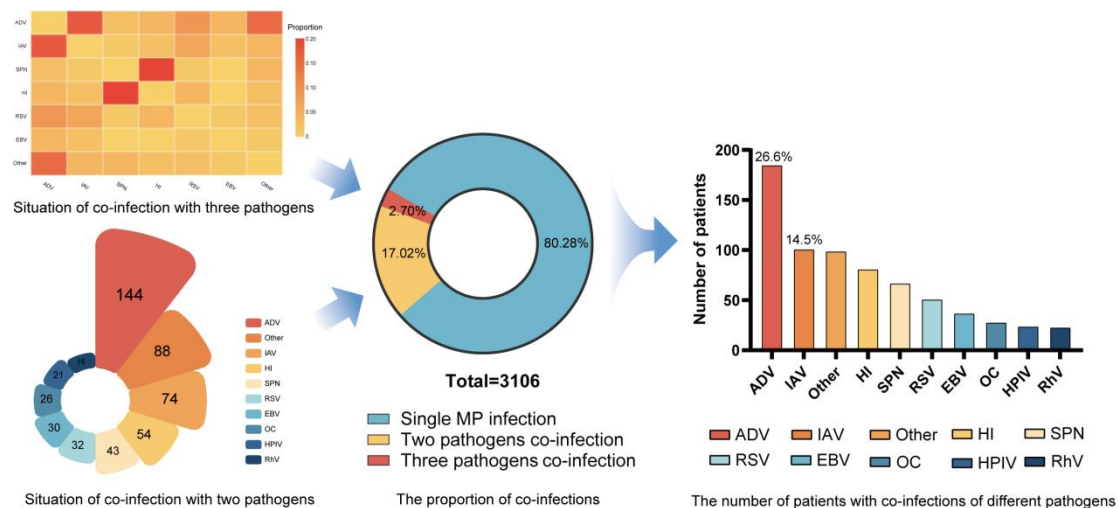
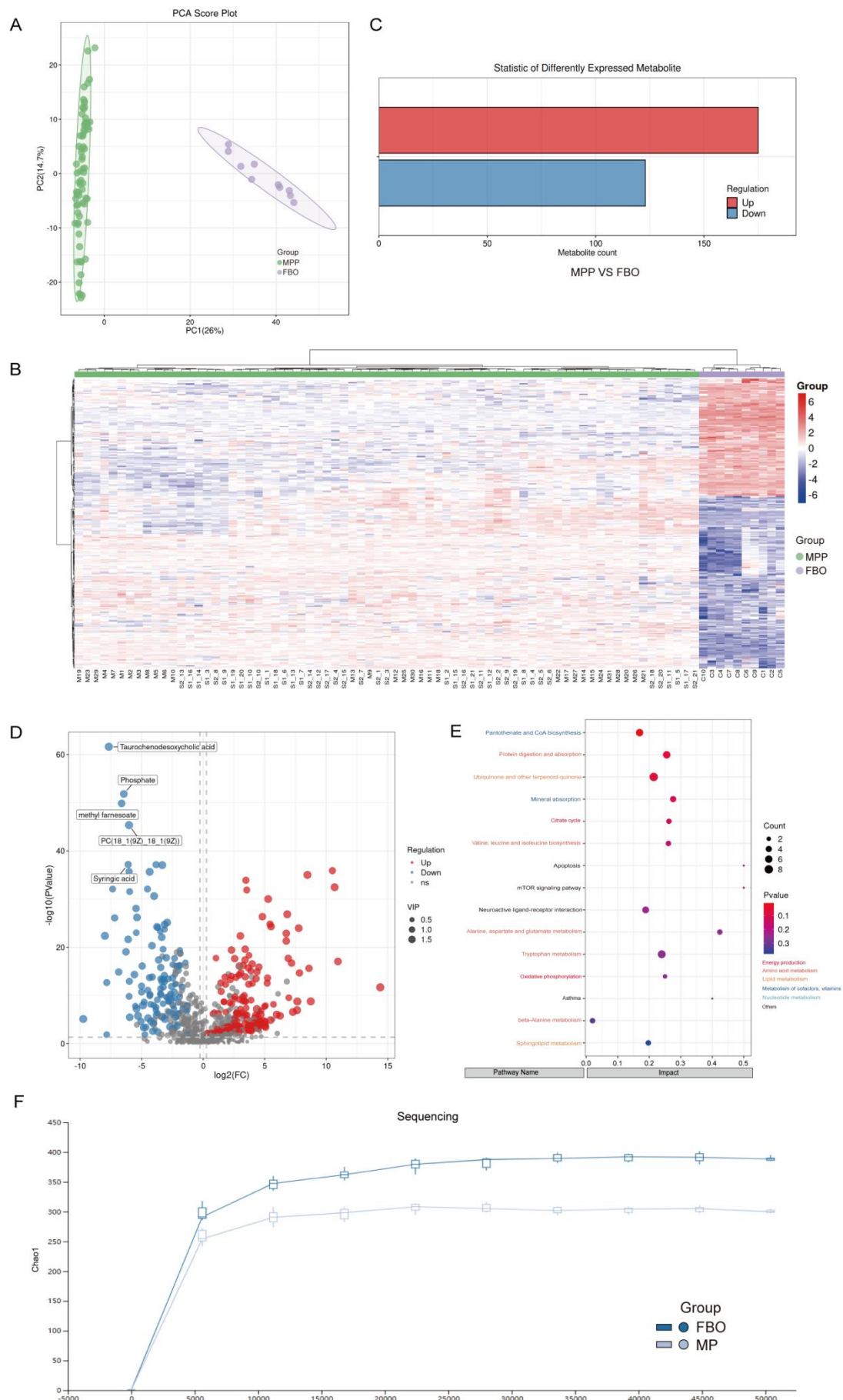
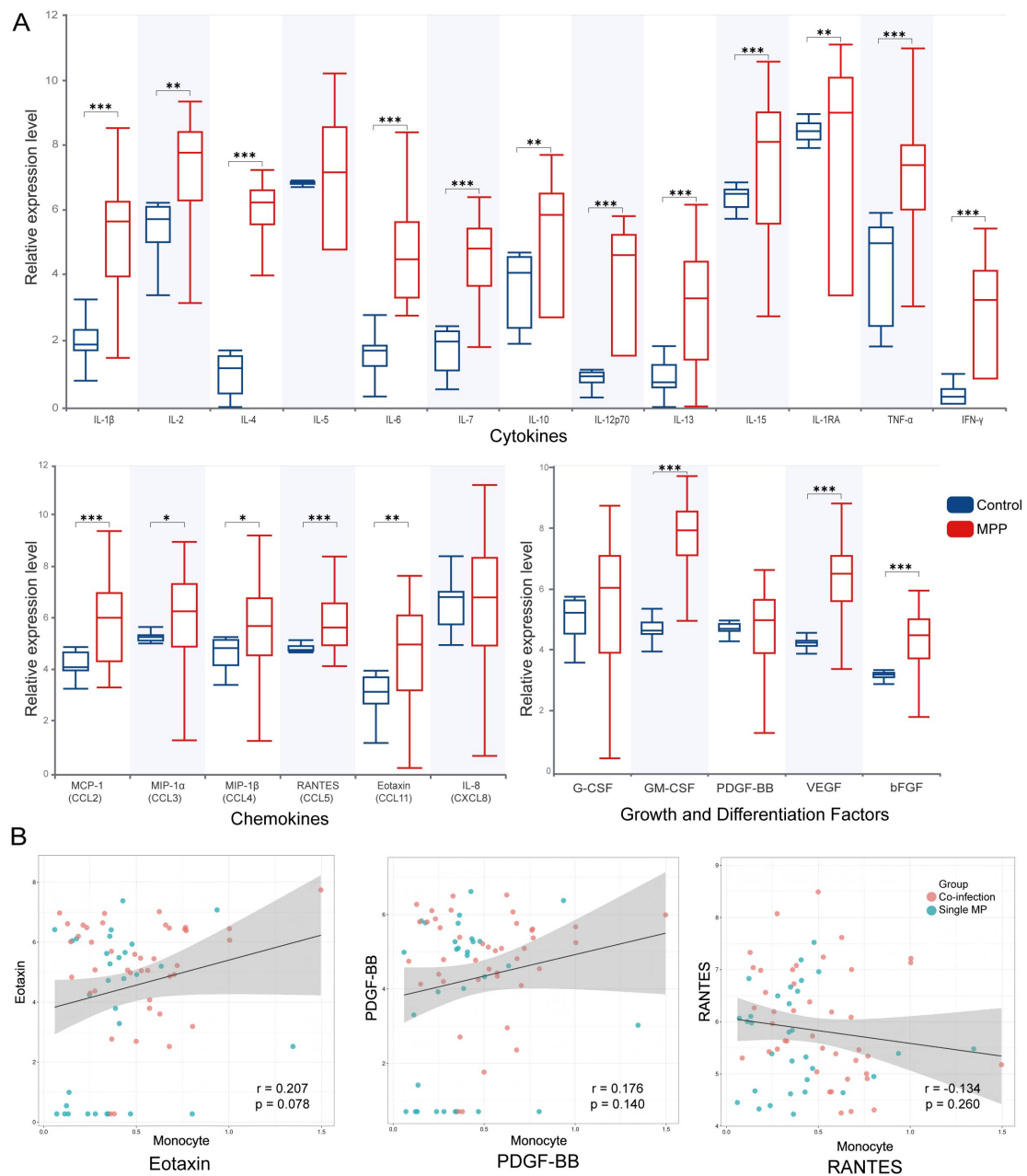




Supplementary Figure 1. The co-infection status of patients with MPP in Henan Province from 2022 to 2024. ADV: adenovirus; IAV: influenza a virus; HI: Haemophilus influenzae; SPN: streptococcus pneumoniae; RSV: respiratory syncytial virus; EBV: Epstein-Barr virus; OC: oral candidosis; HPIV: Human parainfluenza virus; Rhv: rhinovirus.



13 Supplementary Figure 2: Supplementary Results of Metabolomics and Microbiomics. (A) Principal
14 component analysis of pulmonary metabolite profiles in patients from the MPP group and the FBO
15 group; (B) Clustering heatmap of pulmonary metabolites in the two group; (C) The number of
16 differential metabolites in the two groups; (D) The volcano plot clearly shows the types of metabolites
17 that are significantly increased (red) or decreased (blue) in the BALF of MPP patients compared with
18 those of FBO patients, Variable importance in projection (VIP) values were used to illustrate the
19 contribution of metabolites to the orthogonal projections to latent structure-discriminant analysis
20 model; (E) Use the KEGG pathway database to calculate the influencing factors of the enriched
21 pathways of differential metabolites between two groups, and classify the pathways; (F) The results of
22 the rarefaction curves show that the sequencing depth of the samples meets the requirements for
23 microbiome analysis;



Supplementary Figure 3: Supplementary results of cytokine profiling analysis. (A) The distribution of cytokines between the FBO group and the MPP group; (B) Correlation analysis of the remaining differential cytokines with peripheral blood monocyte. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Supplementary Data: Detailed information on 616 differential metabolites.