. n=6, ***p<0.001, ****p<0.0001, one-way ANOVA.