

Figure S1. Expression of AKT1, MAPK3, RELA and CSF1 in G1 (42-67 year healthy control group, mean age 57.6 ± 9.56 years), G2 (79-89 year non-osteoporotic control group, mean age 81.75 ± 4.86 years) and G3 (79-94 year osteoporosis patient group, mean age 86.2 ± 5.89 years) in the GSE35959 dataset. * $P < 0.05$, ** $P < 0.01$. CSF1, colony stimulating factor 1.

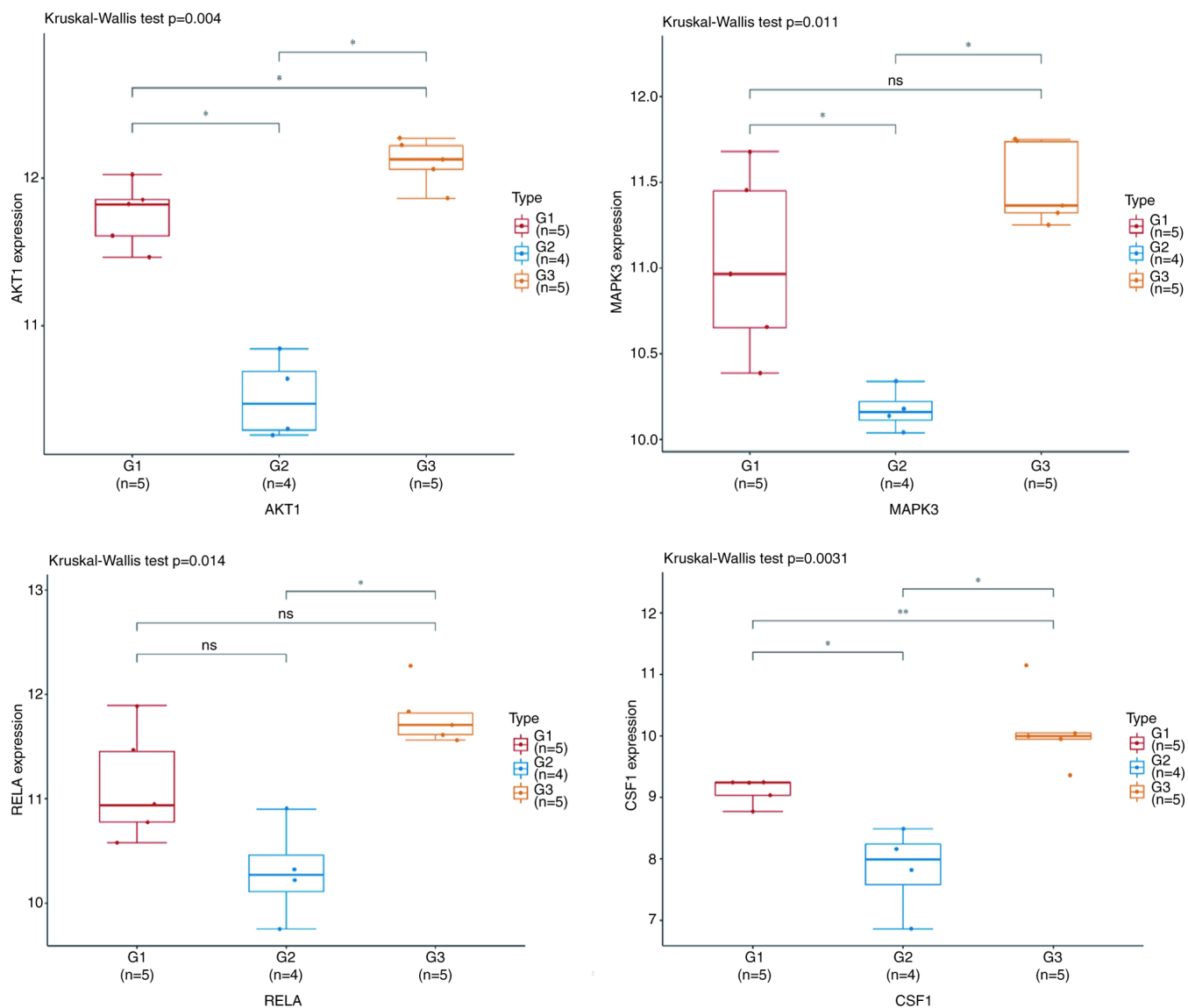


Figure S2. PCA and GSEA results. (A) Two-dimensional PCA plot of the G1, G2 and G3 groups, with PC1 (22.4%) and PC2 (13%). (B) Three-dimensional PCA plot adding PC3 (9.2%) enhances the group separation. (C) GSEA reveals significant activation of the 'PI3K-Akt' pathway in G3 vs. G2 (NES=1.552; adjusted P=0.004). The RES curve (top) peaks positively (max ~0.3), with pathway genes (black lines) clustered on the left of the ranked list (red), indicating upregulation in G3. G1, 42-67 year healthy control group, mean age 57.6±9.56 years; G2, 79-89 year non-osteoporotic control group, mean age 81.75±4.86 years; G3, 79-94 year osteoporosis patient group, mean age 86.2±5.89 years; PCA, principal component analysis; GSEA, gene set enrichment analysis; NES, normalized enrichment score; RES, running enrichment score.

