

Table S1: Functions used in DDLPS Co-expression Network Construction

| No. | Function name | Assigned parameters | Contribution to DDLPS co-expression construction |
|-----|-------------------|---|---|
| 1 | pickSoftThreshold | datExpr_DDLPS, network type = "signed hybrid", corOptions=list (use="p"), corFnc="bicor", corOptions=list(maxPOutliers =0.1), verbose = 5 | calculate a set of values for soft power (β). |
| 2 | adjacency | datExpr = datExpr_DDLPS, network type = "signed hybrid", power = β , corOptions=list (use="p"), corFnc="bicor", corOptions=list(maxPOutliers =0.1) | This function converted the correlation matrix to the adjacency matrix with soft power (β). |
| 3 | TOMsimilarity | Topological Overlap Matrix (TOM) that output of adjacency function | This function calculates the similarities based on the number of shared neighbors between gene pairs in the resulting co-expression network[9]. |
| 4 | hclust | Distance matrix of (1-TOM), Method = "average" | This function was utilized to run the average linkage hierarchical clustering algorithm on the (1-TOM) matrix. |

| No. | Function name | Assigned parameters | Contribution to DDLPS co-expression construction |
|-----|-------------------|--|--|
| 5 | cutreeDynamic | dendro = geneTree_DDLPS, method = "hybrid", distM = dissTOM, deepSplit = 4, pamRespectsDendro = FALSE, minClusterSize = 40 | By cutreeDynamic, gene modules were identified [9]. |
| 6 | labels2colors | dynamicMods | This function converts module labels to module colors. |
| 7 | moduleEigengenes | datExpr_DDLPS , colors = dynamicColors | moduleEigengenes produces a representative for each module[9] |
| 8 | mergeCloseModules | datExpr_DDLPS , dynamicColors, cutHeight = 0.09, verbose = 3 | Close modules were merged by mergeCloseModules based on cutHeight. |

Table S2:Survival analysis detected no modules significantly associated with survival endpoints (OS and PFI)

| Module Name | No. Genes | OS | | | PFI | | |
|-------------|-----------|---------|---------|-----------|---------|---------|-----------|
| | | HR | P-value | CI | HR | P-value | CI |
| MEbrown | 210 | 1.3615 | 0.107 | 0.94-1.98 | 0.8886 | 0.494 | 0.63-1.25 |
| MEsalmon | 50 | 0.91542 | 0.874 | 0.31-2.72 | 0.698 | 0.0612 | 0.45-1.02 |
| MEblue | 3712 | 1.4158 | 0.0867 | 0.95-2.11 | 1.2987 | 0.133 | 0.92-1.83 |
| MEgreen | 129 | 1.2032 | 0.357 | 0.81-1.78 | 0.7368 | 0.0776 | 0.53-1.03 |
| MEblack | 135 | 0.92114 | 0.699 | 0.61-1.39 | 0.7943 | 0.38 | 0.47-1.33 |
| Mepink | 70 | 1.4443 | 0.085 | 0.95-2.19 | 1.06891 | 0.692 | 0.77-1.49 |
| MEyellow | 160 | 0.721 | 0.13 | 0.472-1.1 | 1.1466 | 0.301 | 0.89-1.49 |
| Magenta | 66 | 1.2866 | 0.0903 | 0.96-1.72 | 1.686 | 0.1 | 0.76-1.62 |

Table S3: The correlation of some LF-Related genes in brown module with infiltrates for Sarcoma through TIMER2.0

| RAD54L | | | |
|--------------|--|--------------|-------------|
| cancer | infiltrates | rho | p |
| SARC (n=260) | Cancer associated fibroblast_XCELL | -0.321815151 | 2.77E-07 |
| SARC (n=260) | Macrophage M2_QUANTISEQ | -0.165292028 | 0.009695581 |
| SARC (n=260) | MDSC_TIDE | 0.42078765 | 6.87E-12 |
| SARC (n=260) | Myeloid dendritic cell_TIMER | 0.179307008 | 0.004965151 |
| SARC (n=260) | Neutrophil_QUANTISEQ | 0.190695511 | 0.002781038 |
| SARC (n=260) | T cell CD4+ (non-regulatory)_QUANTISEQ | -0.184935336 | 0.003743598 |
| SARC (n=260) | T cell CD4+ central memory_XCELL | -0.252793392 | 6.51E-05 |
| SARC (n=260) | T cell CD4+ effector memory_XCELL | -0.188284073 | 0.003152732 |
| SARC (n=260) | T cell CD4+ memory resting_CIBERSORT | -0.239734958 | 0.000156305 |
| SARC (n=260) | T cell CD4+ memory resting_CIBERSORT-ABS | -0.262735655 | 3.24E-05 |
| SARC (n=260) | T cell CD4+ Th2_XCELL | 0.645385764 | 3.86E-30 |
| SARC (n=260) | T cell CD4+_TIMER | -0.199713212 | 0.001717102 |
| SARC (n=260) | T cell CD8+ naive_XCELL | 0.211905807 | 0.000865391 |
| SARC (n=260) | T cell CD8+_TIMER | 0.213771754 | 0.000776578 |
| SARC (n=260) | T cell regulatory (Tregs)_XCELL | -0.219753429 | 0.000545434 |
| SARC (n=260) | Purity | 0.218115927 | 0.000585849 |
| SARC (n=260) | B Cell | 0.146127221 | 0.023860399 |
| SARC (n=260) | CD8+ T Cell | 0.043692214 | 0.500524456 |
| SARC (n=260) | CD4+ T Cell | -0.104820571 | 0.10599773 |
| SARC (n=260) | Macrophage | -0.055831592 | 0.394223451 |
| SARC (n=260) | Neutrophil | -0.067020537 | 0.299100305 |
| SARC (n=260) | Dendritic Cell | 0.149603568 | 0.020152944 |
| CKAP2L | | | |
| SARC (n=260) | Cancer associated fibroblast_EPIC | 0.153272857 | 0.016571508 |
| SARC (n=260) | Cancer associated fibroblast_XCELL | -0.20133871 | 0.001570681 |
| SARC (n=260) | Macrophage M2_QUANTISEQ | -0.212769082 | 0.000823199 |
| SARC (n=260) | Macrophage M2_TIDE | -0.153736915 | 0.016242472 |

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| SARC (n=260) | Neutrophil_MCPCOUNTER | 0.207655515 | 0.001103704 |
| SARC (n=260) | Neutrophil_QUANTISEQ | 0.170203263 | 0.007710819 |
| SARC (n=260) | T cell CD4+ central memory_XCELL | -0.241282948 | 0.000141238 |
| SARC (n=260) | T cell CD4+ effector memory_XCELL | -0.294261705 | 2.91E-06 |
| SARC (n=260) | T cell CD4+ memory_XCELL | 0.204292533 | 0.001333495 |
| SARC (n=260) | T cell CD4+ Th2_XCELL | 0.591885046 | 1.86E-24 |
| SARC (n=260) | T cell CD4+ TIMER | -0.226233082 | 0.000368012 |
| SARC (n=260) | T cell CD8+ TIMER | 0.164068936 | 0.010255373 |
| SARC (n=260) | Purity | 0.270549332 | 1.76E-05 |
| SARC (n=260) | B Cell | 0.110478597 | 0.088339256 |
| SARC (n=260) | CD8+ T Cell | 0.130921161 | 0.042727615 |
| SARC (n=260) | CD4+ T Cell | -0.213607158 | 0.000889227 |
| SARC (n=260) | Macrophage | -0.118247739 | 0.07039028 |
| SARC (n=260) | Neutrophil | 0.03500888 | 0.587848298 |
| SARC (n=260) | Dendritic Cell | 0.01428899 | 0.825339466 |
| KLIF18B | | | |
| SARC (n=260) | B cell_EPIC | -0.17835 | 0.005204 |
| SARC (n=260) | Cancer associated fibroblast_EPIC | 0.236151 | 0.000197 |
| SARC (n=260) | Cancer associated fibroblast_XCELL | -0.27058 | 1.83E-05 |
| SARC (n=260) | Macrophage M0_CIBERSORT | 0.193286 | 0.002426 |
| SARC (n=260) | Macrophage M0_CIBERSORT-ABS | 0.199 | 0.001785 |
| SARC (n=260) | Macrophage M2_QUANTISEQ | -0.17817 | 0.005252 |
| SARC (n=260) | Macrophage M2_XCELL | -0.16491 | 0.009866 |
| SARC (n=260) | MDSC_TIDE | 0.508698 | 1.83E-17 |
| SARC (n=260) | T cell CD4+ central memory_XCELL | -0.23361 | 0.000232 |
| SARC (n=260) | T cell CD4+ effector memory_XCELL | -0.31501 | 5.07E-07 |
| SARC (n=260) | T cell CD4+ memory resting_CIBERSORT | -0.18 | 0.004797 |
| SARC (n=260) | T cell CD4+ memory resting_CIBERSORT-ABS | -0.2255 | 0.000385 |
| SARC (n=260) | T cell CD4+ memory_XCELL | 0.171426 | 0.007277 |
| SARC (n=260) | T cell CD4+ Th2_XCELL | 0.594148 | 1.12E-24 |

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| SARC (n=260) | T cell CD4+ TIMER | -0.19653 | 0.002041 |
| SARC (n=260) | T cell CD8+ naive_XCELL | 0.195342 | 0.002175 |
| SARC (n=260) | T cell CD8+ TIMER | 0.197081 | 0.001981 |
| SARC (n=260) | T cell regulatory (Tregs)_XCELL | -0.17608 | 0.005817 |
| SARC (n=260) | Purity | 0.292149 | 3.30E-06 |
| SARC (n=260) | B Cell | 0.125957 | 0.051801 |
| SARC (n=260) | CD8+ T Cell | 0.020631 | 0.750506 |
| SARC (n=260) | CD4+ T Cell | -0.15509 | 0.016411 |
| SARC (n=260) | Macrophage | -0.11083 | 0.090036 |
| SARC (n=260) | Neutrophil | 0.010159 | 0.875066 |
| SARC (n=260) | Dendritic Cell | 0.018332 | 0.777079 |
| CEP78 | | | |
| SARC (n=260) | B cell plasma_CIBERSORT | 0.159543807 | 0.012582906 |
| SARC (n=260) | B cell plasma_CIBERSORT-ABS | 0.162078537 | 0.011227605 |
| SARC (n=260) | B cell_MCPCOUNTER | -0.152920424 | 0.01682527 |
| SARC (n=260) | Cancer associated fibroblast_EPIC | 0.180766233 | 0.00461811 |
| SARC (n=260) | Cancer associated fibroblast_XCELL | -0.182905794 | 0.00414867 |
| SARC (n=260) | Macrophage M1_XCELL | -0.208891093 | 0.001028854 |
| SARC (n=260) | Macrophage M2_QUANTISEQ | -0.290353543 | 3.99E-06 |
| SARC (n=260) | Macrophage M2_XCELL | -0.225954318 | 0.000374382 |
| SARC (n=260) | Macrophage_EPIC | -0.160476522 | 0.012068309 |
| SARC (n=260) | Macrophage_TIMER | -0.200303704 | 0.001662527 |
| SARC (n=260) | Macrophage_XCELL | -0.196570005 | 0.002036154 |
| SARC (n=260) | Macrophage/Monocyte_MCPCOUNTER | -0.228408972 | 0.00032165 |
| SARC (n=260) | MDSC_TIDE | 0.503303064 | 4.49E-17 |
| SARC (n=260) | Myeloid dendritic cell_XCELL | -0.284857188 | 6.16E-06 |
| SARC (n=260) | Neutrophil_QUANTISEQ | 0.155259957 | 0.01520233 |
| SARC (n=260) | NK cell_EPIC | -0.215632911 | 0.000696438 |
| SARC (n=260) | Plasmacytoid dendritic cell_XCELL | -0.167752459 | 0.008650833 |
| SARC (n=260) | T cell CD4+ effector memory_XCELL | -0.3092647 | 8.33E-07 |

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| SARC (n=260) | T cell CD4+ memory_XCELL | 0.17004657 | 0.007768078 |
| SARC (n=260) | T cell CD4+ Th1_XCELL | -0.180275491 | 0.004732306 |
| SARC (n=260) | T cell CD4+ Th2_XCELL | 0.432418204 | 1.54E-12 |
| SARC (n=260) | T cell CD4+ TIMER | -0.330009383 | 1.31E-07 |
| SARC (n=260) | T cell CD8+ central memory_XCELL | -0.164935284 | 0.009855992 |
| SARC (n=260) | T cell CD8+ naive_XCELL | 0.186378958 | 0.003477591 |
| SARC (n=260) | T cell regulatory (Tregs)_XCELL | -0.188936778 | 0.003047921 |
| ESPL1 | | | |
| SARC (n=260) | Cancer associated fibroblast_EPIC | 0.230491 | 0.000282 |
| SARC (n=260) | Cancer associated fibroblast_XCELL | -0.25085 | 7.44E-05 |
| SARC (n=260) | Macrophage M0_CIBERSORT | 0.168563 | 0.008329 |
| SARC (n=260) | Macrophage M0_CIBERSORT-ABS | 0.175568 | 0.005964 |
| SARC (n=260) | Macrophage M2_QUANTISEQ | -0.16427 | 0.010161 |
| SARC (n=260) | Macrophage M2_XCELL | -0.24315 | 0.000125 |
| SARC (n=260) | MDSC_TIDE | 0.501409 | 6.13E-17 |
| SARC (n=260) | Myeloid dendritic cell_QUANTISEQ | 0.180914 | 0.004584 |
| SARC (n=260) | Neutrophil_MCPCOUNTER | 0.158336 | 0.013278 |
| SARC (n=260) | T cell CD4+ effector memory_XCELL | -0.28028 | 8.79E-06 |
| SARC (n=260) | T cell CD4+ memory resting_CIBERSORT-ABS | -0.1886 | 0.003101 |
| SARC (n=260) | T cell CD4+ Th2_XCELL | 0.496153 | 1.44E-16 |
| SARC (n=260) | T cell CD4+ TIMER | -0.16471 | 0.009957 |
| SARC (n=260) | T cell CD8+ naive_XCELL | 0.179254 | 0.004978 |
| SARC (n=260) | T cell regulatory (Tregs)_XCELL | -0.16894 | 0.008184 |
| SARC (n=260) | Purity | 0.278029 | 1.00E-05 |
| SARC (n=260) | B Cell | 0.074482 | 0.251375 |
| SARC (n=260) | CD8+ T Cell | -0.02067 | 0.750097 |
| SARC (n=260) | CD4+ T Cell | -0.13705 | 0.034205 |
| SARC (n=260) | Macrophage | -0.13371 | 0.040565 |
| SARC (n=260) | Neutrophil | 0.077908 | 0.227233 |
| SARC (n=260) | Dendritic Cell | -0.06596 | 0.307836 |

