1)

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| GOBP_ESTABLISHMENT_OF_LOCALIZATION_IN_CELL | The movement of substances and cell components is important for keeping cells working properly. If this process gets messed up, it can affect where important proteins go, which has been linked to cancers like OSC. |
| GOBP_VESICLE_MEDIATED_TRANSPORT | Vesicle-mediated transport is when things inside the cell move around using vesicles. If this system doesn't work right, it can mess up cell signaling and possibly contribute to ovarian cancer. |
| GOBP_INTRACELLULAR_SIGNALING_CASSETTE | Membrane trafficking is how membranes, proteins, and lipids move around the cell. Problems with this process have been connected to cancer, including OSC, since it can change how cells signal and stick together. |
| GOBP_PROTEIN_TRANSPORT | Protein transport is just what it sounds like—the way proteins move within a cell. If proteins don't get where they need to go, it can mess with how cells function and may play a role in ovarian cancer. |
| GOBP_NITROGEN_COMPOUND_TRANSPORT | Nitrogen compound transport has to do with moving nitrogen-containing molecules. It's not directly linked to OSC, but since nitrogen is important for metabolism, issues with it could affect cancer cell growth. |
| GOBP_INTRACELLULAR_TRANSPORT | Intracellular transport is another way things move inside the cell. If this doesn't work properly, it can affect how cells take in nutrients and get rid of waste, which has been seen in OSC and other cancers. |
| GOCC_SYNAPSE | Synapses are usually talked about in the context of neurons, but some studies suggest that similar mechanisms might help cancer cells communicate and interact with their environment. |
| GOMF_ENZYME_REGULATOR_ACTIVITY | Enzyme regulation controls how active enzymes are, and if this gets messed up, it can lead to cells growing out of control, which is a key part of how OSC and other cancers develop. |
| GOCC_ORGANELLE_SUBCOMPARTMENT | Organelle subcompartments are specialized areas inside organelles. If something goes wrong with these, it can mess with normal cell function and has been connected to cancer in some cases. |
| GOCC_NEURON_PROJECTION | Neuron projections help neurons send signals, but some research suggests that similar structures in cancer cells might help them spread, which could be relevant to OSC. |

2-2)

Genes in cluster 1:
CYTH3, ISOC1, CAMK2G, CRK, WDR81, SEMA4A, CRYAB, MLLT10, GSR, CSNK1G1, ARHGAP12, MFAP1, FN3KRP, RABGEF1, RECQL, CSTF3, TMEM18, POLD3, ZNF12, TBC1D23, TMED1, SASH1, USP8, CRCP, FN3K, MRPL23, PLDN, VPS54, NSF, SRGAP1, ELP3, TRPM7, ZNF436, KIAA1033, KRTCAP3, SLC37A4, ENTPD1, GGCX, C2orf88, PLXDC2, FAM128A, TBC1D8, LUZP1, LMTK2, STAT5A, C20orf117, BCL7A, HBS1L, TMEM173, STRA13, HAUS4, AGPS, GRAMD4, EPB49, OSBPL11, MTHFR, VPS53, SNX4, C16orf57, CDK19, ASAP3, SECISBP2L, OSBPL8, RHOT1, MAD1L1, INPP5K, RFC2, TSEN54, SLC29A2, CDT1, RBPMS, ITFG2, PREX1, LOC441869, TTPAL, INPP4A, LPAR2, CLPX, C7orf28A, SERPINE1, SNX29, RBM34, GALNT10, C5orf25, CTPS2, VPS36, PNP, PMVK, TUSC3, D4S234E, ATG4D, DNAJC2, ZDHHC18, SHOC2, XPO4, THOP1, HIF1AN, TYW1, MIIP, RFX7, USP42, SGK269, PARD6B, CTDSPL2, TMEM134, RNF160, PLEKHG4B, AQP5, ZNF76, FAM190B, MRPL55, EIF4E3, FTSJ2, IGF1, PIK3R4, PTPMT1, ZZEF1, TUT1, ZKSCAN1, KIAA0226, GGNBP2, SLIT3, SLC4A11, KPNA3, TMEM19, AKAP11, HERC4, EXOC5, SIK2, ZNF770, SNAP23, REST, NRM

Gene Expressions:

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| GOBP_VESICLE_MEDIATED_TRANSPORT | This process is about moving stuff in and out of the cell using vesicles (small membrane-bound sacs). It's important for things like taking in nutrients or getting rid of waste. |
| GOBP_ESTABLISHMENT_OF_PROTEIN_LOCALIZATION | This is all about getting proteins to the right parts of the cell. If proteins aren't in the right place, the cell might not function properly, so this process is pretty crucial. |
| GOBP_PROTEIN_TRANSPORT | This involves moving proteins around the cell or between cells. It's a basic function for making sure proteins do their jobs in the right spots. |
| GOBP_NITROGEN_COMPOUND_TRANSPORT | This function helps move nitrogen-containing compounds, which are important for making amino acids and nucleotides, so it's key for cell growth and metabolism. |
| GOBP_ENDOSOMAL_TRANSPORT | This is about moving substances with the help of endosomes, which are kind of like delivery trucks inside the cell. It helps with recycling stuff and bringing in nutrients. |
| GOBP_ESTABLISHMENT_OF_LOCALIZATION_IN_CELL | This function helps get substances or components into the right parts of the cell. It could involve moving things, holding them in place, or breaking them down when needed. |
| GOBP_INTRACELLULAR_TRANSPORT | This is just the movement of stuff inside the cell. It's important for keeping everything in the cell organized and working properly. |
| GOBP_RESPONSE_TO_OXYGEN_CONTAINING_COMPOUND | This is just the movement of stuff inside the cell. It's important for keeping everything in the cell organized and working properly. |
| GOMF_ADENYL_NUCLEOTIDE_BINDING | This function involves binding to adenyl nucleotides (like ATP), which are important for energy transfer and signaling in the cell. |
| GOMF_PURINE_NUCLEOTIDE_BINDING | This is similar to the adenyl nucleotide binding function and has to do with energy metabolism and making DNA and RNA. |

3-1)

Classification Accuracy (k=1, flag=1): 0.6216
Classification Accuracy (k=3, flag=1): 0.6486
Classification Accuracy (k=5, flag=1): 0.6216

3-2)

Classification Accuracy (k=1, flag=0): 0.6757
Classification Accuracy (k=3, flag=0): 0.7027
Classification Accuracy (k=5, flag=0): 0.7027

The reason the accuracy improved is because only selecting the top 1000 genes reduces noise from irrelevant genes.

3-3)

Classification accuracy: 0.6216