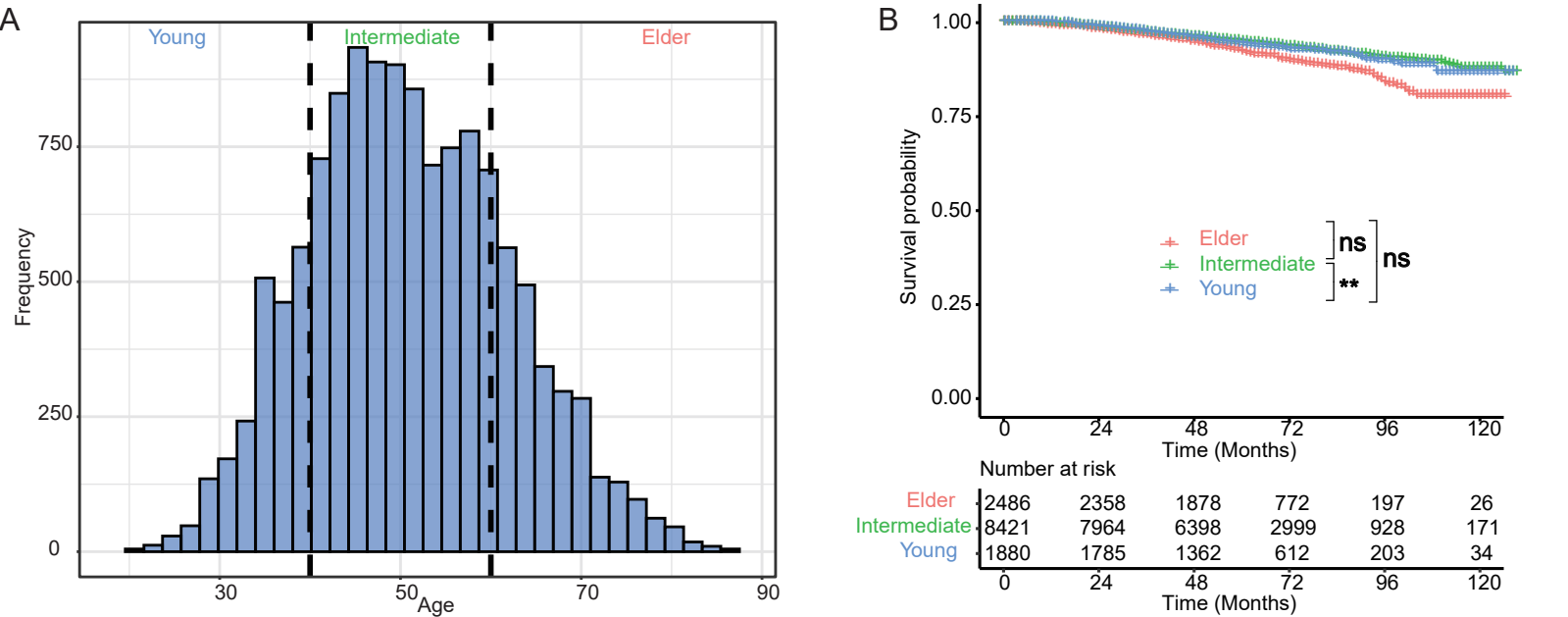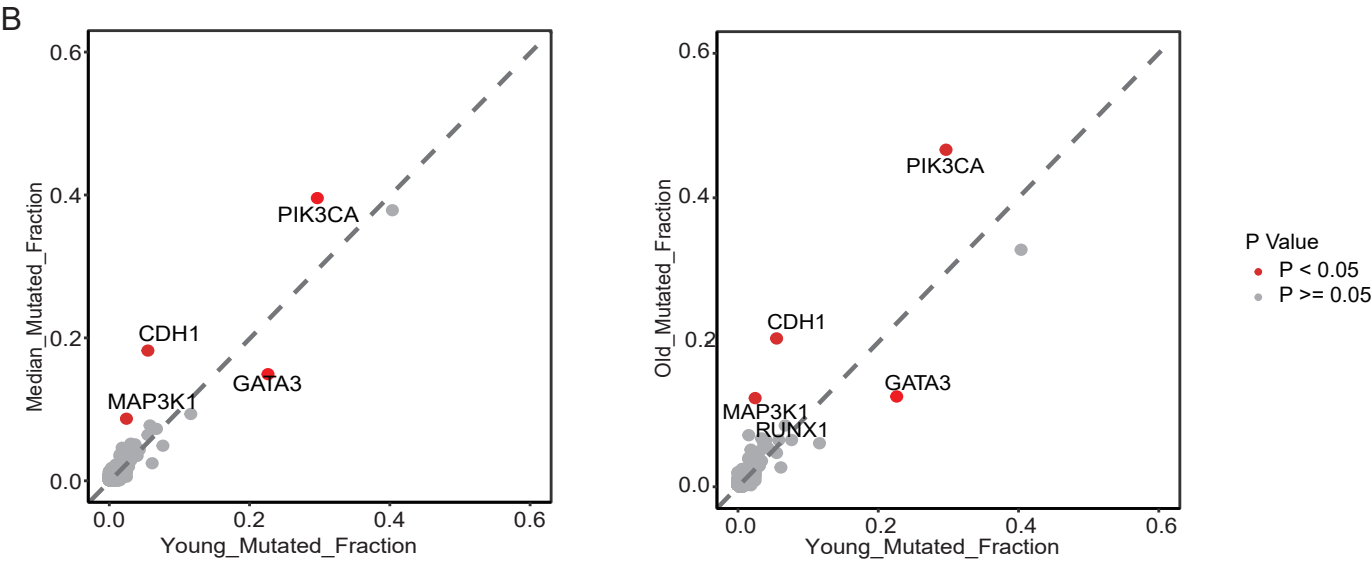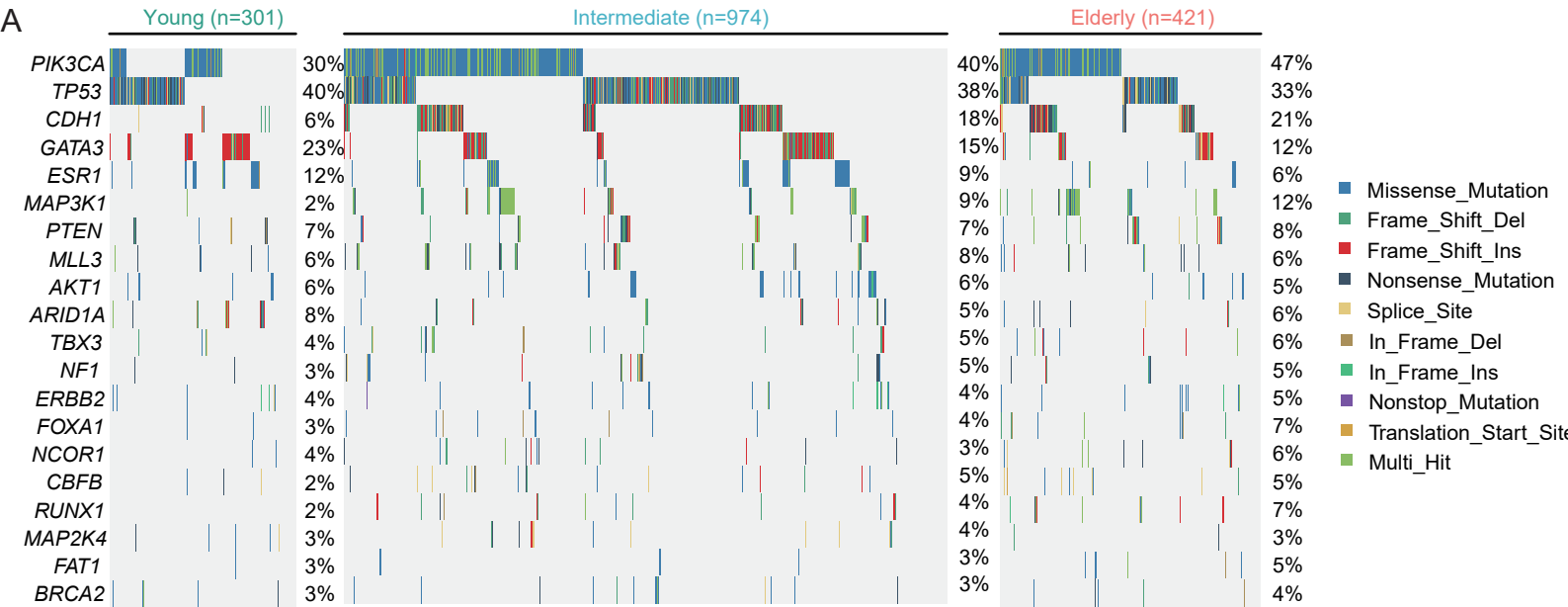**Supplementary Figure 1:**

Supplementary Figure 1: Clinical features of breast cancer patients across different age groups.
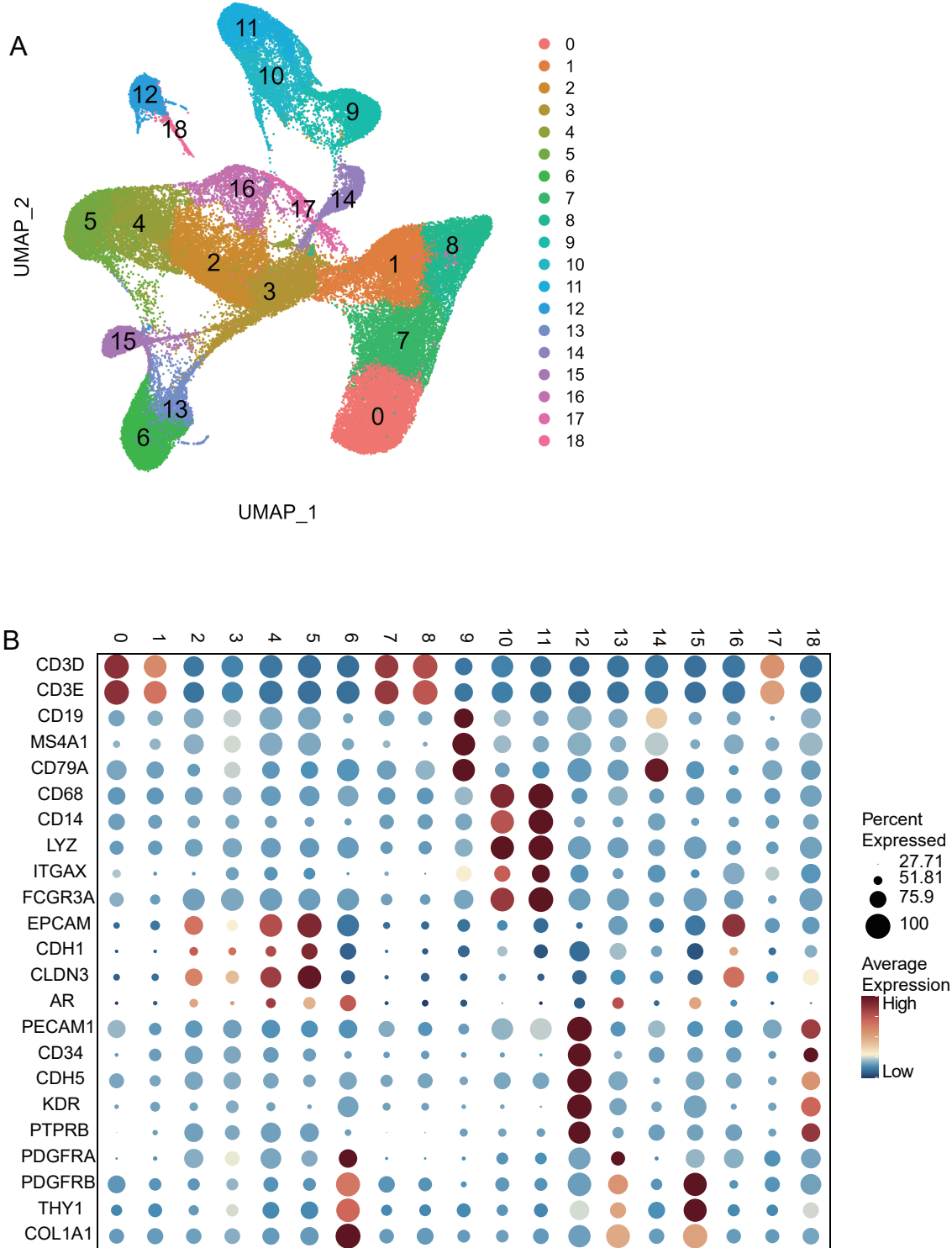(A) Distribution of age at diagnosis and the defined age groups in the FUSCC cohort.
(B) Overall survival (OS) in the FUSCC cohort. Survival comparisons were performed, and significant differences were annotated as *P < .05; **P < .01; ***P < .001; or not significant (ns) (P > .05).

Supplementary Figure 2:

Supplementary Figure 2: Genomic features of breast cancer patients across different age groups.
(A) Mutation profile of patients in elder, intermediate, and young groups. The top 20 genes were listed.
(B) Comparison of mutations in young, intermediate (left), and elder (right) groups.

Supplementary Figure 3:

Supplementary Figure 3: Cellular composition of breast cancers and identification of cancer cells.
(A) UMAP visualization of 84,854 cells by scRNA-seq and integrated across 35 primary breast tumors.
(B) Dotplot visualizing averaged expression of cell markers across 19 clusters. T cells (CD3D, CD3E);
B cells (CD19, MS4A1, CD79A); Epithelial cells (EpCAM, CDH1, CLDN3, AR); Endothelial cells (PECAM1).