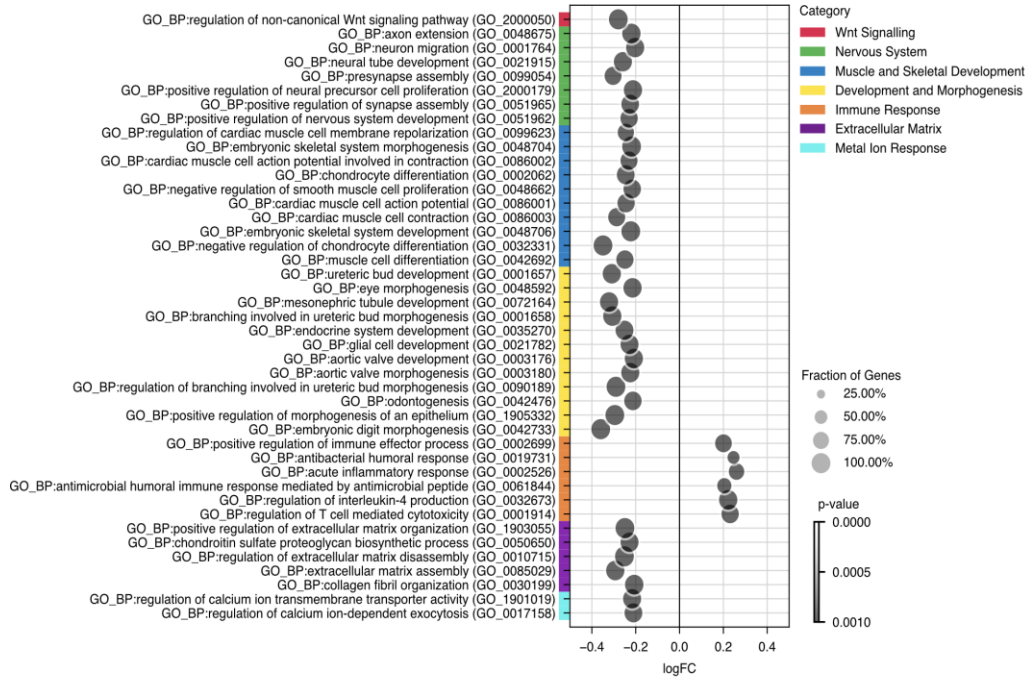
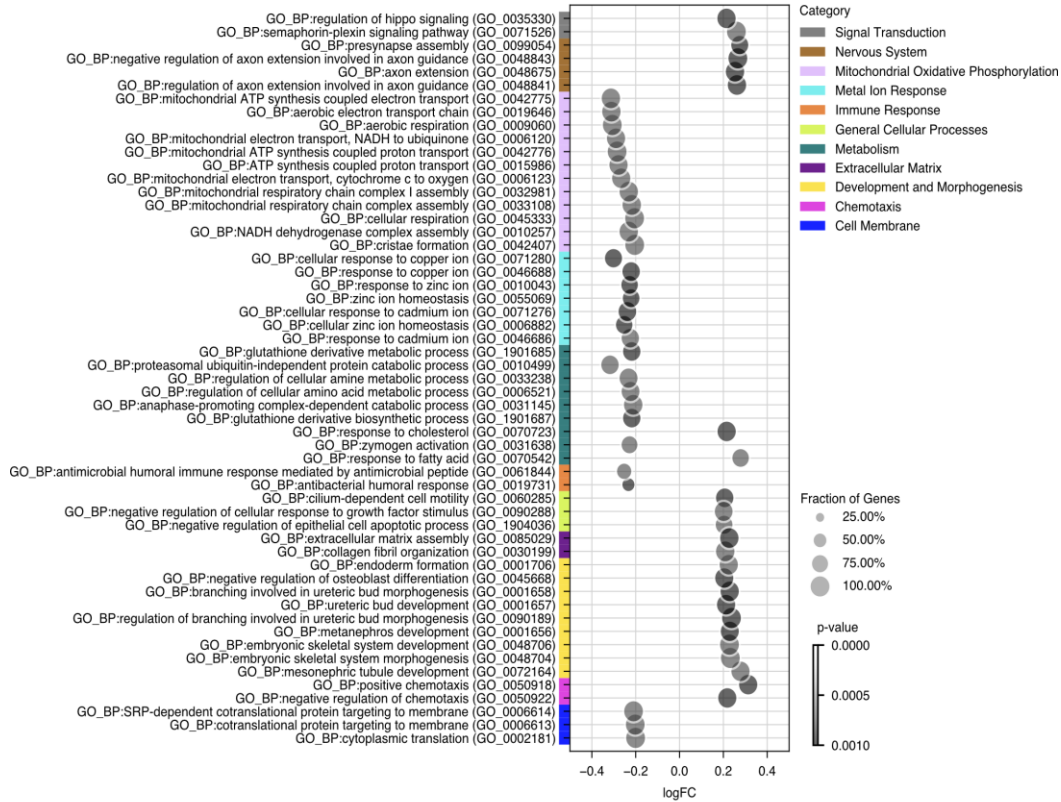


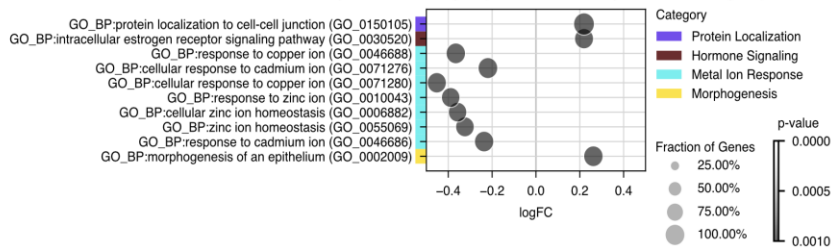
### Highly Differentiated group vs Intermediately Differentiated group



### Lowly Differentiated group vs Highly Differentiated group



### Lowly Differentiated group vs Intermediately Differentiated group



**Supplementary Fig. S7.** Pairwise gene enrichment analysis comparisons between the common histomic cluster associated groups. In the highly differentiated (HD) vs. intermediately differentiated (ID) comparison, the HD group shows downregulation in nervous system development, muscle and skeletal development, development and morphogenesis, extracellular matrix organization, and metal ion response, while exhibited upregulation in immune response processes compared to the ID group. In the lowly differentiated (LD) vs. HD comparison, the LD group shows significant downregulation in mitochondrial oxidative phosphorylation, metal ion response, metabolism, immune response, and cell membrane processes. Conversely, the HD group exhibits downregulation in signal transduction, nervous system-associated processes, extracellular matrix organization, development, morphogenesis, and chemotaxis. In the LD vs. ID comparison, fewer significant processes are noted. The LD group shows downregulation in metal ion response, while the ID group shows upregulation in protein localization to cell-cell junctions, intracellular estrogen receptor signaling pathway and morphogenesis of an epithelium.