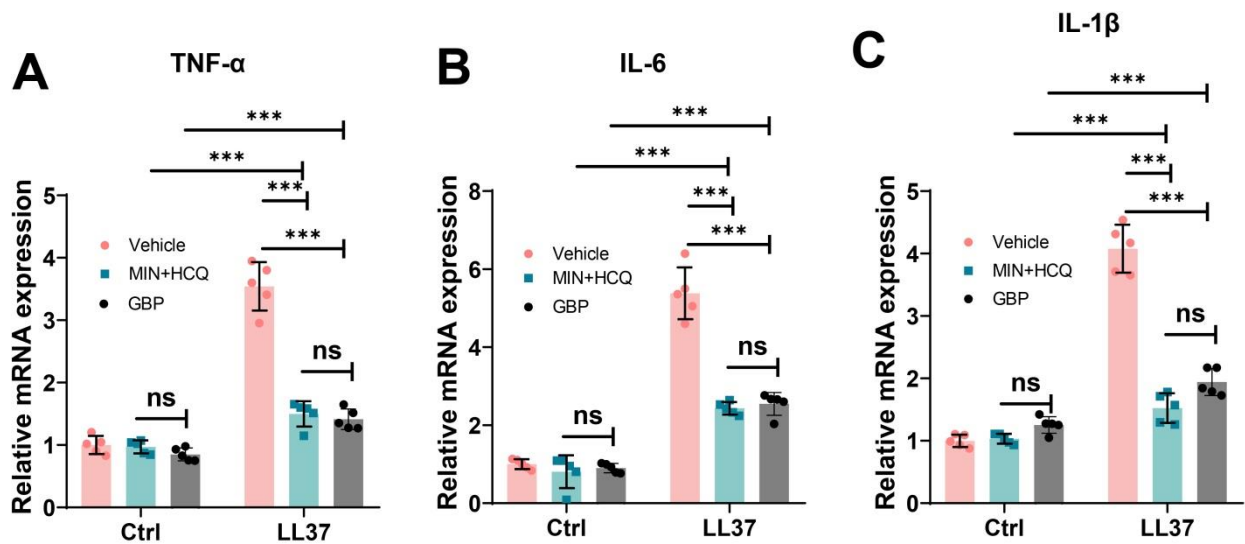
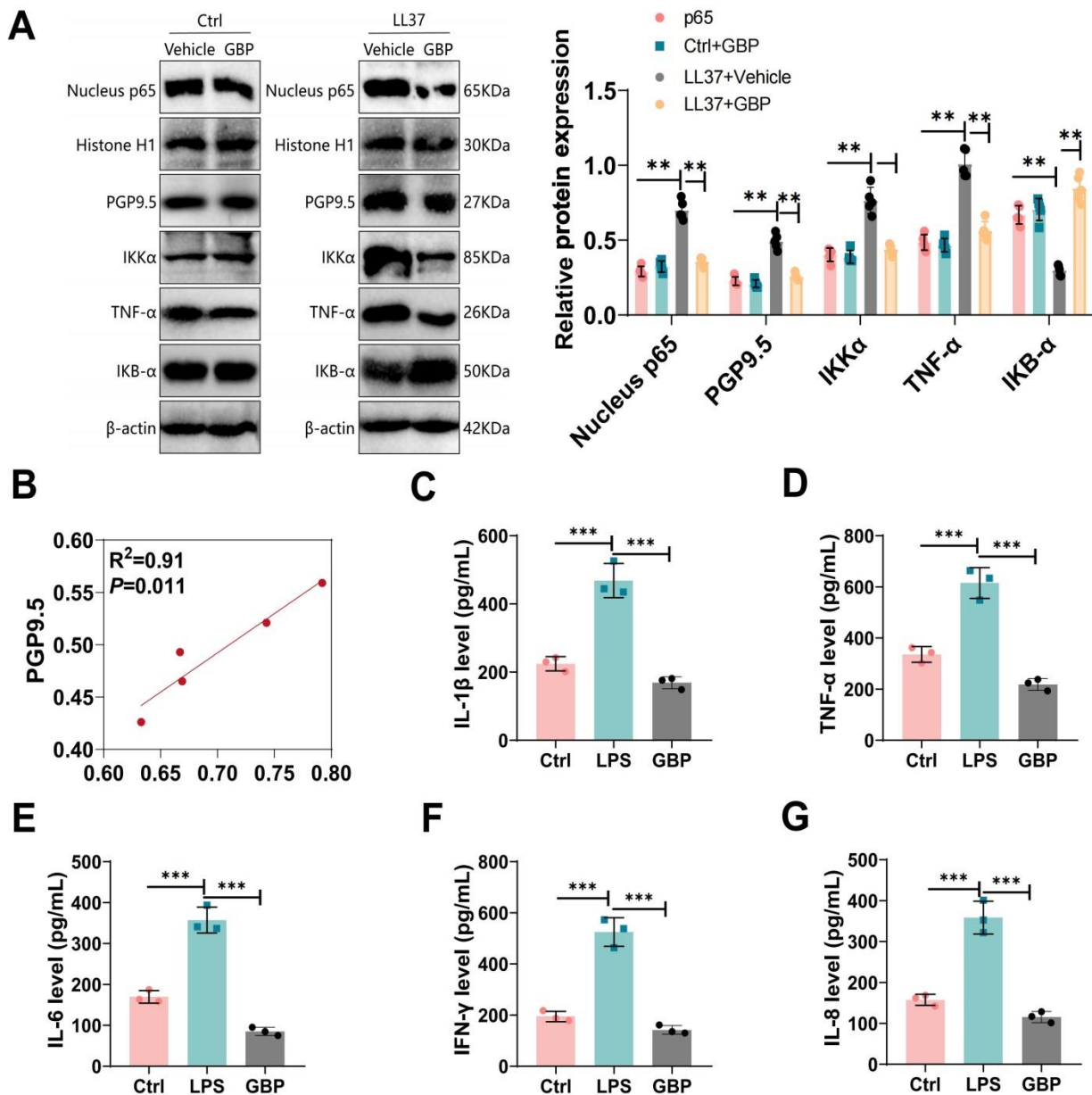




Supplementary Figure 1. GBP inhibits the expression levels of inflammatory cytokines in rosacea.

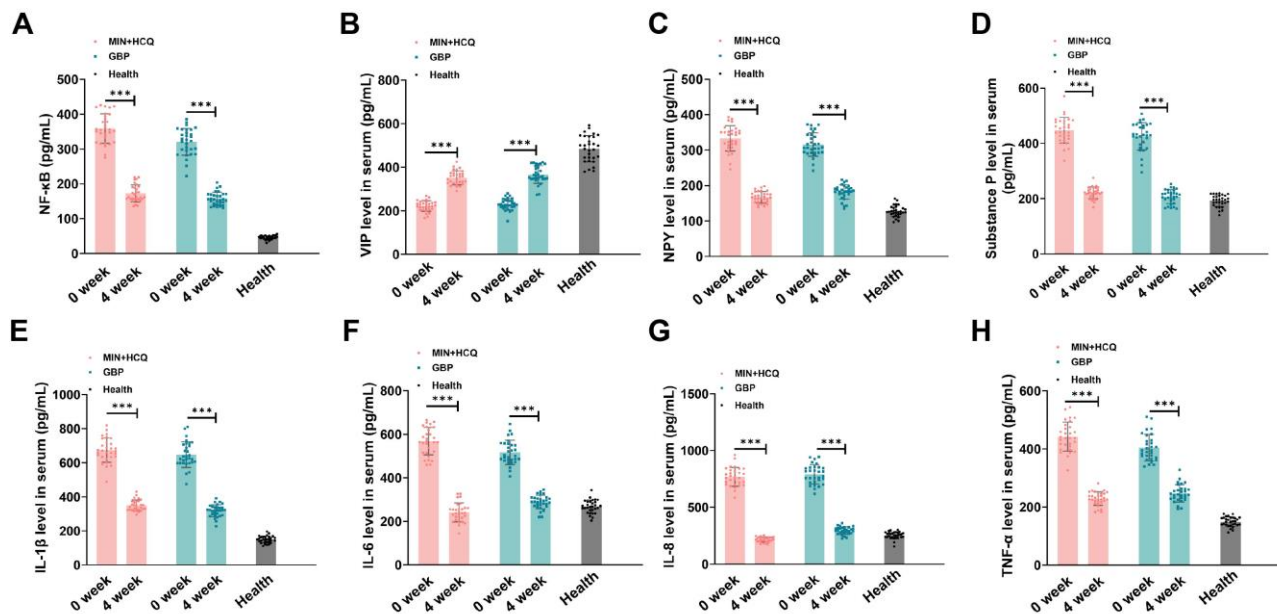
Note: (A-C) RT-qPCR detection of *TNF- α* mRNA (A), *IL-6* mRNA (B), and *IL-1 β* mRNA (C) expression levels in the dermal tissues of each group of mice. All data are expressed as mean $\pm$ standard deviation (SD). Comparisons among multiple groups were performed using one-way analysis of variance (ANOVA), followed by post hoc tests with Dunnett's T3 and LSD-t methods. Animal experiment $n=5$, ^{ns} $P>0.05$, *** $P<0.001$.



Supplementary Figure 2. Detection of NF-κB-Related inflammatory factors.

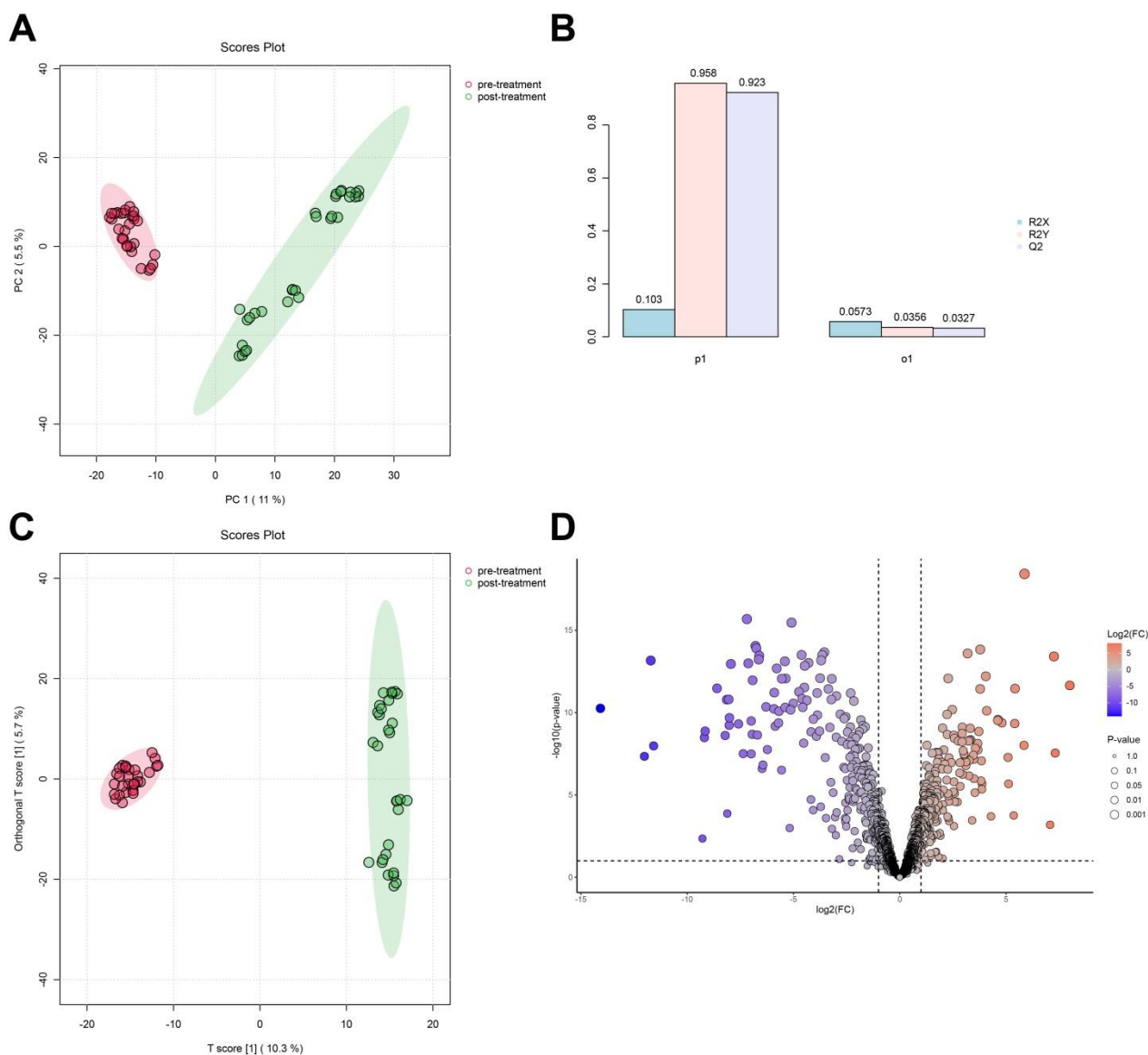
Note: (A) Western blot analysis of Nuclear p65, PGP9.5, IKKα, TNF-α, and IKB-α protein expression in dermal tissues of each group of mice; (B) Correlation analysis (n=10) of Nuclear p65 (detected by Western blot) and PGP9.5 (detected by Western blot) expression in the epidermis of mice with rosacea lesions using Spearman correlation coefficient for correlation analysis (two-tailed); (C-G) ELISA detection of IL-1β (C), TNF-α (D), IL-6 (E), IFN-γ (F), and IL-8 (G) expression in the supernatant of BV2 cells. All data are expressed as mean ± standard deviation (SD). Comparisons among multiple groups were performed using one-way analysis of variance (ANOVA), followed by Dunnett's T3 and LSD-t post hoc tests. Animal experiment n=5, cell

experiment repeated three times, ** $P < 0.01$, *** $P < 0.001$.



Supplementary Figure 3. GBP Inhibits the Expression of Inflammatory Cytokines in the Serum of Rosacea Patients.

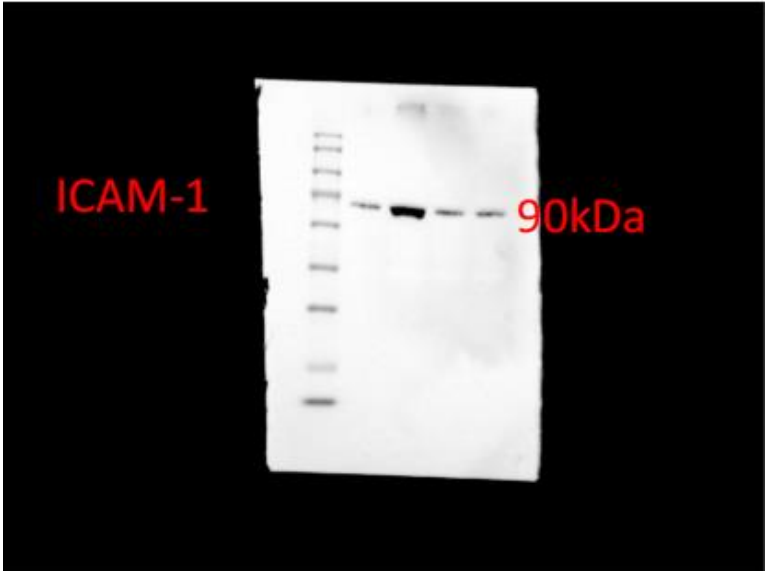
Note: (A-H) ELISA detection of serum levels of inflammatory cytokines in each group of 30 rosacea patients receiving either the MIN and HCQ combination treatment or GBP treatment after 4 weeks of therapy to assess the expression of NF-κB (A), VIP (B), NPY (C), substance P (D), IL-1β (E), IL-6 (F), IL-8 (G), and TNF-α (H) in the serum of each group of patients. All data are expressed as mean ± standard deviation (SD). Comparisons among multiple groups were performed using one-way analysis of variance (ANOVA), followed by post hoc tests with Dunnett's T3 and LSD-t methods. *** $P < 0.001$.



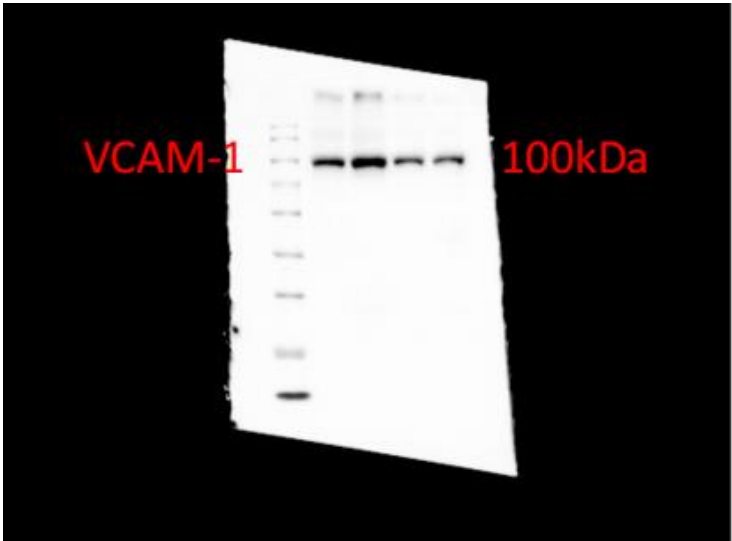
Supplementary Figure 4. PLS-DA analysis of serum metabolomics in different groups of patients.

Note: (A) PCA score plot of rosacea patients treated with GBP; (B-C) OPLS-DA score plot of rosacea patients treated with GBP; (D) Volcano plot showing the metabolites identified in the metabolomics analysis. Each point represents a metabolite, with red points representing pre-treatment with GBP (0 Week), blue points representing post-treatment with GBP (4 Weeks), and grey points representing metabolites that are not significantly different between the two groups.

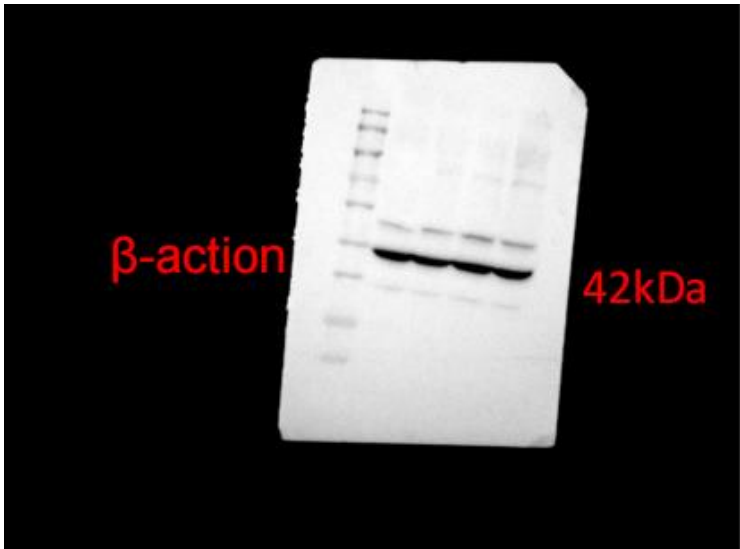
Supplementary figure 5 Blots and gels



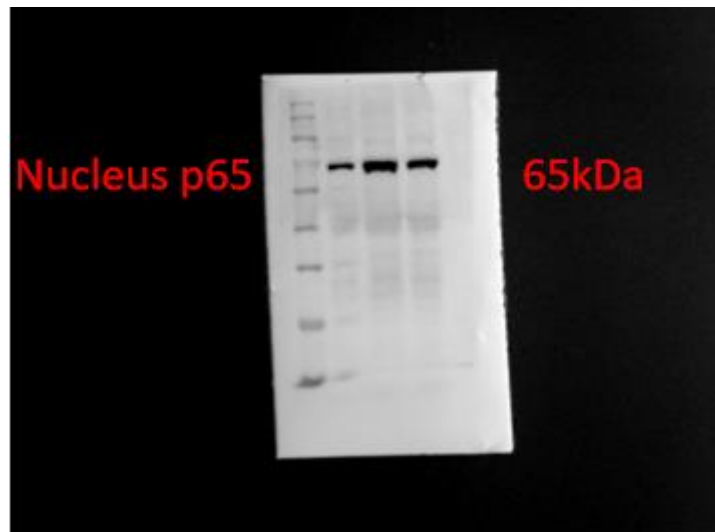
Uncropped and unedited blot/gel image for Figure 2D-1



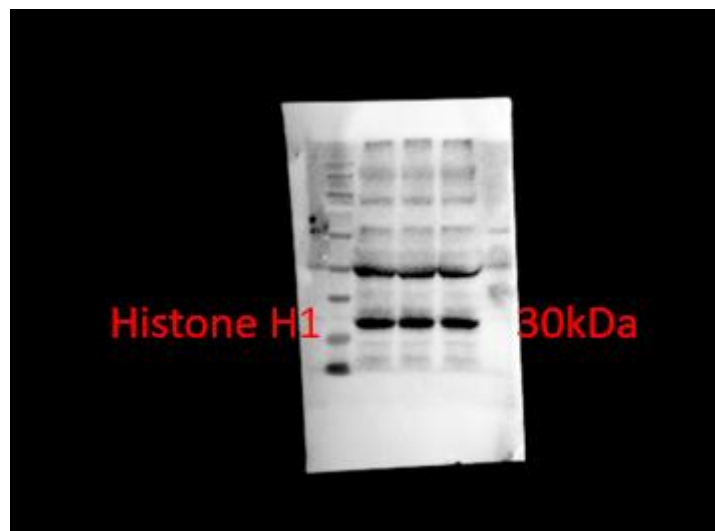
Uncropped and unedited blot/gel image for Figure 2D-2



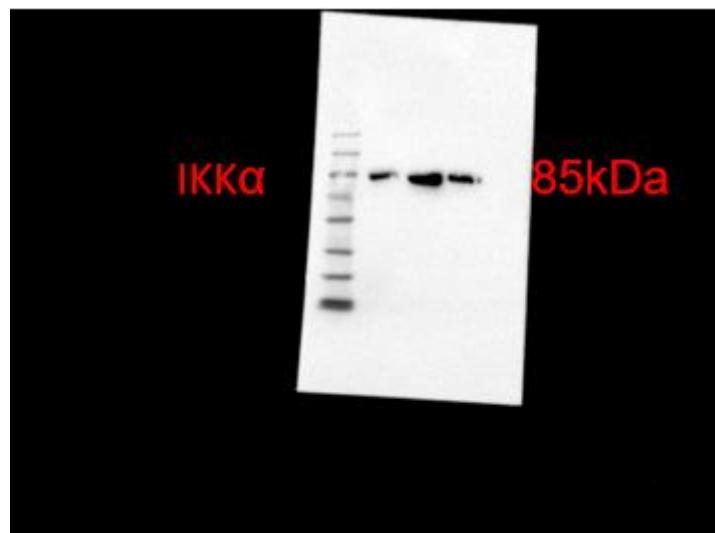
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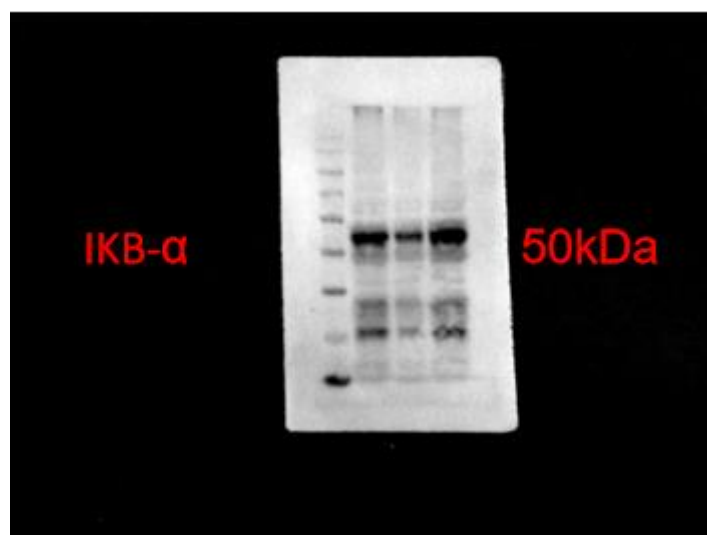
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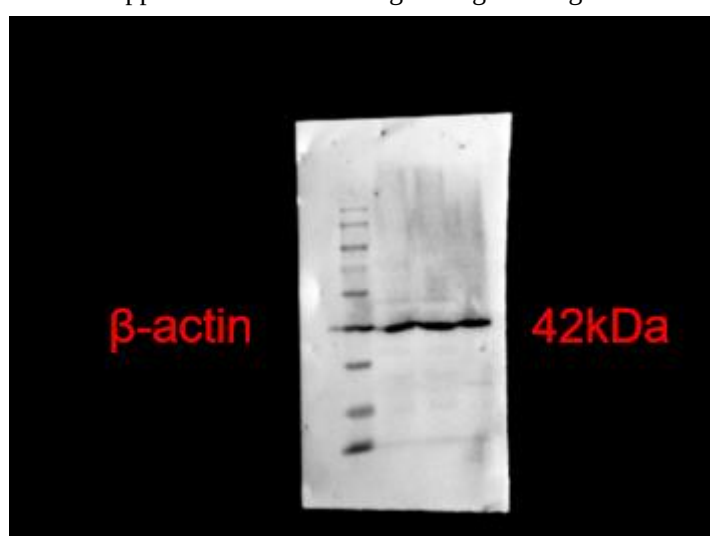
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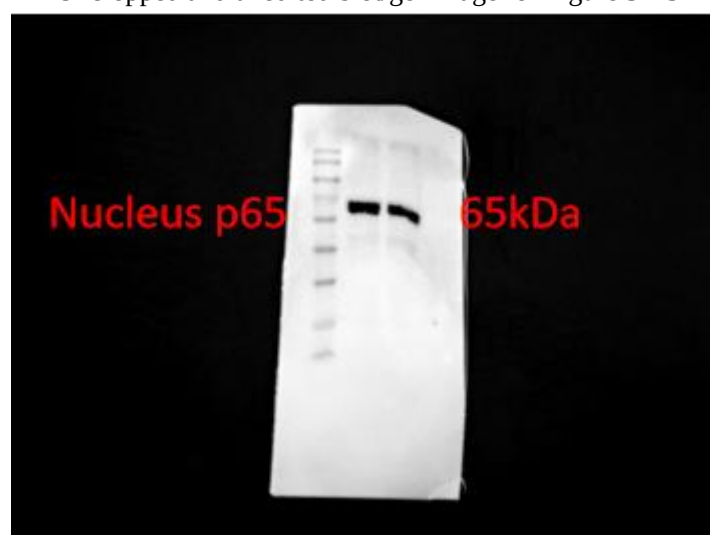
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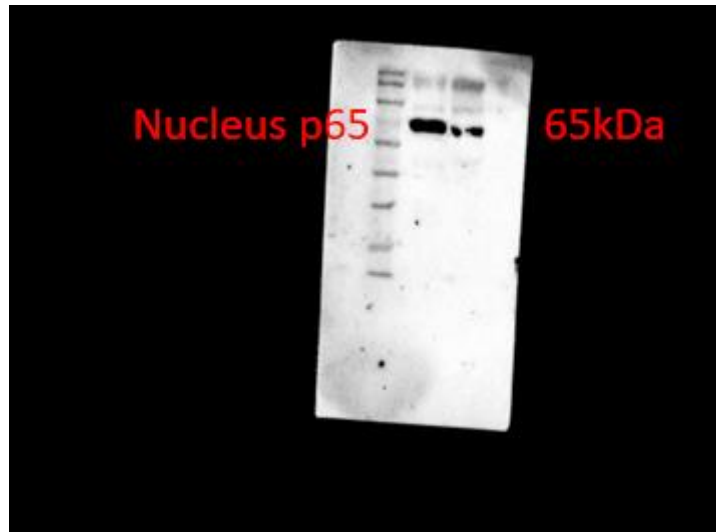
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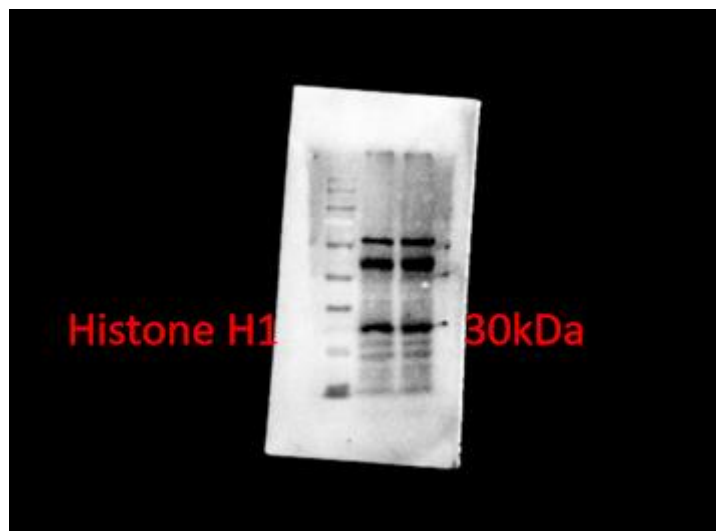
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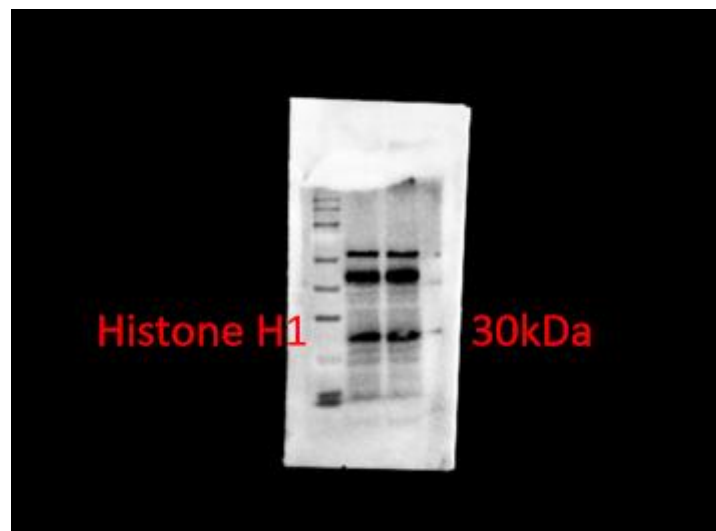
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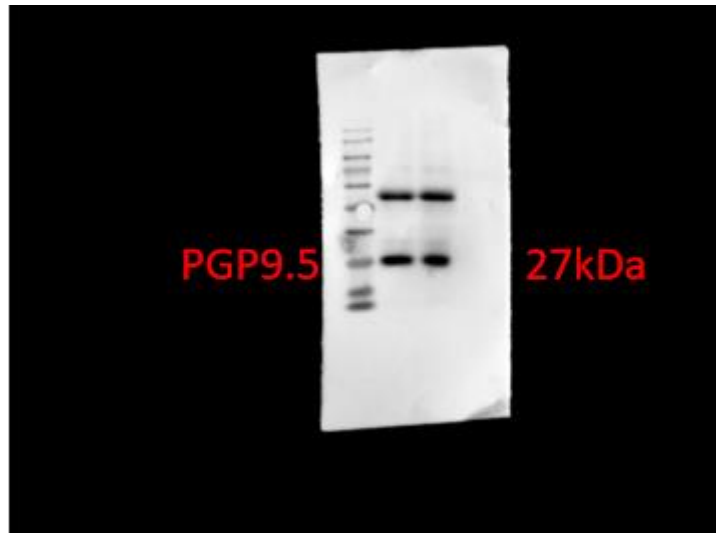
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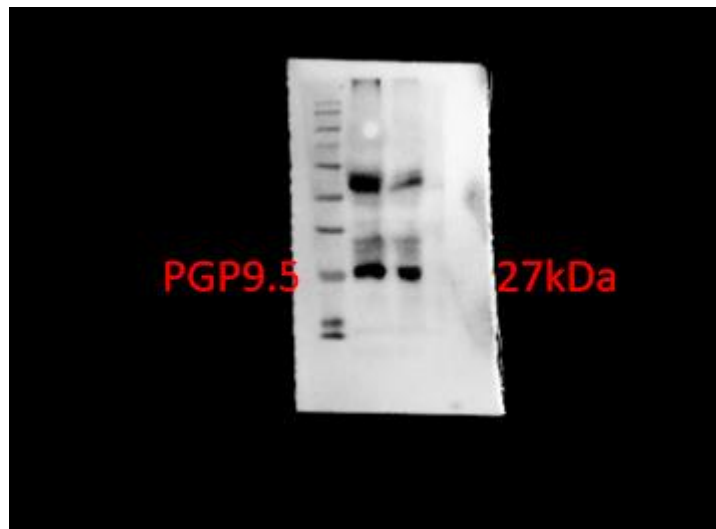
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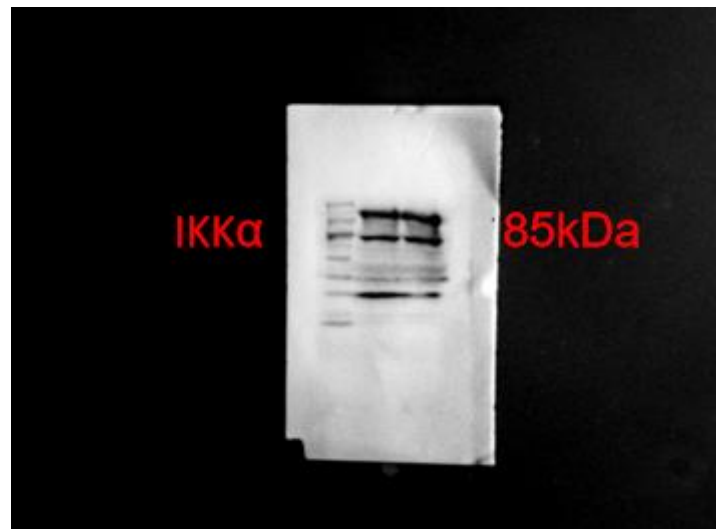
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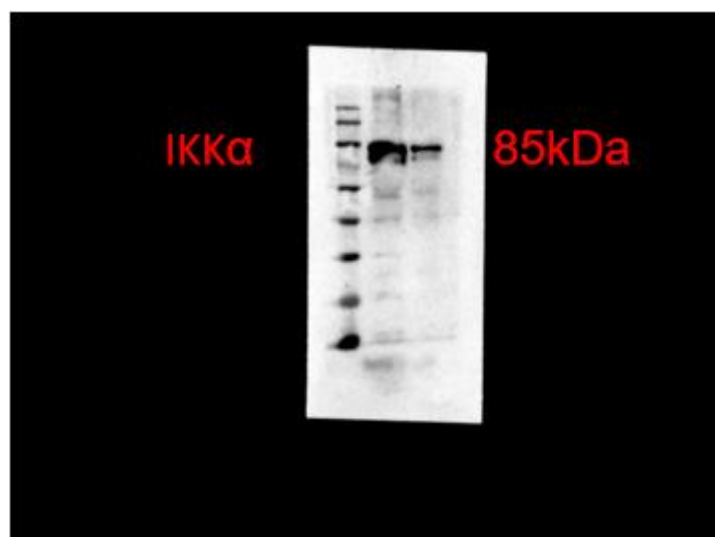
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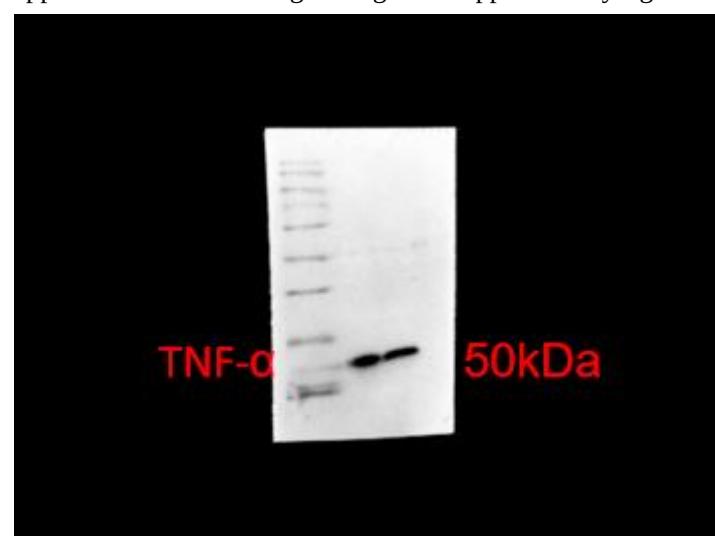
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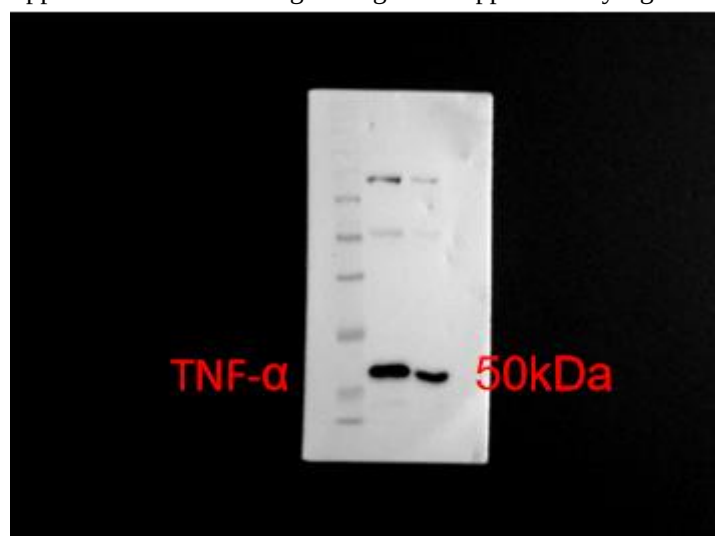
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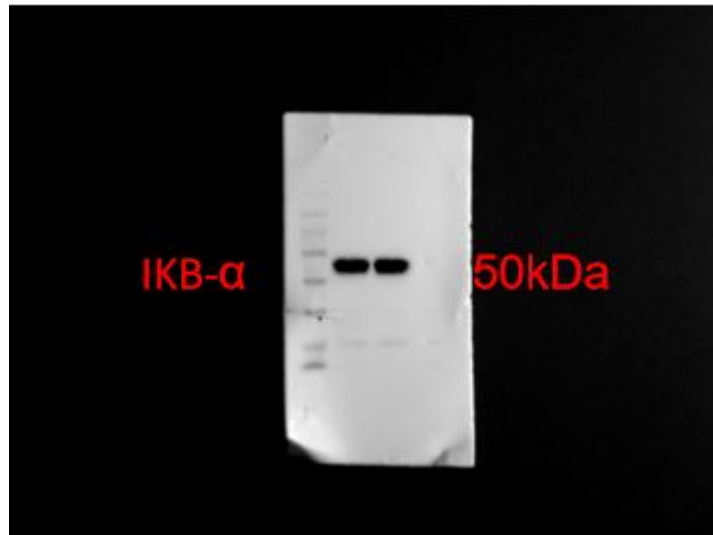
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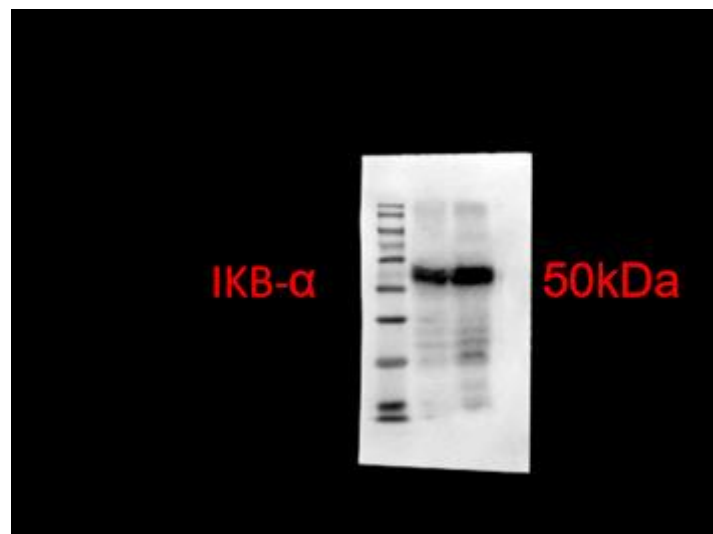
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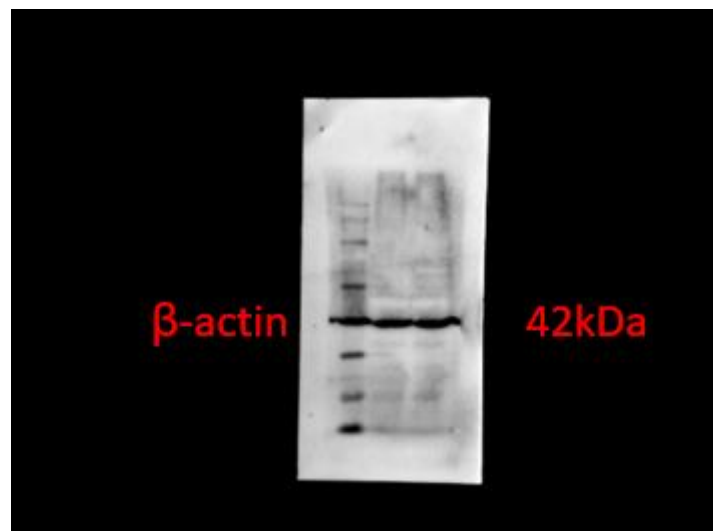
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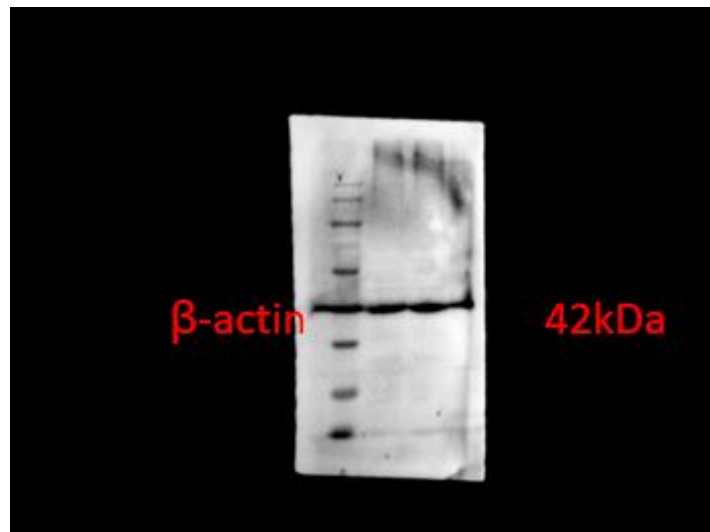
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Uncropped and unedited blot/gel image for Supplementary figure 2A-6-2



Uncropped and unedited blot/gel image for Supplementary figure 2A-7-1



Uncropped and unedited blot/gel image for Supplementary figure 2A-7-2