

Additional file 13: ToppGene GOEA based on SAM gene lists for the three clusters, internal and external cohorts. Identical GO terms per SAM lists are indicated in bold characters.

	Internal cohort	External cohort
C1 high vs C2 low	Lipid metabolic process Single-organism catabolic process Oxidation-reduction process Vasculature development Blood vessel development Cardiovascular system development Circulatory system development Cellular lipid metabolic process Secretion Organonitrogen compound catabolic process	Lipid metabolic process Cell migration Circulatory system development Cardiovascular system development Cellular lipid metabolic process Single-organism catabolic process Vasculature development Regulation of cell migration Blood vessel development Localization of cell
C1 low vs C2 high	Cell cycle Cell cycle process Mitotic cell cycle Mitotic cell cycle process Chromosome organization Mitotic nuclear division Nuclear division Organelle fission Chromosome segregation Sister chromatid segregation	Mitotic cell cycle Mitotic cell cycle process Cell cycle Cell cycle process Mitotic nuclear division Nuclear division Organelle fission Sister chromatid segregation Cell division Chromosome organization
C1 high vs C3 low	Cardiovascular system development Circulatory system development Cell projection organization Movement of cell or subcellular component Anatomical structure formation involved in morphogenesis Cellular component morphogenesis Skeletal system development Cell morphogenesis Urogenital system development Regulation of anatomical structure morphogenesis	Cellular lipid metabolic process Lipid modification Cell projection organization Neuron projection development Fatty acid metabolic process Establishment of vesicle localization Lipid biosynthetic process Vesicle localization Neuron development
C1 low vs C3 high	Immune response Mitotic cell cycle Mitotic cell cycle process Cell cycle process Cell cycle Regulation of immune system process Positive regulation of immune system process Lymphocyte activation Leukocyte activation Regulation of immune response	Immune response Lymphocyte activation Regulation of immune system process Leukocyte activation Positive regulation of immune response Regulation of immune response Leukocyte cell-cell adhesion Cell activation Leukocyte aggregation Positive regulation of immune response No results displayed
C2 high vs C3 low	Bone development Dorsal/ventral pattern formation Neural tube development Smoothened signaling pathway Cell projection organization Cellular component morphogenesis Cell morphogenesis Neural tube closure Digestive system process Tube closure	
C2 low vs C3 high	Immune response Regulation of immune system process Regulation of immune response Defense response Positive regulation of immune system process Leukocyte activation Cell activation Innate immune response Lymphocyte activation Positive regulation of immune response	Immune response Regulation of immune system process Regulation of immune response Positive regulation of immune system process Defense response Leukocyte activation Cell activation Positive regulation of immune response Innate immune response Lymphocyte activation
C1 high vs C2-C3 low	Cardiovascular system development Circulatory system development Oxidation-reduction process Lipid metabolic process Vasculature development Blood vessel development Response to endogenous stimulus Enzyme linked receptor protein signaling pathway Cellular lipid metabolic process Organic acid catabolic process	Lipid metabolic process Cellular lipid metabolic process Single-organism catabolic process Cell migration Neuron development Regulation of anatomical structure morphogenesis Neuron projection development Localization of cell Cell motility Nucleoside diphosphate catabolic process
C1 low vs C2-C3 high	Mitotic cell cycle Cell cycle Mitotic cell cycle process Cell cycle process Chromosome organization Mitotic nuclear division Nuclear division Organelle fission Sister chromatid segregation Chromosome segregation	Mitotic cell cycle Mitotic cell cycle process Cell cycle Cell cycle process Mitotic nuclear division Nuclear division Organelle fission Cell cycle phase transition Mitotic cell cycle phase transition Sister chromatid segregation