

A CAVIN1/SULF1-associated myCAF Signature Predicts Metastatic Progression in Colorectal Cancer

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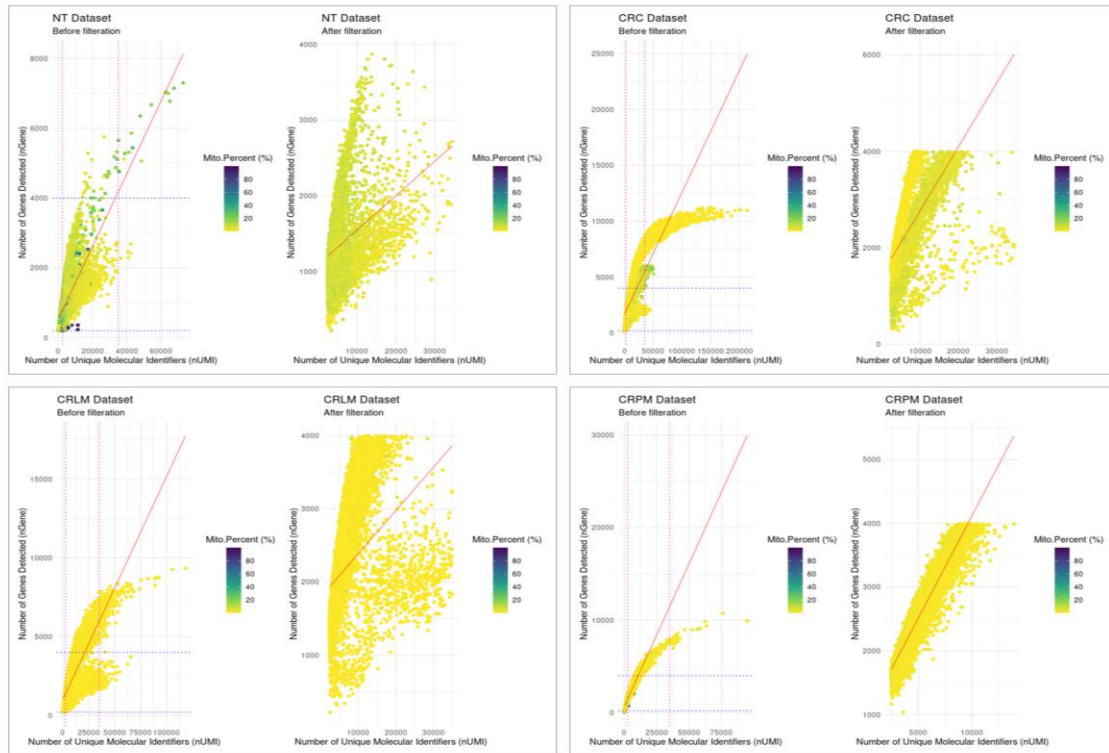
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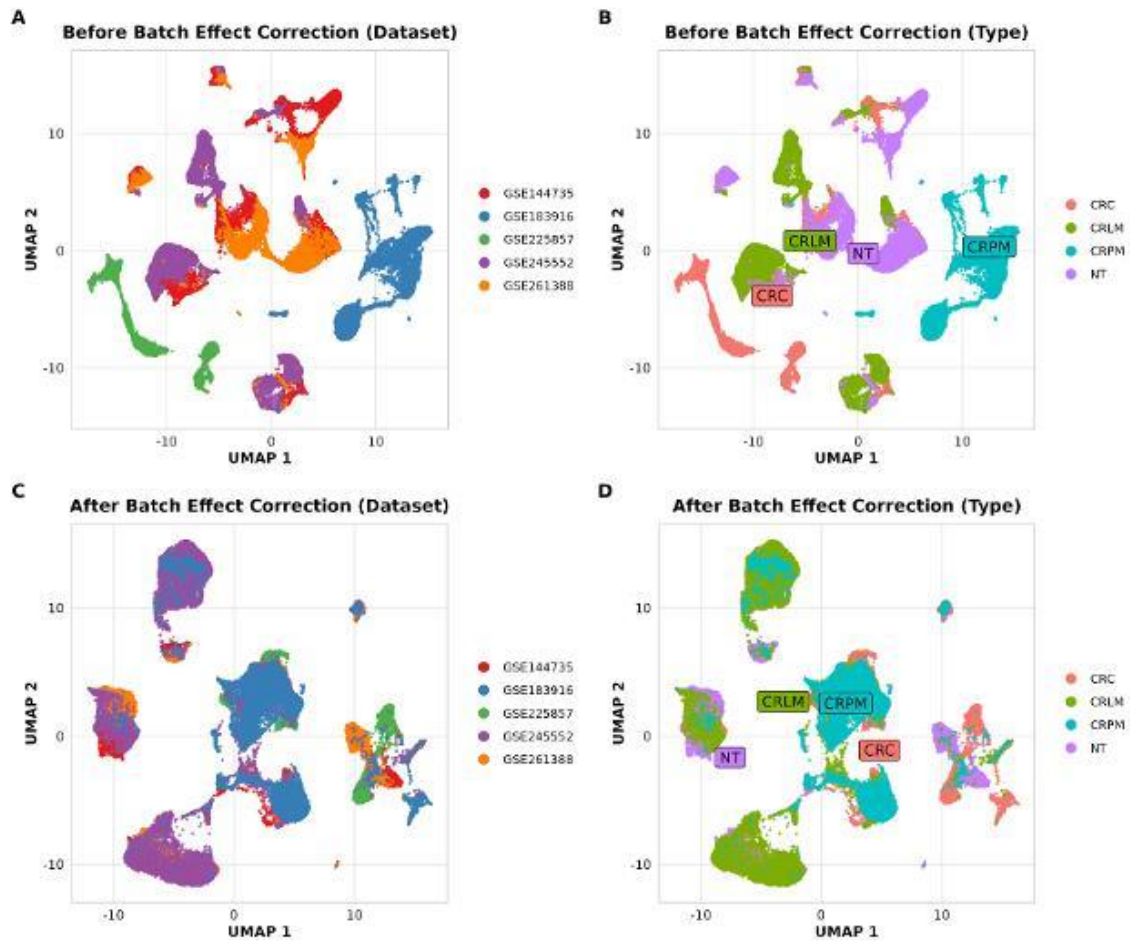
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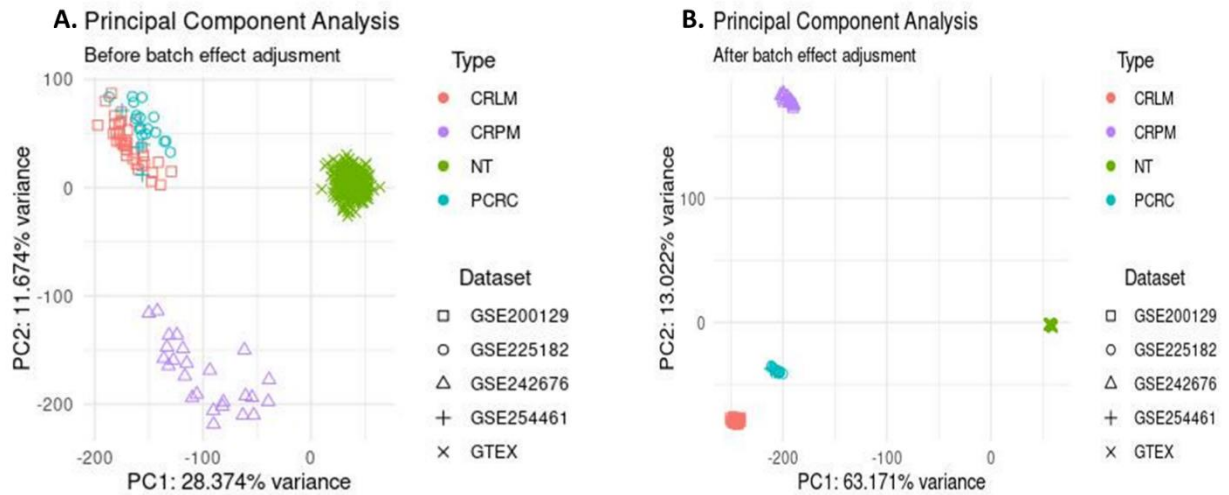
Supplementary Fig. S1. Quality control of single-cell RNA sequencing data before and after filtering.

Scatter plots illustrate the correlation between the number of detected genes (nFeature) and the total number of unique molecular identifiers (nUMI) across different sample groups (NT, pCRC, CRLM, and CRPM). Each dot represents an individual cell, with the color gradient indicating the percentage of mitochondrial gene expression (Mito.Percent). The pre-filtering plots display the unfiltered cells, whereas the post-filtering plots demonstrate the high-quality cells following the removal of low-quality events based on predefined thresholds (e.g., $2500 < \text{nUMI} < 35000$, $\text{nFeature} > 200$, and mitochondrial content $< 15\%$). *nUMI* Number of unique molecular identifiers; *NT* Normal tissue; *pCRC* Primary colorectal cancer; *CRLM* Colorectal liver metastasis; *CRPM* Colorectal peritoneal metastasis.



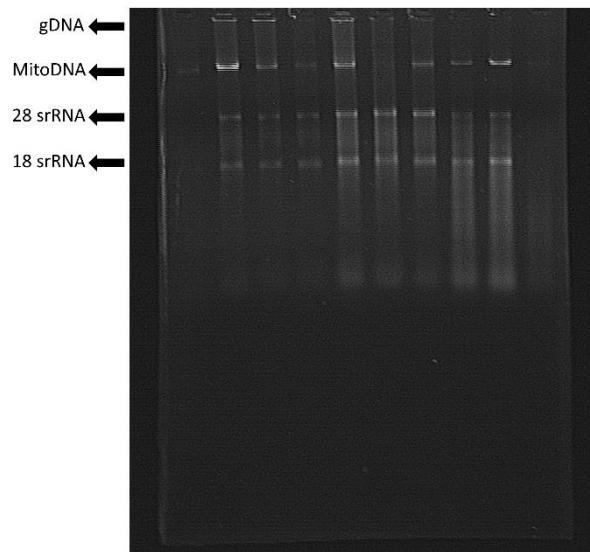
Supplementary Fig. S2. scRNA-seq integration and batch effect correction across multi-center CRC cohorts.

(A) UMAP plot before batch correction, colored by GEO dataset, showing technical batch-driven segregation. **(B)** UMAP plot before batch correction, colored by tissue type (NT, pCRC, CRLM, CRPM). **(C)** UMAP plot after batch correction, showing homogeneous mixing across all five datasets. **(D)** UMAP plot after batch correction, colored by tissue type, confirming cell clustering driven by biological identity rather than technical origin. *UMAP* Uniform manifold approximation and projection; *NT* Normal tissue; *pCRC* Primary colorectal cancer; *CRLM* Colorectal liver metastasis; *CRPM* Colorectal peritoneal metastasis



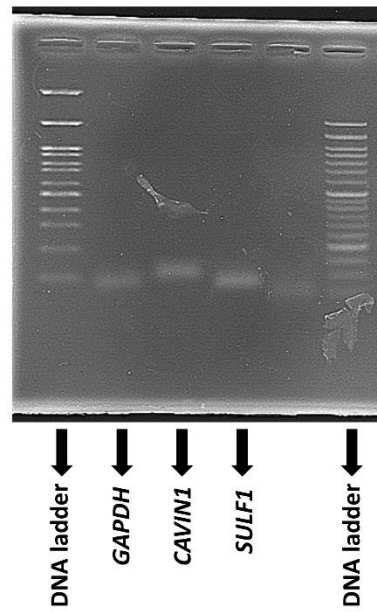
Supplementary Fig. S3. Validation of batch effect correction across transcriptomic datasets.

Principal Component Analysis (PCA) plots before **(A)** and after **(B)** batch correction. Uncorrected data exhibit technical variation due to batch effects, whereas corrected data demonstrate robust clustering driven by biological conditions. *PCs* Principal components; *NT* Normal tissue; *pCRC* Primary colorectal cancer; *CRLM* Colorectal liver metastasis; *CRPM* Colorectal peritoneal metastasis.



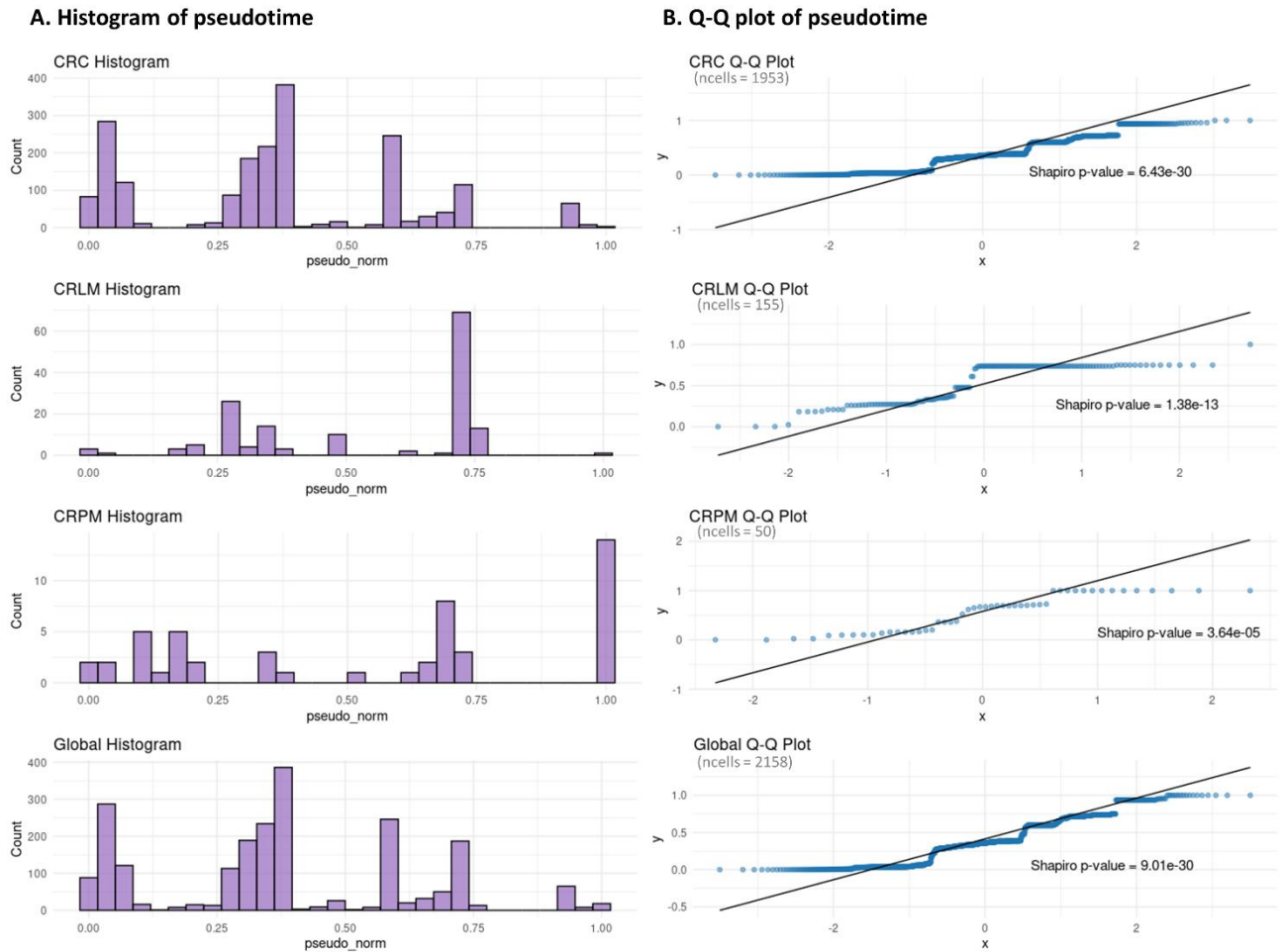
Supplementary Fig. S4. Evaluation of RNA integrity in tissue samples by 1.5% denaturing agarose gel electrophoresis.

Bands of 28S rRNA, 18S rRNA, and 5.8S rRNA were resolved from top to bottom, confirming the high integrity of the extracted RNA as well as the absence of additional bands in this study. *gDNA* Genomic DNA; *mitoDNA* Mitochondrial DNA



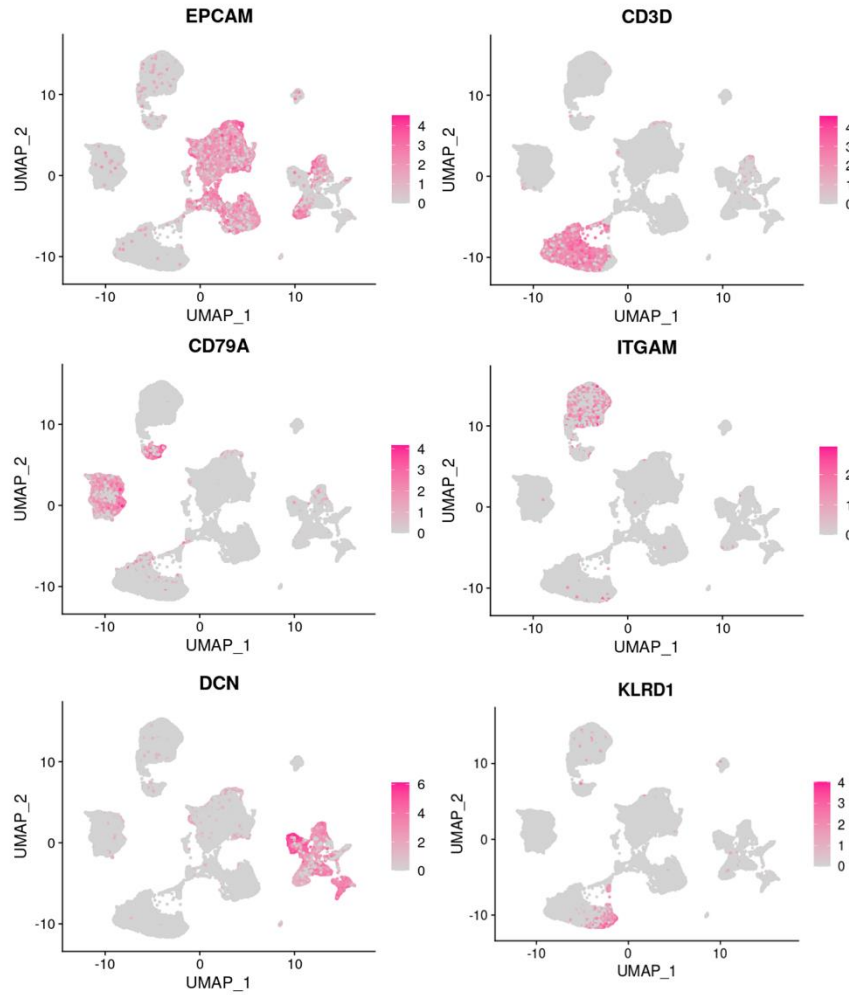
Supplementary Fig. S5. DNA gel electrophoresis for verification of gene amplification and primer specificity in RT-qPCR.

RT-qPCR products loaded on a 2% agarose gel stained with Safe Stain. The first lane accommodates a 100-bp ladder. Amplicon sizes of *CAVIN1* = 160 bp, *SULF1* = 120 bp, *GAPDH* = 102 bp. The gel image has been cropped for clarity.



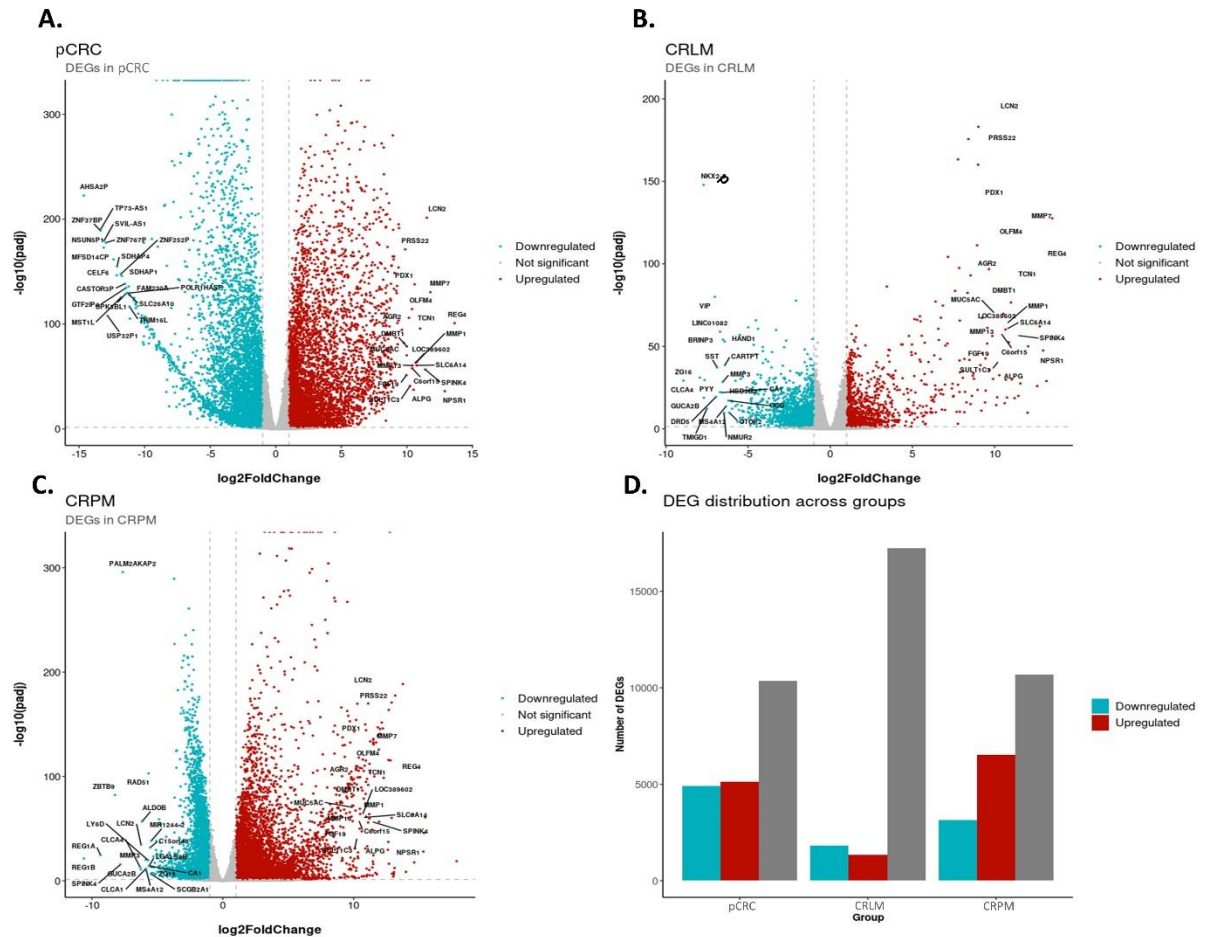
Supplementary Fig. S6. Normality assessment of fibroblast pseudotime distributions across primary and metastatic tumors.

(A) Histograms and (B) Q-Q plots illustrating the distribution of normalized pseudotime trajectories in pCRC, CRLM, and CRPM groups, alongside the global fibroblast population. Shapiro-Wilk test P -values are annotated on the respective Q-Q plots. The demonstrated deviation from normal distribution in certain cohorts provides the statistical rationale for employing non-parametric tests in subsequent analyses. *pCRC* Primary colorectal cancer; *CRLM* Colorectal liver metastasis; *CRPM* Colorectal peritoneal metastasis; Q-Q quantile-quantile.



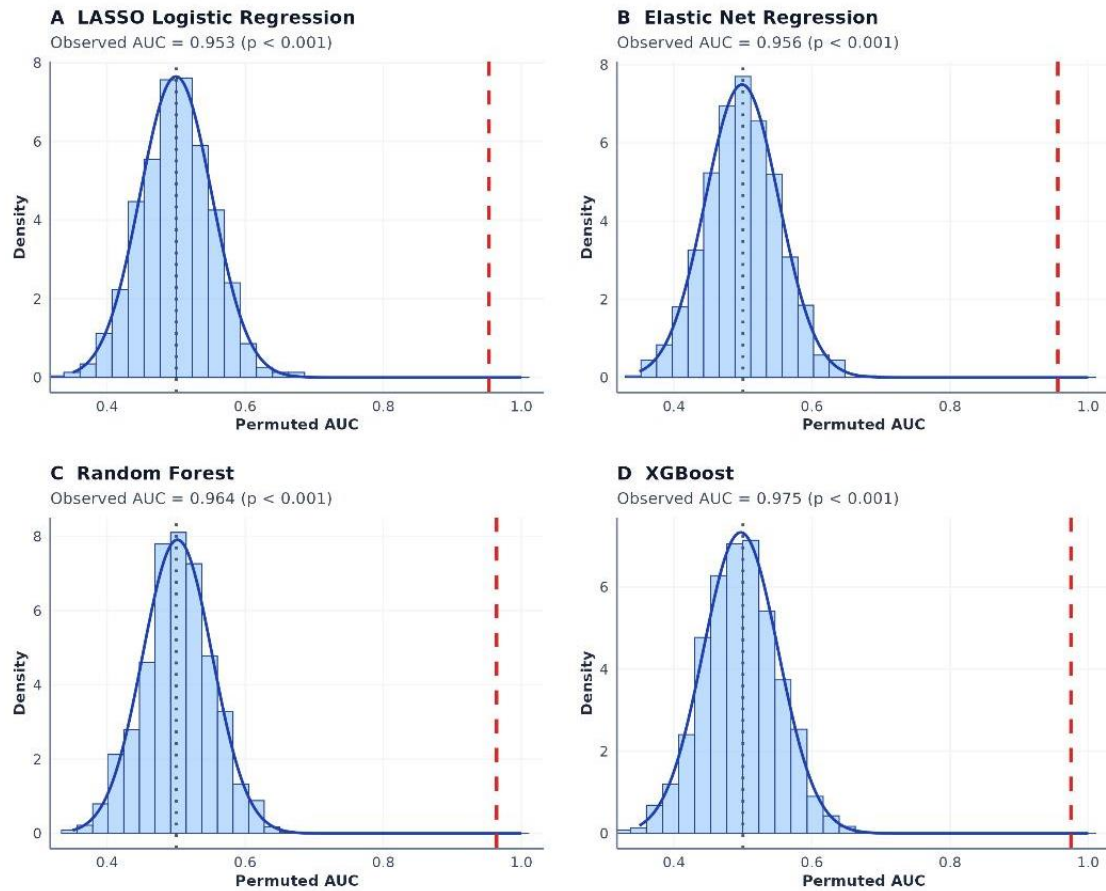
Supplementary Fig. S7. Validation of cell identity via canonical marker expression.

Feature plots on UMAP embeddings show the scaled expression of canonical cell-type marker genes. The color intensity (grey to pink) corresponds to relative expression levels, verifying the specificity of each marker within its corresponding cell cluster. *UMAP* Uniform manifold approximation and projection.



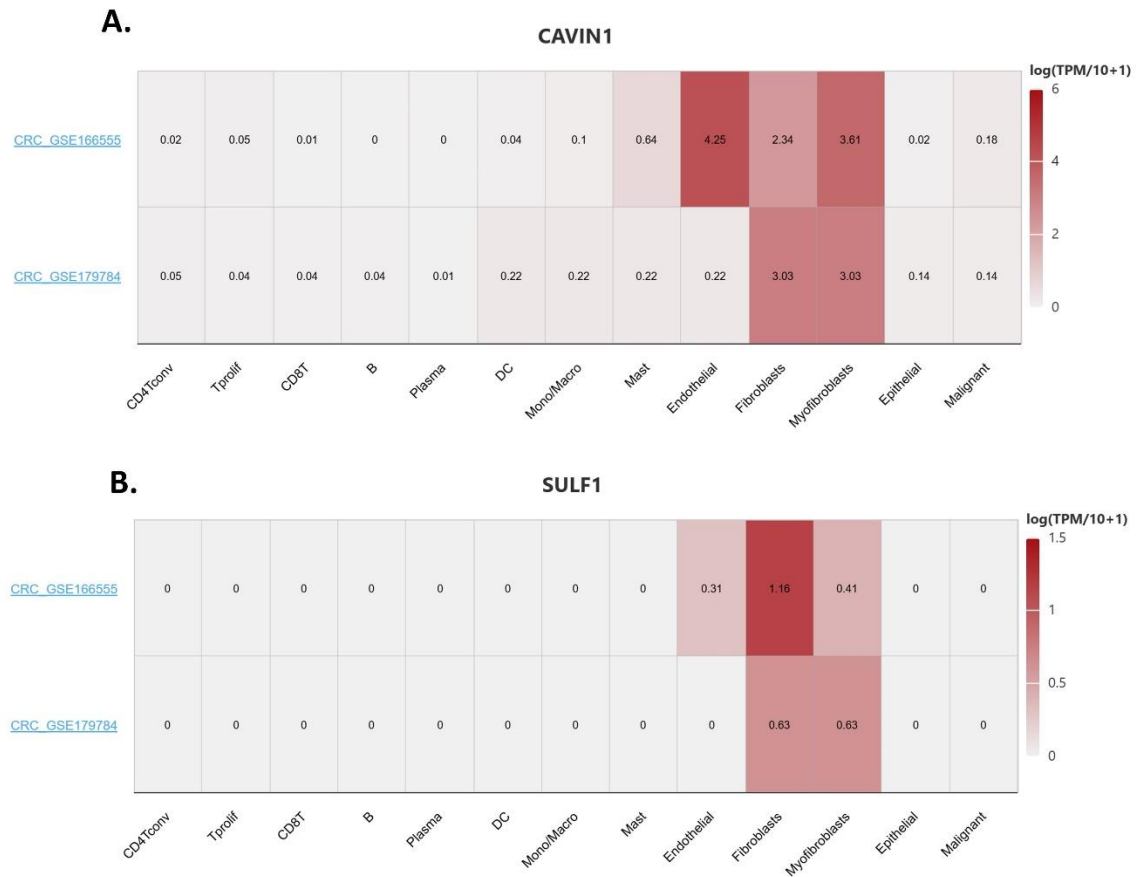
Supplementary Fig. S8. Differential gene expression profiles across colorectal cancer progression stages.

Volcano plots displaying differentially expressed genes (DEGs) for three pairwise comparisons. **(A)** pCRC vs. NT, **(B)** CRLM vs. pCRC, and **(C)** CRPM vs. pCRC. Significantly upregulated (red) and downregulated (blue) genes are highlighted based on the thresholds of adjusted P ($P_{adj} < 0.05$ and $|\log_2FC| > 1$). Non-significant genes are shown in grey. **(D)** Bar plot summarizing the total number of upregulated, downregulated, and non-significant genes across the three comparisons. *pCRC* Primary colorectal cancer; *CRLM* Colorectal liver metastasis; *CRPM* Colorectal peritoneal metastasis; *DEGs* Differentially expressed genes; *FC* Fold change.



Supplementary Figure S9. Permutation test validation for machine learning classification models.

Null distributions (density curves and histograms) of permuted AUC values generated from label-shuffling permutations ($N = 1000$) for **(A)** LASSO logistic regression, **(B)** Elastic Net regression, **(C)** Random Forest, and **(D)** XGBoost models. The vertical dotted lines represent the theoretical null mean (AUC = 0.50), and the red dashed lines indicate the empirical observed AUC values (LASSO: 0.953, Elastic Net: 0.956, Random Forest: 0.964, XGBoost: 0.975; all permutation $P < 0.001$). The complete separation of observed AUCs from the permuted distributions confirms robust predictive performance and rules out chance correlation or model overfitting. AUC Area under the receiver operating characteristic curve; LASSO Least absolute shrinkage and selection operator; XGBoost Extreme gradient boosting.



Supplementary Figure S10. *In-silico* validation of the strictly stromal origin of *CAVIN1* and *SULF1* within the colorectal cancer microenvironment.

(A, B) TISCH database heatmaps (datasets CRC_GSE166555 and CRC_GSE179784) illustrating the average expression [$\log(\text{TPM}/10 + 1)$] of *CAVIN1* **(A)** and *SULF1* **(B)** across cell clusters. Both genes are highly enriched in fibroblasts and myofibroblasts but are virtually absent in epithelial and malignant cells, confirming their strict myCAF-specific origin. *TISCH* Tumor Immune Single-cell Hub; *TPM* Transcripts per million; *myCAF* myofibroblastic cancer-associated fibroblast.

Supplementary Table S1. Overview of Publicly Available RNA-Seq Datasets Selected for Transcriptomic Analysis

GEO Accession	BioProject	Assay	Tissue Type	Total Samples	Selected samples				Platform	Layout
					pCRC	CRLM	CRPM	NT		
GSE225182	PRJNA934310	Bulk RNA-seq	Primary tumor Peritoneal metastasis Matched Normal	33	19	7	7	-	NovaSeq 6000	Paired-end
GSE221240	PRJNA913584	Bulk RNA-seq	Primary tumor Liver metastasis Matched Normal	35	6	13	8	-	NovaSeq 6000	Paired-end
GSE193534	PRJNA796554	Bulk RNA-seq	Primary tumor Liver metastasis Peritoneal metastasis	33	13	16	-	-	NovaSeq 6000	Paired-end
GSE144735	PRJNA604751	scRNA-seq (10x Genomics v2)	Primary tumor Matched Normal	18	6	-	-	6	NovaSeq 6000	Paired-end
GSE225857	PRJNA937723	scRNA-seq (10x Genomics v3)	Primary tumor Matched Normal	8	4	-	-	-	NovaSeq 6000	Paired-end
GSE261388	PRJNA1086829	scRNA-seq (10x Genomics 5' v2)	Primary tumor Matched Normal	10	3	-	-	3	NovaSeq 6000	Paired-end
GSE245552	PRJNA1028966	scRNA-seq (10x Genomics 5' v2)	Primary tumor Liver metastasis Matched Normal	39	-	3	-	-	NovaSeq 6000	Paired-end
GSE183916	PRJNA762334	scRNA-seq (10x Genomics 5')	Peritoneal metastasis	6	-	-	6	-	Illumina HiSeq 4000	Paired-end

Notes: Data were retrieved from the Gene Expression Omnibus (GEO) database. Assay chemistries for scRNA-seq datasets are indicated where available.

Abbreviations: *NT* Normal tissue; *pCRC* Primary colorectal cancer; *CRLM* Colorectal liver metastasis; *CRPM* Colorectal peritoneal metastasis.

Supplementary Table S2. Detailed single-cell RNA-sequencing quality control (QC) and filtering metrics across integrated datasets.

Dataset (GSE)	Tissue Group	Sample ID (GSM)	Pre-QC Cells (n)	Post-QC Cells (n)	Doublets Removed n (%)	Retention Rate (%)	Total Detected Genes	Median Genes/Cell (nFeature)	Median UMI/Cell (nCount)	Median Mito (%)
GSE245552	CRLM	GSM7844813	6461	3383	73 (2.16%)	52.36%	23131	2244	6489	0.42%
		GSM7844830	6140	2767	16 (0.58%)	45.07%	20054	2104	5230	0.19%
		GSM7844834	8502	4255	120 (2.82%)	50.05%	20963	1390	5062	0.22%
	Subtotal (GSE245552)	CRLM (3 samples)	21103	10405	209 (2.01%)	49.31%	—	1390-2244	5062-6489	0.19-0.42%
GSE183916	CRPM	GSM5573762-7	28661	10993	758 (6.89%)	38.35%	33808	1847	4187	0.22%
	Subtotal (GSE183916)	CRPM (6 samples)	28661	10993	758 (6.89%)	38.35%	33808	1847	4187	0.22%
GSE225857	pCRC	GSM7058756	2054	293	1 (0.34%)	14.27%	16667	3128	6091	0.50%
		GSM7058757	3204	1248	9 (0.72%)	38.95%	17366	2734.5	5227.5	0.37%
		GSM7058758	3393	1140	7 (0.61%)	33.60%	16386	2760	5229	0.50%
		GSM7058759	3998	2106	28 (1.33%)	52.68%	15091	2295.5	4228.5	0.40%
	Subtotal	pCRC (4 samples)	12649	4787	45 (0.94%)	37.84%	—	2295-3128	4228-6091	0.37-0.50%
GSE144735	pCRC	GSM4294474	8175	4626	152 (3.29%)	56.59%	22073	1594	5174.5	4.58%
	NT	GSM4294486-91	9736	5615	217 (3.86%)	57.67%	21315	1465	6261	3.83%
	Subtotal	Mixed (7 samples)	17911	10241	369 (3.60%)	57.18%	—	1465-1594	5174-6261	3.83-4.58%
GSE261388	NT	GSM8141849-51	29614	6905	337 (4.88%)	23.32%	24749	1287	4721	6.53%
	Subtotal	3 samples	29614	6905	337 (4.88%)	23.32%	24749	1287	4721	6.53%
Overall Total	4 Groups	5 Datasets	109938	43331	1718 (3.96%)	39.41%	—	1287-3128	4187-6489	0.19-6.53%

Notes: Quality control thresholds were applied to filter out low-quality cells (e.g., high mitochondrial content or extreme UMI counts). Subtotals represent dataset-level metrics with median values expressed as ranges [Min-Max].

Abbreviations: *QC* Quality control; *UMI* Unique molecular identifier; *Mito* Mitochondrial; *pCRC* Primary colorectal cancer; *CRLM* Colorectal liver metastasis; *CRPM* Colorectal peritoneal metastasis; *NT* Normal tissue.

Supplementary Table S3. Exploration of hyperparameter configurations and nested cross-validation

Model	Hyperparameter	Grid Search	Optimal Value	Description
LASSO	Alpha (α)	Fixed (1.0)	1.0	Pure L_1 penalty (lasso; $\alpha = 1$ in glmnet.(
	lambda (λ)	$10^{-4} - 10^1$ (100 log-spaced)	0.018	Overall regularization strength; optimal λ selected via minimum binomial deviance (lambda.min.(
Elastic Net	alpha (α)	0.1 – 0.9 (step 0.1)	0.50	Elastic net mixing parameter balancing L_1 and L_2 penalties ($\alpha = 0.5$ selects/drops correlated features in groups).
	lambda (λ)	$10^{-4} - 10^1$ (100 log-spaced)	0.025	Overall regularization penalty; optimal (α, λ) pair selected via minimum binomial deviance across the 2D grid.
Random Forest	num.trees	500 (fixed)	500	Number of trees grown in the ensemble.
	mtry	1 – 4 (step 1)	2	Number of candidate features evaluated at each split; primary tuning parameter of ranger (equivalent to max_features in Python).
	min.node.size	1 – 5 (step 1)	2	Minimum terminal node size; regularizes tree depth to control overfitting.
XGBoost	nrounds	50 – 500 (step 50)	150	Number of boosting iterations (equivalent to n_estimators in Python).
XGBoost	max_depth	2 – 6 (step 1)	3	Maximum tree depth; increasing depth increases model complexity and overfitting risk.
	eta (η)	0.01, 0.05, 0.1, 0.2	0.05	Step-size shrinkage per boosting update; smaller η makes boosting more conservative.
	subsample	0.6 – 1.0 (step 0.1)	0.80	Subsample ratio of training instances per boosting iteration.
	colsample_bytree	0.6 – 1.0 (step 0.1)	0.80	Subsample ratio of columns when constructing each tree.
Nested cross validation	Outer Loop	Stratified 10-folds $\times$ 5 repeats	50 outer splits	Used exclusively for unbiased performance evaluation. The holdout test fold in each split remains entirely untouched until the final tuned model is evaluated.
	Inner Loop	Stratified 5-fold	5 inner splits	Executed strictly within each outer training set to tune hyperparameters ($\lambda, \alpha, mtry, \eta$, etc.) via grid search without seeing the outer test fold.
_____	Feature Preprocessing & Scaling	Within-fold scaling & isolation	Strict Isolation	Normalization, centering, and feature transformations were fitted solely on the inner training folds to ensure zero data leakage.

Supplementary Table S4. qRT-PCR-primers data used in this study

Gene symbol	Definition	NCBI Reference Sequence	Primer sequence (5'→3')	Amplicon (bp)	Ta (°C)
CAVIN1	Caveolae associated protein 1	NM_012232.6	F: GTGCCTCTGTGCTCCATCCTAG R: CTCCCTTCACCCGCAAAGAT	160	60
SULF1	Sulfatase 1	NM_001412833.1	F: AAGCCCAGATTTGTCCATACT R: AATGTTTCTTGGTTGCAACACT	120	60
GAPDH (Internal control)	Glyceraldehyde-3-phosphate dehydrogenase, protein coding	NM_002046.7	F: CAGGGCTGCTTTTAACTCTGG R: TGGGTGGAATCATATTGGAACA	102	60

Abbreviations: *F* Forward primer; *R* Reverse primer; *Ta* Temperature of annealing

Supplementary Table S5. The optimized conditions of qRT-PCR

cDNA (1 µl)	Temperature (°C)		Time (s)	Cycle	Step	Total volume
<i>CAVIN1</i> ^a <i>SULF1</i> ^b	95		180	1	Polymerase activation	10 µl
	95		15	1	Denaturation	
	59.5 ^a	60 ^b	30	40	Annealing	
	72		30	40	Extension	
	95		5	40	Denaturation	
	60		30	40	Annealing/ Extension	

Notes: Melting curve calculation following the final protocol: 55 °C to 95 °C in 1°C increments with samples hold at each increment for 5 s.

Supplementary Table S6. List of the 500 core gene signatures identified across disease stages.

Group	Gene Symbol	Ensembl ID	log2FC	Padj	DEG
CRLM	<i>FCRL1</i>	ENSG00000163534	-4/06	1/06E-07	Down
CRLM	<i>WNT2B</i>	ENSG00000134245	-1/88	1/39E-23	Down
CRLM	<i>FCRLA</i>	ENSG00000132185	-3/32	1/48E-08	Down
CRLM	<i>P2RY14</i>	ENSG00000174944	-2/22	1/01E-10	Down
CRLM	<i>CLEC3B</i>	ENSG00000163815	-2/02	1/13E-08	Down
CRLM	<i>BTNL8</i>	ENSG00000113303	-4/26	3/92E-17	Down
CRLM	<i>MS4A1</i>	ENSG00000156738	-4/02	1/06E-08	Down
CRLM	<i>MRGPRF</i>	ENSG00000172935	-2/68	3/03E-54	Down
CRLM	<i>CD19</i>	ENSG00000177455	-3/47	2/99E-19	Down
CRLM	<i>CD79B</i>	ENSG00000007312	-2/60	8/12E-22	Down
CRLM	<i>ACTG2</i>	ENSG00000163017	4/65	1/15E-51	Up
CRLM	<i>PIEZO2</i>	ENSG00000154864	2/07	1/51E-18	Up
CRLM	<i>ACTA2</i>	ENSG00000107796	1/07	7/57E-20	Up
CRLM	<i>COL2A1</i>	ENSG00000139219	2/52	1/05E-06	Up
CRLM	<i>C8A</i>	ENSG00000157131	1/09	9/91E-17	Up
CRLM	<i>AGTR1</i>	ENSG00000144891	3/04	1/10E-32	Up
CRLM	<i>CDH9</i>	ENSG00000113100	2/96	1/45E-05	Up
CRLM	<i>FGL1</i>	ENSG00000104760	11/00	2/63E-77	Up
CRLM	<i>CHIT1</i>	ENSG00000133063	3/39	8/77E-16	Up
CRLM	<i>FABP3</i>	ENSG00000121769	2/47	8/84E-20	Up
CRLM	<i>PFKFB1</i>	ENSG00000158571	2/03	2/89E-06	Up
CRLM	<i>CXCL11</i>	ENSG00000169248	2/36	0/0013537	Up
pCRC	<i>EPHA2</i>	ENSG00000142627	3/18	3/64E-100	Up
pCRC	<i>CD2</i>	ENSG00000116824	3/98	6/34E-66	Up
pCRC	<i>LAMC2</i>	ENSG00000058085	5/11	1/84E-122	Up
pCRC	<i>GPA33</i>	ENSG00000143167	8/53	1/10E-63	Up
pCRC	<i>NUF2</i>	ENSG00000143228	4/87	1/04E-149	Up
pCRC	<i>CAPN8</i>	ENSG00000203697	7/71	1/71E-85	Up
pCRC	<i>DTL</i>	ENSG00000143476	5/45	1/30E-107	Up
pCRC	<i>SLAMF7</i>	ENSG00000026751	6/15	1/78E-95	Up
pCRC	<i>LAMB3</i>	ENSG00000196878	7/52	4/66E-271	Up
pCRC	<i>KIF14</i>	ENSG00000118193	5/42	4/31E-99	Up
pCRC	<i>CLSPN</i>	ENSG00000092853	5/19	3/00E-108	Up
pCRC	<i>RAB25</i>	ENSG00000132698	8/71	1/38E-200	Up
pCRC	<i>PDZK1IP1</i>	ENSG00000162366	9/37	8/54E-196	Up
pCRC	<i>KIF2C</i>	ENSG00000142945	4/37	3/23E-131	Up
pCRC	<i>REG4</i>	ENSG00000134193	13/64	1/66E-101	Up
pCRC	<i>CD52</i>	ENSG00000169442	4/55	2/76E-79	Up
pCRC	<i>MARCKSL1</i>	ENSG00000175130	4/47	2/47E-170	Up
pCRC	<i>CTSE</i>	ENSG00000196188	9/77	1/52E-82	Up
pCRC	<i>CTSS</i>	ENSG00000163131	4/34	1/71E-140	Up
pCRC	<i>CDC20</i>	ENSG00000117399	6/62	1/30E-182	Up
pCRC	<i>ASPM</i>	ENSG00000066279	5/57	4/19E-79	Up
pCRC	<i>S100A14</i>	ENSG00000189334	7/85	1/67E-207	Up
pCRC	<i>ELF3</i>	ENSG00000163435	7/86	3/32E-118	Up
pCRC	<i>IGSF9</i>	ENSG00000085552	5/53	8/52E-96	Up
pCRC	<i>LAD1</i>	ENSG00000159166	8/52	3/23E-174	Up
pCRC	<i>TSPAN1</i>	ENSG00000117472	8/22	9/07E-120	Up
pCRC	<i>AKR7A3</i>	ENSG00000162482	5/58	4/34E-189	Up
pCRC	<i>IRF6</i>	ENSG00000117595	5/36	2/90E-165	Up
pCRC	<i>TNFRSF18</i>	ENSG00000186891	3/92	3/52E-61	Up
pCRC	<i>TNFRSF9</i>	ENSG00000049249	4/85	6/65E-46	Up
pCRC	<i>UBE2T</i>	ENSG00000077152	3/67	8/76E-172	Up
pCRC	<i>CGN</i>	ENSG00000143375	5/73	6/49E-210	Up

pCRC	<i>CENPF</i>	ENSG00000117724	5/08	5/77E-119	Up
pCRC	<i>CDCA8</i>	ENSG00000134690	5/46	1/14E-228	Up
pCRC	<i>SERINC2</i>	ENSG00000168528	6/92	2/20E-206	Up
pCRC	<i>DEPDC1</i>	ENSG00000024526	6/11	3/57E-83	Up
pCRC	<i>VSNL1</i>	ENSG00000163032	5/68	8/51E-108	Up
pCRC	<i>ANXA4</i>	ENSG00000196975	2/52	2/88E-259	Up
pCRC	<i>GALNT5</i>	ENSG00000136542	7/37	1/76E-159	Up
pCRC	<i>HJURP</i>	ENSG00000123485	6/08	2/96E-78	Up
pCRC	<i>SPC25</i>	ENSG00000152253	5/95	6/28E-99	Up
pCRC	<i>CCL20</i>	ENSG00000115009	8/70	5/09E-58	Up
pCRC	<i>KRTCAP3</i>	ENSG00000157992	5/48	6/84E-233	Up
pCRC	<i>MALL</i>	ENSG00000144063	4/69	8/07E-150	Up
pCRC	<i>RRM2</i>	ENSG00000171848	7/23	1/20E-103	Up
pCRC	<i>SDC1</i>	ENSG00000115884	7/53	1/61E-207	Up
pCRC	<i>BUB1</i>	ENSG00000169679	6/16	1/62E-134	Up
pCRC	<i>VIL1</i>	ENSG00000127831	8/39	9/40E-99	Up
pCRC	<i>CAPG</i>	ENSG00000042493	4/30	2/95E-171	Up
pCRC	<i>DHRS9</i>	ENSG00000073737	6/62	4/89E-88	Up
pCRC	<i>CDCA7</i>	ENSG00000144354	6/90	2/14E-232	Up
pCRC	<i>IL1A</i>	ENSG00000115008	6/75	1/45E-58	Up
pCRC	<i>EPCAM</i>	ENSG00000119888	8/74	9/02E-125	Up
pCRC	<i>CENPA</i>	ENSG00000115163	6/23	4/29E-117	Up
pCRC	<i>NCAPH</i>	ENSG00000121152	5/79	4/41E-180	Up
pCRC	<i>GALNT3</i>	ENSG00000115339	6/51	1/1E10-259	Up
pCRC	<i>FAM3D</i>	ENSG00000198643	9/14	8/38E-88	Up
pCRC	<i>B3GNT5</i>	ENSG00000176597	3/15	2/96E-105	Up
pCRC	<i>TIGIT</i>	ENSG00000181847	4/66	2/41E-49	Up
pCRC	<i>ARL14</i>	ENSG00000179674	8/01	4/38E-54	Up
pCRC	<i>SLC12A8</i>	ENSG00000221955	5/87	5/59E-154	Up
pCRC	<i>PLS1</i>	ENSG00000120756	7/67	1/43E-200	Up
pCRC	<i>PPARG</i>	ENSG00000132170	3/37	5/71E-115	Up
pCRC	<i>SLC6A20</i>	ENSG00000163817	7/58	8/00E-101	Up
pCRC	<i>LAMP3</i>	ENSG00000078081	6/36	8/78E-84	Up
pCRC	<i>MAD2L1</i>	ENSG00000164109	4/31	4/00E-258	Up
pCRC	<i>SLC7A11</i>	ENSG00000151012	6/28	2/15E-99	Up
pCRC	<i>NCAPG</i>	ENSG00000109805	5/89	2/66E-113	Up
pCRC	<i>JCHAIN</i>	ENSG00000132465	8/58	1/02E-90	Up
pCRC	<i>S100P</i>	ENSG00000163993	9/39	3/51E-192	Up
pCRC	<i>CENPE</i>	ENSG00000138778	3/29	2/44E-111	Up
pCRC	<i>CXCL1</i>	ENSG00000163739	6/13	1/35E-74	Up
pCRC	<i>CXCL5</i>	ENSG00000163735	7/93	1/05E-66	Up
pCRC	<i>RASSF6</i>	ENSG00000169435	6/20	6/50E-153	Up
pCRC	<i>RBM47</i>	ENSG00000163694	5/56	1/25E-267	Up
pCRC	<i>ITGA2</i>	ENSG00000164171	3/79	1/03E-122	Up
pCRC	<i>CSF2</i>	ENSG00000164400	8/57	5/07E-42	Up
pCRC	<i>ESM1</i>	ENSG00000164283	5/51	1/55E-32	Up
pCRC	<i>GZMA</i>	ENSG00000145649	4/54	1/18E-67	Up
pCRC	<i>PTTG1</i>	ENSG00000164611	5/18	7/01E-168	Up
pCRC	<i>BTNL8</i>	ENSG00000113303	7/36	1/47E-73	Up
pCRC	<i>MZB1</i>	ENSG00000170476	7/30	7/75E-57	Up
pCRC	<i>SPINK1</i>	ENSG00000164266	8/26	2/70E-75	Up
pCRC	<i>CDX1</i>	ENSG00000113722	8/48	1/04E-110	Up
pCRC	<i>CDHR2</i>	ENSG00000074276	6/71	6/59E-82	Up
pCRC	<i>HMMR</i>	ENSG00000072571	6/37	4/67E-110	Up
pCRC	<i>CCNB1</i>	ENSG00000134057	4/96	0/00E+00	Up
pCRC	<i>HAVCR1</i>	ENSG00000113249	8/38	4/32E-104	Up
pCRC	<i>GMDS</i>	ENSG00000112699	4/82	1/1E-81	Up

pCRC	<i>PRDM1</i>	ENSG00000057657	3/23	4/86E-81	Up
pCRC	<i>CD24</i>	ENSG00000272398	7/16	6/42E-191	Up
pCRC	<i>COL10A1</i>	ENSG00000123500	9/02	4/50E-165	Up
pCRC	<i>LTB</i>	ENSG00000227507	4/62	4/71E-82	Up
pCRC	<i>GMNN</i>	ENSG00000112312	2/42	4/45E-131	Up
pCRC	<i>TRIM31</i>	ENSG00000204616	8/55	2/80E-69	Up
pCRC	<i>TRIM15</i>	ENSG00000204610	7/46	1/99E-90	Up
pCRC	<i>SLC44A4</i>	ENSG00000204385	8/13	2/92E-101	Up
pCRC	<i>PLA2G7</i>	ENSG00000146070	5/23	3/20E-55	Up
pCRC	<i>KIFC1</i>	ENSG00000237649	5/78	4/32E-187	Up
pCRC	<i>PKIB</i>	ENSG00000135549	5/20	5/86E-123	Up
pCRC	<i>SPDEF</i>	ENSG00000124664	7/38	1/16E-104	Up
pCRC	<i>DSP</i>	ENSG00000096696	4/85	5/27E-190	Up
pCRC	<i>AOC1</i>	ENSG00000002726	8/38	3/15E-90	Up
pCRC	<i>CLDN3</i>	ENSG00000165215	8/39	1/50E-91	Up
pCRC	<i>CLDN4</i>	ENSG00000189143	8/63	5/45E-216	Up
pCRC	<i>CYP3A5</i>	ENSG00000106258	3/42	4/03E-122	Up
pCRC	<i>TSPAN13</i>	ENSG00000106537	4/03	2/48E-130	Up
pCRC	<i>AGR2</i>	ENSG00000106541	10/15	1/19E-106	Up
pCRC	<i>CXCR3</i>	ENSG00000186810	4/63	2/02E-62	Up
pCRC	<i>SSR4</i>	ENSG00000180879	2/05	7/20E-189	Up
pCRC	<i>FOXP3</i>	ENSG00000049768	4/40	2/60E-90	Up
pCRC	<i>PIM2</i>	ENSG00000102096	3/23	1/84E-162	Up
pCRC	<i>CDH17</i>	ENSG00000079112	8/33	1/09E-153	Up
pCRC	<i>CA2</i>	ENSG00000104267	6/36	7/63E-170	Up
pCRC	<i>TNFRSF11B</i>	ENSG00000164761	5/80	6/46E-100	Up
pCRC	<i>ATP6V0D2</i>	ENSG00000147614	7/99	2/29E-68	Up
pCRC	<i>MAL2</i>	ENSG00000147676	8/46	6/08E-225	Up
pCRC	<i>GGH</i>	ENSG00000137563	5/17	1/19E-203	Up
pCRC	<i>SDR16C5</i>	ENSG00000170786	7/10	2/64E-139	Up
pCRC	<i>MCM4</i>	ENSG00000104738	3/47	4/37E-207	Up
pCRC	<i>PBK</i>	ENSG00000168078	6/76	9/17E-64	Up
pCRC	<i>DEFB1</i>	ENSG00000164825	6/23	3/25E-54	Up
pCRC	<i>CLDN23</i>	ENSG00000253958	4/94	2/61E-135	Up
pCRC	<i>SLC28A3</i>	ENSG00000197506	6/10	1/08E-64	Up
pCRC	<i>RASEF</i>	ENSG00000165105	5/97	2/27E-165	Up
pCRC	<i>GOLM1</i>	ENSG00000135052	3/54	1/93E-251	Up
pCRC	<i>MELK</i>	ENSG00000165304	6/52	3/47E-142	Up
pCRC	<i>LCN2</i>	ENSG00000148346	11/52	3/91E-202	Up
pCRC	<i>TMEM141</i>	ENSG00000244187	2/92	2/86E-171	Up
pCRC	<i>PRSS3</i>	ENSG00000010438	6/80	3/28E-202	Up
pCRC	<i>FBP1</i>	ENSG00000165140	4/42	3/13E-134	Up
pCRC	<i>EPB41L4B</i>	ENSG00000095203	4/80	6/73E-182	Up
pCRC	<i>TXN</i>	ENSG00000136810	2/53	6/92E-170	Up
pCRC	<i>SIAE</i>	ENSG00000110013	3/84	9/09E-236	Up
pCRC	<i>FAM111B</i>	ENSG00000189057	6/44	5/46E-116	Up
pCRC	<i>IL18</i>	ENSG00000150782	4/09	1/90E-121	Up
pCRC	<i>PHLDA2</i>	ENSG00000181649	5/74	3/76E-166	Up
pCRC	<i>EHF</i>	ENSG00000135373	8/14	1/47E-119	Up
pCRC	<i>MMP1</i>	ENSG00000196611	10/76	1/07E-64	Up
pCRC	<i>TMEM45B</i>	ENSG00000151715	8/54	1/52E-150	Up
pCRC	<i>ST14</i>	ENSG00000149418	7/73	6/00E-221	Up
pCRC	<i>ASCL2</i>	ENSG00000183734	7/98	8/61E-212	Up
pCRC	<i>CD3D</i>	ENSG00000167286	4/86	2/09E-67	Up
pCRC	<i>VSIG2</i>	ENSG00000019102	6/52	5/53E-118	Up
pCRC	<i>STARD10</i>	ENSG00000214530	3/10	1/46E-147	Up
pCRC	<i>TMPRSS4</i>	ENSG00000137648	9/22	4/57E-130	Up

pCRC	<i>PKP3</i>	ENSG00000184363	8/02	2/48E-229	Up
pCRC	<i>AKR1C3</i>	ENSG00000196139	3/83	4/64E-113	Up
pCRC	<i>ZWINT</i>	ENSG00000122952	5/29	3/31E-192	Up
pCRC	<i>RTKN2</i>	ENSG00000182010	5/36	2/28E-100	Up
pCRC	<i>CEP55</i>	ENSG00000138180	6/18	4/33E-97	Up
pCRC	<i>FFAR4</i>	ENSG00000186188	7/57	3/69E-88	Up
pCRC	<i>HKDC1</i>	ENSG00000156510	8/00	2/45E-198	Up
pCRC	<i>KIF11</i>	ENSG00000138160	4/58	1/06E-207	Up
pCRC	<i>ANKRD22</i>	ENSG00000152766	7/61	6/42E-111	Up
pCRC	<i>MCM10</i>	ENSG00000065328	5/94	7/71E-129	Up
pCRC	<i>COL17A1</i>	ENSG00000065618	8/08	2/42E-120	Up
pCRC	<i>HELLS</i>	ENSG00000119969	3/36	5/66E-114	Up
pCRC	<i>CDK1</i>	ENSG00000170312	5/97	1/63E-156	Up
pCRC	<i>MKI67</i>	ENSG00000148773	5/93	1/07E-71	Up
pCRC	<i>ITGB7</i>	ENSG00000139626	4/04	2/98E-106	Up
pCRC	<i>C12orf75</i>	ENSG00000235162	4/96	9/17E-115	Up
pCRC	<i>SCNN1A</i>	ENSG00000111319	5/87	3/70E-169	Up
pCRC	<i>TROAP</i>	ENSG00000135451	4/83	2/30E-58	Up
pCRC	<i>IL23A</i>	ENSG00000110944	3/88	2/02E-81	Up
pCRC	<i>KRT18</i>	ENSG00000111057	8/07	6/06E-273	Up
pCRC	<i>KRT8</i>	ENSG00000170421	6/46	1/30E-230	Up
pCRC	<i>RASAL1</i>	ENSG00000111344	7/15	2/86E-111	Up
pCRC	<i>OASL</i>	ENSG00000135114	5/12	4/20E-106	Up
pCRC	<i>KLF5</i>	ENSG00000102554	5/75	3/23E-292	Up
pCRC	<i>DIAPH3</i>	ENSG00000139734	5/05	8/29E-64	Up
pCRC	<i>GJB2</i>	ENSG00000165474	6/77	1/78E-140	Up
pCRC	<i>SKA3</i>	ENSG00000165480	6/75	1/21E-121	Up
pCRC	<i>LMO7</i>	ENSG00000136153	4/34	1/1E10-300	Up
pCRC	<i>SERPINA1</i>	ENSG00000197249	6/91	2/96E-128	Up
pCRC	<i>LGALS3</i>	ENSG00000131981	3/63	1/08E-197	Up
pCRC	<i>DLGAP5</i>	ENSG00000126787	7/17	7/85E-72	Up
pCRC	<i>CDKN3</i>	ENSG00000100526	4/68	7/45E-154	Up
pCRC	<i>GPX2</i>	ENSG00000176153	9/36	1/38E-154	Up
pCRC	<i>AMN</i>	ENSG00000166126	7/14	1/77E-81	Up
pCRC	<i>IFI27</i>	ENSG00000165949	4/15	3/56E-111	Up
pCRC	<i>CCNB2</i>	ENSG00000157456	4/50	9/54E-169	Up
pCRC	<i>BUB1B</i>	ENSG00000156970	5/81	9/27E-99	Up
pCRC	<i>KIF23</i>	ENSG00000137807	3/95	4/54E-95	Up
pCRC	<i>C15orf48</i>	ENSG00000166920	8/78	4/68E-139	Up
pCRC	<i>DUOX2</i>	ENSG00000140279	6/68	4/57E-113	Up
pCRC	<i>DUOXA2</i>	ENSG00000140274	8/82	3/39E-156	Up
pCRC	<i>SPINT1</i>	ENSG00000166145	6/70	7/93E-275	Up
pCRC	<i>ARHGAP11A</i>	ENSG00000198826	3/18	2/01E-92	Up
pCRC	<i>RHOV</i>	ENSG00000104140	5/63	2/48E-130	Up
pCRC	<i>TSPAN3</i>	ENSG00000140391	2/17	3/65E-253	Up
pCRC	<i>C2CD4A</i>	ENSG00000198535	7/23	3/74E-90	Up
pCRC	<i>SMIM22</i>	ENSG00000267795	8/39	8/48E-193	Up
pCRC	<i>TMC5</i>	ENSG00000103534	8/49	2/18E-205	Up
pCRC	<i>CCL22</i>	ENSG00000102962	5/41	5/15E-51	Up
pCRC	<i>FA2H</i>	ENSG00000103089	5/30	1/34E-94	Up
pCRC	<i>GINS2</i>	ENSG00000131153	5/03	2/55E-226	Up
pCRC	<i>PKMYT1</i>	ENSG00000127564	5/76	2/24E-123	Up
pCRC	<i>PRSS8</i>	ENSG00000052344	8/42	2/56E-114	Up
pCRC	<i>PLK1</i>	ENSG00000166851	4/07	3/94E-223	Up
pCRC	<i>MSLN</i>	ENSG00000102854	8/13	3/33E-54	Up
pCRC	<i>CDH1</i>	ENSG00000039068	7/74	3/27E-178	Up
pCRC	<i>APOBR</i>	ENSG00000184730	4/72	7/11E-115	Up

pCRC	<i>DPEP1</i>	ENSG00000015413	9/03	1/06E-63	Up
pCRC	<i>CDT1</i>	ENSG00000167513	5/02	4/81E-148	Up
pCRC	<i>IRF8</i>	ENSG00000140968	3/29	1/25E-92	Up
pCRC	<i>TNFRSF17</i>	ENSG00000048462	6/97	1/12E-56	Up
pCRC	<i>PRSS22</i>	ENSG00000005001	9/87	6/78E-172	Up
pCRC	<i>CDC6</i>	ENSG00000094804	5/48	1/38E-234	Up
pCRC	<i>TNS4</i>	ENSG00000131746	8/06	3/83E-158	Up
pCRC	<i>TOP2A</i>	ENSG00000131747	6/08	1/87E-130	Up
pCRC	<i>LGALS9C</i>	ENSG00000171916	6/56	9/11E-48	Up
pCRC	<i>SOX9</i>	ENSG00000125398	6/76	9/59E-177	Up
pCRC	<i>AURKB</i>	ENSG00000178999	6/37	2/93E-89	Up
pCRC	<i>ST6GALNAC1</i>	ENSG00000070526	6/27	1/36E-130	Up
pCRC	<i>TK1</i>	ENSG00000167900	4/21	3/28E-119	Up
pCRC	<i>BIRC5</i>	ENSG00000089685	6/64	1/04E-97	Up
pCRC	<i>KRT20</i>	ENSG00000171431	8/78	4/01E-79	Up
pCRC	<i>CLDN7</i>	ENSG00000181885	7/16	3/16E-196	Up
pCRC	<i>JUP</i>	ENSG00000173801	3/18	4/18E-179	Up
pCRC	<i>TXNDC17</i>	ENSG00000129235	2/68	5/90E-238	Up
pCRC	<i>ZBTB7C</i>	ENSG00000184828	3/91	2/68E-75	Up
pCRC	<i>SERPINB5</i>	ENSG00000206075	9/17	1/87E-132	Up
pCRC	<i>TYMS</i>	ENSG00000176890	5/53	4/27E-227	Up
pCRC	<i>COL9A2</i>	ENSG00000049089	2/74	8/74E-42	Up
pCRC	<i>MPZ</i>	ENSG00000158887	-3/63	1/32E-53	Down
pCRC	<i>NGF</i>	ENSG00000134259	-2/75	2/81E-39	Down
pCRC	<i>COL16A1</i>	ENSG00000084636	-2/12	5/30E-43	Down
pCRC	<i>KCNN3</i>	ENSG00000143603	-4/06	2/06E-77	Down
pCRC	<i>TMEM178A</i>	ENSG00000152154	-3/15	5/02E-48	Down
pCRC	<i>SNCA</i>	ENSG00000145335	-2/75	1/44E-45	Down
pCRC	<i>CMYA5</i>	ENSG00000164309	-4/71	1/82E-133	Down
pCRC	<i>NRN1</i>	ENSG00000124785	-2/34	5/41E-27	Down
pCRC	<i>FRS3</i>	ENSG00000137218	-1/45	8/00E-50	Down
pCRC	<i>GRIK2</i>	ENSG00000164418	-3/21	5/43E-34	Down
pCRC	<i>SLC16A2</i>	ENSG00000147100	-2/07	2/29E-76	Down
pCRC	<i>L1CAM</i>	ENSG00000198910	-3/71	2/17E-45	Down
pCRC	<i>GPM6B</i>	ENSG00000046653	-4/82	5/04E-98	Down
pCRC	<i>HSPB2</i>	ENSG00000170276	-5/79	1/81E-104	Down
pCRC	<i>FXD2</i>	ENSG00000137731	-4/48	1/08E-62	Down
pCRC	<i>CXCL12</i>	ENSG00000107562	-2/62	7/97E-32	Down
pCRC	<i>CLEC4A</i>	ENSG00000111729	-2/97	2/52E-51	Down
pCRC	<i>RHOJ</i>	ENSG00000126785	-1/79	3/60E-33	Down
pCRC	<i>SHC4</i>	ENSG00000185634	-3/54	5/42E-54	Down
pCRC	<i>GATM</i>	ENSG00000171766	-1/77	1/87E-24	Down
pCRC	<i>TVP23A</i>	ENSG00000166676	-1/59	5/06E-22	Down
pCRC	<i>PMP22</i>	ENSG00000109099	-1/89	7/50E-61	Down
pCRC	<i>GAS7</i>	ENSG00000007237	-2/84	1/47E-61	Down
pCRC	<i>ABCA8</i>	ENSG00000141338	-3/23	7/33E-56	Down
pCRC	<i>PIEZO2</i>	ENSG00000154864	-3/33	4/41E-69	Down
CRPM	<i>HMCN1</i>	ENSG00000143341	3/87	1/03E-41	Up
CRPM	<i>HSPG2</i>	ENSG00000142798	2/40	2/11E-46	Up
CRPM	<i>COL16A1</i>	ENSG00000084636	2/13	1/93E-25	Up
CRPM	<i>DDR2</i>	ENSG00000162733	2/35	8/77E-42	Up
CRPM	<i>CFH</i>	ENSG00000000971	4/51	5/30E-71	Up
CRPM	<i>PBX1</i>	ENSG00000185630	2/06	8/37E-33	Up
CRPM	<i>NFIA</i>	ENSG00000162599	2/50	1/96E-109	Up
CRPM	<i>NEXN</i>	ENSG00000162614	2/58	2/14E-35	Up
CRPM	<i>ABL2</i>	ENSG00000143322	2/55	6/00E-82	Up
CRPM	<i>PRELP</i>	ENSG00000188783	3/39	2/72E-46	Up

CRPM	<i>PTGER3</i>	ENSG00000050628	2/94	2/22E-49	Up
CRPM	<i>PODN</i>	ENSG00000174348	2/46	5/34E-36	Up
CRPM	<i>HECW2</i>	ENSG00000138411	2/20	1/42E-20	Up
CRPM	<i>ANKRD44</i>	ENSG00000065413	2/24	7/35E-59	Up
CRPM	<i>CD302</i>	ENSG00000241399	3/55	3/89E-90	Up
CRPM	<i>CCDC88A</i>	ENSG00000115355	2/86	9/65E-100	Up
CRPM	<i>ZEB2</i>	ENSG00000169554	3/17	1/73E-48	Up
CRPM	<i>CLIP4</i>	ENSG00000115295	2/14	1/26E-37	Up
CRPM	<i>TNS1</i>	ENSG00000079308	3/21	1/64E-79	Up
CRPM	<i>SLC8A1</i>	ENSG00000183023	2/46	4/26E-43	Up
CRPM	<i>CYP1B1</i>	ENSG00000138061	3/77	7/24E-39	Up
CRPM	<i>TTN</i>	ENSG00000155657	6/04	2/83E-147	Up
CRPM	<i>CSRNP3</i>	ENSG00000178662	2/94	7/77E-39	Up
CRPM	<i>RBMS3</i>	ENSG00000144642	3/91	9/82E-146	Up
CRPM	<i>VGLL3</i>	ENSG00000206538	2/86	6/93E-53	Up
CRPM	<i>DNAJB4</i>	ENSG00000162616	1/38	3/93E-13	Up
CRPM	<i>COBLL1</i>	ENSG00000082438	1/98	2/43E-45	Up
CRPM	<i>IKZF2</i>	ENSG00000030419	1/67	5/23E-16	Up
CRPM	<i>ANKRD28</i>	ENSG00000206560	1/36	5/07E-27	Up
CRPM	<i>PDGFC</i>	ENSG00000145431	1/62	8/09E-29	Up
CRPM	<i>CALD1</i>	ENSG00000122786	1/92	4/12E-29	Up
CRPM	<i>GNB4</i>	ENSG00000114450	2/43	1/57E-64	Up
CRPM	<i>WWTR1</i>	ENSG00000018408	2/14	7/43E-53	Up
CRPM	<i>BOC</i>	ENSG00000144857	2/94	1/45E-50	Up
CRPM	<i>HEG1</i>	ENSG00000173706	2/22	9/55E-43	Up
CRPM	<i>CLDN11</i>	ENSG00000013297	3/87	1/84E-35	Up
CRPM	<i>CCDC80</i>	ENSG00000091986	3/23	1/56E-20	Up
CRPM	<i>SUSD5</i>	ENSG00000173705	3/26	2/88E-20	Up
CRPM	<i>PHLDB2</i>	ENSG00000144824	2/61	1/29E-34	Up
CRPM	<i>MITF</i>	ENSG00000187098	2/35	3/41E-36	Up
CRPM	<i>SLIT2</i>	ENSG00000145147	2/93	2/01E-59	Up
CRPM	<i>FAT4</i>	ENSG00000196159	2/62	1/02E-34	Up
CRPM	<i>CXXC4</i>	ENSG00000168772	3/51	1/23E-51	Up
CRPM	<i>VCAN</i>	ENSG00000038427	2/89	3/66E-25	Up
CRPM	<i>CMYA5</i>	ENSG00000164309	6/55	8/64E-154	Up
CRPM	<i>NREP</i>	ENSG00000134986	2/69	4/47E-24	Up
CRPM	<i>MAP1B</i>	ENSG00000131711	4/35	1/35E-136	Up
CRPM	<i>LIFR</i>	ENSG00000113594	3/95	1/78E-57	Up
CRPM	<i>SLC1A3</i>	ENSG00000079215	3/21	4/08E-24	Up
CRPM	<i>ADAMTS6</i>	ENSG00000049192	2/41	1/76E-19	Up
CRPM	<i>SLIT3</i>	ENSG00000184347	3/24	5/16E-51	Up
CRPM	<i>EBF1</i>	ENSG00000164330	3/78	1/72E-60	Up
CRPM	<i>ID4</i>	ENSG00000172201	2/49	2/94E-26	Up
CRPM	<i>FILIP1</i>	ENSG00000118407	4/08	2/18E-100	Up
CRPM	<i>AKAP12</i>	ENSG00000131016	3/04	2/99E-40	Up
CRPM	<i>LAMA2</i>	ENSG00000196569	2/89	6/41E-26	Up
CRPM	<i>DST</i>	ENSG00000151914	2/73	6/63E-131	Up
CRPM	<i>TNXB</i>	ENSG00000168477	4/66	3/78E-56	Up
CRPM	<i>QKI</i>	ENSG00000112531	2/57	4/46E-85	Up
CRPM	<i>CREB5</i>	ENSG00000146592	3/03	3/99E-20	Up
CRPM	<i>RELN</i>	ENSG00000189056	4/61	2/69E-42	Up
CRPM	<i>THSD7A</i>	ENSG00000005108	2/79	6/26E-47	Up
CRPM	<i>PDK4</i>	ENSG00000004799	3/25	2/25E-15	Up
CRPM	<i>PLXNA4</i>	ENSG00000221866	3/72	2/43E-43	Up
CRPM	<i>DGKI</i>	ENSG00000157680	3/75	8/19E-36	Up
CRPM	<i>AFF2</i>	ENSG00000155966	3/46	2/72E-21	Up
CRPM	<i>CFP</i>	ENSG00000126759	2/45	5/38E-17	Up

CRPM	<i>DMD</i>	ENSG00000198947	3/52	5/78E-86	Up
CRPM	<i>EGR3</i>	ENSG00000179388	2/59	9/93E-08	Up
CRPM	<i>ZFX4</i>	ENSG00000091656	5/20	7/29E-215	Up
CRPM	<i>PREX2</i>	ENSG00000046889	3/30	1/07E-51	Up
CRPM	<i>SFRP1</i>	ENSG00000104332	3/31	4/52E-25	Up
CRPM	<i>SLC7A2</i>	ENSG00000003989	3/41	2/66E-36	Up
CRPM	<i>DLC1</i>	ENSG00000164741	2/31	2/71E-43	Up
CRPM	<i>PAPPA</i>	ENSG00000182752	2/71	1/37E-20	Up
CRPM	<i>SLC31A2</i>	ENSG00000136867	4/41	7/17E-74	Up
CRPM	<i>ABCA1</i>	ENSG00000165029	2/53	2/67E-33	Up
CRPM	<i>SVEP1</i>	ENSG00000165124	3/58	1/45E-45	Up
CRPM	<i>ECM2</i>	ENSG00000106823	2/78	1/63E-21	Up
CRPM	<i>NFIB</i>	ENSG00000147862	2/94	2/55E-112	Up
CRPM	<i>AHNAK</i>	ENSG00000124942	2/60	5/66E-80	Up
CRPM	<i>GUCY1A2</i>	ENSG00000152402	3/92	7/63E-68	Up
CRPM	<i>PLXDC2</i>	ENSG00000120594	2/25	8/59E-32	Up
CRPM	<i>BICC1</i>	ENSG00000122870	2/60	6/43E-46	Up
CRPM	<i>PRKG1</i>	ENSG00000185532	2/63	1/34E-62	Up
CRPM	<i>ADIRF</i>	ENSG00000148671	12/29	2/79E-99	Up
CRPM	<i>EGR2</i>	ENSG00000122877	2/28	7/85E-10	Up
CRPM	<i>VIM</i>	ENSG00000026025	2/27	8/56E-28	Up
CRPM	<i>BCAT1</i>	ENSG00000060982	2/72	9/12E-20	Up
CRPM	<i>ALDH1L2</i>	ENSG00000136010	2/43	1/03E-52	Up
CRPM	<i>LRP1</i>	ENSG00000123384	2/80	9/99E-97	Up
CRPM	<i>ABCC9</i>	ENSG00000069431	3/49	8/29E-88	Up
CRPM	<i>IGF1</i>	ENSG00000017427	6/01	4/49E-69	Up
CRPM	<i>KCTD12</i>	ENSG00000178695	2/03	2/89E-27	Up
CRPM	<i>DCLK1</i>	ENSG00000133083	3/80	3/11E-49	Up
CRPM	<i>LTBP2</i>	ENSG00000119681	2/73	1/00E-23	Up
CRPM	<i>ATP8B4</i>	ENSG00000104043	2/42	2/83E-35	Up
CRPM	<i>ALDH1A3</i>	ENSG00000184254	2/93	1/35E-37	Up
CRPM	<i>NTRK3</i>	ENSG00000140538	3/50	3/55E-25	Up
CRPM	<i>MAP1A</i>	ENSG00000166963	3/12	2/12E-85	Up
CRPM	<i>THBS1</i>	ENSG00000137801	2/28	2/06E-07	Up
CRPM	<i>FBN1</i>	ENSG00000166147	2/47	1/75E-26	Up
CRPM	<i>MAF</i>	ENSG00000178573	2/05	1/36E-25	Up
CRPM	<i>CRISPLD2</i>	ENSG00000103196	2/48	7/87E-16	Up
CRPM	<i>CD68</i>	ENSG00000129226	4/11	2/05E-40	Up
CRPM	<i>GJC1</i>	ENSG00000182963	2/11	6/40E-30	Up
CRPM	<i>ABCA9</i>	ENSG00000154258	4/96	1/96E-79	Up
CRPM	<i>ABCA6</i>	ENSG00000154262	4/78	1/04E-83	Up
CRPM	<i>MYH10</i>	ENSG00000133026	2/77	3/95E-81	Up
CRPM	<i>XAF1</i>	ENSG00000132530	2/79	2/04E-28	Up
CRPM	<i>RNF152</i>	ENSG00000176641	2/02	1/70E-26	Up
CRPM	<i>TCF4</i>	ENSG00000196628	2/38	6/28E-83	Up
CRPM	<i>PIEZO2</i>	ENSG00000154864	4/12	2/24E-61	Up
CRPM	<i>ABCC9</i>	ENSG00000069431	3/49	8/29E-88	Up
CRPM	<i>IGF1</i>	ENSG00000017427	6/01	4/49E-69	Up
CRPM	<i>KCTD12</i>	ENSG00000178695	2/03	2/89E-27	Up
CRPM	<i>DCLK1</i>	ENSG00000133083	3/80	3/11E-49	Up
CRPM	<i>LTBP2</i>	ENSG00000119681	2/73	1/00E-23	Up
CRPM	<i>ATP8B4</i>	ENSG00000104043	2/42	2/83E-35	Up
CRPM	<i>ALDH1A3</i>	ENSG00000184254	2/93	1/35E-37	Up
CRPM	<i>NTRK3</i>	ENSG00000140538	3/50	3/55E-25	Up
CRPM	<i>MAP1A</i>	ENSG00000166963	3/12	2/12E-85	Up
CRPM	<i>THBS1</i>	ENSG00000137801	2/28	2/06E-07	Up
CRPM	<i>FBN1</i>	ENSG00000166147	2/47	1/75E-26	Up

CRPM	<i>MAF</i>	ENSG00000178573	2/05	1/36E-25	Up
CRPM	<i>CRISPLD2</i>	ENSG00000103196	2/48	7/87E-16	Up
CRPM	<i>CD68</i>	ENSG00000129226	4/11	2/05E-40	Up
CRPM	<i>GJC1</i>	ENSG00000182963	2/11	6/40E-30	Up
CRPM	<i>ABCA9</i>	ENSG00000154258	4/96	1/96E-79	Up
CRPM	<i>GPA33</i>	ENSG00000143167	-3/47	3/55E-07	Down
CRPM	<i>NUF2</i>	ENSG00000143228	-1/07	3/30E-05	Down
CRPM	<i>DTL</i>	ENSG00000143476	-0/93	0/0067387	Down
CRPM	<i>LAMB3</i>	ENSG00000196878	-0/85	0/0040529	Down
CRPM	<i>CAMK2N1</i>	ENSG00000162545	-0/84	1/89E-09	Down
CRPM	<i>RAB25</i>	ENSG00000132698	-3/05	2/73E-15	Down
CRPM	<i>TMEM54</i>	ENSG00000121900	-3/08	6/35E-62	Down
CRPM	<i>KIF2C</i>	ENSG00000142945	-1/42	5/82E-09	Down
CRPM	<i>S100A14</i>	ENSG00000189334	-2/79	2/55E-16	Down
CRPM	<i>ELF3</i>	ENSG00000163435	-1/62	0/0005038	Down
CRPM	<i>LAD1</i>	ENSG00000159166	-1/49	0/0003256	Down
CRPM	<i>TSPAN1</i>	ENSG00000117472	-4/76	4/14E-24	Down
CRPM	<i>ATP1B1</i>	ENSG00000143153	-1/35	9/67E-13	Down
CRPM	<i>ARHGEF16</i>	ENSG00000130762	-1/74	1/28E-06	Down
CRPM	<i>CGN</i>	ENSG00000143375	-0/73	0/0044607	Down
CRPM	<i>CDCA8</i>	ENSG00000134690	-1/68	2/14E-13	Down
CRPM	<i>SERINC2</i>	ENSG00000168528	-1/96	8/95E-11	Down
CRPM	<i>DEPDC1</i>	ENSG00000024526	-1/18	0/007112	Down
CRPM	<i>ANXA4</i>	ENSG00000196975	-1/57	2/77E-58	Down
CRPM	<i>HJURP</i>	ENSG00000123485	-0/92	0/0443741	Down
CRPM	<i>SPC25</i>	ENSG00000152253	-1/54	6/73E-05	Down
CRPM	<i>HES6</i>	ENSG00000144485	-1/87	1/50E-17	Down
CRPM	<i>KRTCAP3</i>	ENSG00000157992	-2/99	1/65E-39	Down
CRPM	<i>HSPD1</i>	ENSG00000144381	-1/74	1/07E-37	Down
CRPM	<i>RRM2</i>	ENSG00000171848	-2/43	6/83E-08	Down
CRPM	<i>BUB1</i>	ENSG00000169679	-1/05	0/0021715	Down
CRPM	<i>VIL1</i>	ENSG00000127831	-1/27	0/0220229	Down
CRPM	<i>CDCA7</i>	ENSG00000144354	-1/35	2/44E-06	Down
CRPM	<i>EPCAM</i>	ENSG00000119888	-2/26	5/95E-06	Down
CRPM	<i>CENPA</i>	ENSG00000115163	-1/67	6/50E-06	Down
CRPM	<i>NCAPH</i>	ENSG00000121152	-1/69	8/46E-10	Down
CRPM	<i>GALNT3</i>	ENSG00000115339	-1/60	9/82E-14	Down
CRPM	<i>PLS1</i>	ENSG00000120756	-1/82	1/03E-07	Down
CRPM	<i>MAD2L1</i>	ENSG00000164109	-1/59	9/65E-21	Down
CRPM	<i>NCAPG</i>	ENSG00000109805	-0/89	0/0134976	Down
CRPM	<i>CCNA2</i>	ENSG00000145386	-1/60	3/50E-09	Down
CRPM	<i>CDX1</i>	ENSG00000113722	-2/73	9/54E-08	Down
CRPM	<i>HMMR</i>	ENSG00000072571	-1/79	4/12E-06	Down
CRPM	<i>CD24</i>	ENSG00000272398	-2/07	2/12E-10	Down
CRPM	<i>PERP</i>	ENSG00000112378	-1/26	2/53E-11	Down
CRPM	<i>TRIM31</i>	ENSG00000204616	-1/77	0/0082523	Down
CRPM	<i>TRIM15</i>	ENSG00000204610	-2/51	4/91E-07	Down
CRPM	<i>SLC44A4</i>	ENSG00000204385	-3/02	3/54E-09	Down
CRPM	<i>KIFC1</i>	ENSG00000237649	-1/30	1/28E-06	Down
CRPM	<i>ZP3</i>	ENSG00000188372	-1/84	1/22E-07	Down
CRPM	<i>AOC1</i>	ENSG00000002726	-2/91	2/06E-07	Down
CRPM	<i>CLDN3</i>	ENSG00000165215	-2/13	0/0001617	Down
CRPM	<i>CLDN4</i>	ENSG00000189143	-2/74	1/02E-13	Down
CRPM	<i>AGR2</i>	ENSG00000106541	-4/58	1/22E-13	Down
CRPM	<i>CDH17</i>	ENSG00000079112	-1/96	4/50E-06	Down
CRPM	<i>MAL2</i>	ENSG00000147676	-1/46	4/96E-05	Down
CRPM	<i>BOP1</i>	ENSG00000261236	-1/41	1/14E-26	Down

CRPM	<i>GGH</i>	ENSG00000137563	-1/43	3/73E-10	Down
CRPM	<i>TPD52</i>	ENSG00000076554	-1/37	1/30E-12	Down
CRPM	<i>MCM4</i>	ENSG00000104738	-1/27	5/95E-17	Down
CRPM	<i>MELK</i>	ENSG00000165304	-1/40	6/80E-05	Down
CRPM	<i>PRSS3</i>	ENSG00000010438	-2/41	1/02E-15	Down
CRPM	<i>FAM111B</i>	ENSG00000189057	-1/26	0/0011245	Down
CRPM	<i>EHF</i>	ENSG00000135373	-1/48	0/0020265	Down
CRPM	<i>TMEM45B</i>	ENSG00000151715	-2/62	2/35E-09	Down
CRPM	<i>ST14</i>	ENSG00000149418	-2/25	6/22E-12	Down
CRPM	<i>STARD10</i>	ENSG00000214530	-2/85	4/82E-71	Down
CRPM	<i>TMPRSS4</i>	ENSG00000137648	-1/17	0/0275867	Down
CRPM	<i>PKP3</i>	ENSG00000184363	-2/01	1/60E-09	Down
CRPM	<i>ZWINT</i>	ENSG00000122952	-1/77	2/36E-13	Down
CRPM	<i>CEP55</i>	ENSG00000138180	-1/41	0/0005	Down
CRPM	<i>HKDC1</i>	ENSG00000156510	-1/06	0/0038261	Down
CRPM	<i>KIF11</i>	ENSG00000138160	-0/95	3/29E-06	Down
CRPM	<i>COL17A1</i>	ENSG00000065618	-1/30	0/0067721	Down
CRPM	<i>SCNN1A</i>	ENSG00000111319	-1/13	9/27E-05	Down
CRPM	<i>CDCA3</i>	ENSG00000111665	-1/66	5/37E-12	Down
CRPM	<i>TROAP</i>	ENSG00000135451	-1/33	0/0012249	Down
CRPM	<i>ERBB3</i>	ENSG00000065361	-0/82	0/0028256	Down
CRPM	<i>KRT18</i>	ENSG00000111057	-2/08	1/13E-11	Down
CRPM	<i>KRT8</i>	ENSG00000170421	-3/31	5/38E-36	Down
CRPM	<i>DLGAP5</i>	ENSG00000126787	-1/49	0/0068171	Down
CRPM	<i>CDKN3</i>	ENSG00000100526	-1/56	9/99E-11	Down
CRPM	<i>GPX2</i>	ENSG00000176153	-2/75	7/43E-09	Down
CRPM	<i>CCNB2</i>	ENSG00000157456	-2/28	4/12E-25	Down
CRPM	<i>BUB1B</i>	ENSG00000156970	-1/18	0/0017994	Down
CRPM	<i>KIF23</i>	ENSG00000137807	-1/05	6/22E-05	Down
CRPM	<i>SPINT1</i>	ENSG00000166145	-2/09	1/17E-16	Down
CRPM	<i>PHGR1</i>	ENSG00000233041	-3/95	1/49E-11	Down
CRPM	<i>SMIM22</i>	ENSG00000267795	-2/58	1/17E-11	Down
CRPM	<i>TMC5</i>	ENSG00000103534	-1/29	0/0007194	Down
CRPM	<i>FA2H</i>	ENSG00000103089	-2/01	6/39E-09	Down
CRPM	<i>GIN52</i>	ENSG00000131153	-1/61	4/57E-14	Down
CRPM	<i>PKMYT1</i>	ENSG00000127564	-1/23	0/0002411	Down
CRPM	<i>PRSS8</i>	ENSG00000052344	-2/46	9/35E-07	Down
CRPM	<i>PLK1</i>	ENSG00000166851	-1/54	5/07E-19	Down
CRPM	<i>CDH1</i>	ENSG00000039068	-0/84	0/0278157	Down
CRPM	<i>CDT1</i>	ENSG00000167513	-1/19	6/83E-06	Down
CRPM	<i>PRSS22</i>	ENSG00000005001	-1/90	7/24E-05	Down
CRPM	<i>CDC6</i>	ENSG00000094804	-1/45	1/77E-10	Down
CRPM	<i>TOP2A</i>	ENSG00000131747	-0/86	0/0130203	Down
CRPM	<i>AURKB</i>	ENSG00000178999	-1/96	6/03E-06	Down
CRPM	<i>BIRC5</i>	ENSG00000089685	-2/10	9/66E-07	Down
CRPM	<i>CLDN7</i>	ENSG00000181885	-3/44	3/67E-27	Down
CRPM	<i>JUP</i>	ENSG00000173801	-1/37	3/70E-20	Down

Abbreviations: *pCRC* Primary Colorectal cancer; *CRLM* Colorectal liver metastasis; *CRPM* Colorectal peritoneal metastasis; *FC* Fold change; *DEGs* Differentially expressed genes; *padj* Adjusted *P*-value.

Supplementary Table S7. Canonical gene signatures utilized for the functional annotation and sub-clustering of CAFs

CAF Sub-cluster	Signature Gene	Full Name	Function Involved in pCRC/ECM/CAF	Reference
myCAF	<i>ACTA2</i>	Alpha-smooth muscle actin (α -SMA)	Canonical myCAF marker; contractility and ECM remodeling in CAFs	(1, 2)
myCAF	<i>COL1A1</i>	Collagen type I alpha 1	Major ECM component; promotes CRC cell migration and metastasis	(2, 3)
myCAF	<i>TAGLN</i>	Transgelin	Actin-binding protein; associated with CAF contractile phenotype	(4)
myCAF	<i>FAP</i>	Fibroblast Activation Protein	Highly expressed in CAFs; promotes invasion	(4)
myCAF	<i>TPM1</i>	Tropomyosin 1	Cytoskeletal protein supporting stromal contractility	(4)
iCAF	<i>LIF</i>	Leukemia Inhibitory Factor	CAF-tumor crosstalk promoting malignancy	(5, 6)
iCAF	<i>IL6</i>	Interleukin-6	CAF cytokine driving STAT3 signaling & metastasis	(7)
iCAF	<i>CXCL8</i>	C-X-C motif chemokine ligand 8	CAF-derived chemokine promoting angiogenesis	(8, 9)
iCAF	<i>CXCL1</i>	C-X-C motif chemokine ligand 1	Pro-migratory chemokine from CAFs	(10)
iCAF	<i>CXCL2</i>	C-X-C motif chemokine ligand 2	Inflammatory chemokine in CAF signaling	(11)
iCAF	<i>CXCL5</i>	C-X-C motif chemokine ligand 5	CAF chemokine promoting CRC progression	(12)
iCAF	<i>CCL2</i>	C-C Motif Chemokine Ligand 2	Recruits immune cells; metastatic niche	(13)
iCAF	<i>CCL7</i>	C-C Motif Chemokine Ligand 7	Immune-mediated remodeling	(12)
iCAF	<i>IL1R1</i>	Interleukin-1 Receptor Type 1	Inflammatory signaling, CAF activation	(14)
iCAF	<i>PTGS2</i>	prostaglandin-endoperoxide synthase 2	Prostaglandins promoting tumor progression	(15, 16)
iCAF	<i>IDO1</i>	Indoleamine 2,3-dioxygenase 1	Immunosuppressive TME enzyme	(17, 18)
iCAF	<i>SFRP1</i>	Secreted Frizzled Related Protein 1	Modulates Wnt; CAF-linked matrix signaling	(19, 20)
apCAF	<i>CD7</i>	CD7	Immune marker; limited direct CAF evidence	(21, 22)
apCAF	<i>HLA-DRA</i>	MHC class II DR alpha	apCAF antigen-presentation	(23, 24)
apCAF	<i>HLA-DRB1</i>	MHC class II DR beta 1	apCAF antigen-presenting gene	(24)
apCAF	<i>HLA-DQA1</i>	MHC class II DQ alpha 1	apCAF identity	(23)
apCAF	<i>HLA-DPA1</i>	HLA class II histocompatibility antigen, DP alpha 1 chain	MHC-II antigen presentation; marker of antigen-presenting CAFs (apCAFs); mediates immune-stroma interactions (not directly ECM-remodeling)	(25)
apCAF	<i>HLA-DPB1</i>	HLA class II histocompatibility antigen, DP beta 1 chain	MHC-II component in apCAFs; supports immune modulation within TME; limited direct role in ECM/CAF mechanics	(24)
apCAF	<i>HLA-DQB1</i>	MHC class II DQ beta 1	apCAF identity	(26)
apCAF	<i>CIITA</i>	MHC class II transactivator	Master regulator of MHC-II in apCAFs	(27)

Notes: The table delineates the established marker genes used to define myCAF, iCAF, and apCAF phenotypes within the tumor microenvironment. Gene symbols are italicized in accordance with standard nomenclature.

Abbreviations: *mCRC* Metastatic CRC; *myCAF* Myofibroblastic CAF; *iCAF* Inflammatory CAF; *apCAF* Antigen-presenting CAF; *ECM* Extracellular matrix; *CAF Sub-cluster* CAF subpopulation cluster.

Supplementary Table S8. Differentially expressed genes (DEG) characterizing CAF populations across sample groups

CAFs	ENSEMBL ID	Gene	log ₂ FC	Padj	Group
myCAF	ENSG00000149591	<i>TAGLN</i>	1.82	1.29E-14	pCRC
myCAF	ENSG00000107796	<i>ACTA2</i>	1.25	4.35E-47	pCRC
myCAF	ENSG00000140416	<i>TPM1</i>	2.82	2.06E-13	pCRC
myCAF	ENSG00000108821	<i>COL1A1</i>	0.95	2.27E-08	pCRC
myCAF	ENSG00000149591	<i>TAGLN</i>	3.04	4.20E-08	CRLM
myCAF	ENSG00000107796	<i>ACTA2</i>	1.69	1E-03	CRLM
myCAF	ENSG00000140416	<i>TPM1</i>	1.82	6.88E-07	CRLM
myCAF	ENSG00000108821	<i>COL1A1</i>	1.41	0.01E-03	CRLM
myCAF	ENSG00000078098	<i>FAP</i>	2.18	7.89E-33	CRLM
myCAF	ENSG00000078098	<i>FAP</i>	1.18	1.07E-05	CRPM
myCAF	ENSG00000149591	<i>TAGLN</i>	2.48	0.01E-04	CRPM
myCAF	ENSG00000107796	<i>ACTA2</i>	1.26	0.01E-02	CRPM
myCAF	ENSG00000108821	<i>COL1A1</i>	1.80	5.88E-18	CRPM
myCAF	ENSG00000140416	<i>TPM1</i>	2.02	6.35E-16	CRPM
iCAF	ENSG00000115594	<i>IL1R1</i>	0.75	1.00E-4	CRPM
iCAF	ENSG00000136244	<i>IL6</i>	0.85	0.03E-02	CRLM
iCAF	ENSG00000104332	<i>SFRP1</i>	2.28	4.50E-21	pCRC
iCAF	ENSG00000073756	<i>PTGS2</i>	1.07	1.12E-06	CRPM
iCAF	ENSG00000081041	<i>CXCL2</i>	1.07	0.01E-02	CRLM
iCAF	ENSG00000163739	<i>CXCL1</i>	2.33	4.05E-08	CRLM
iCAF	ENSG00000169429	<i>CXCL8</i>	2.27	5.17E-05	CRPM
iCAF	ENSG00000136244	<i>IL6</i>	2.40	1.59E-06	pCRC
iCAF	ENSG00000108691	<i>CCL2</i>	1.16	0.02E-02	pCRC
iCAF	ENSG00000115594	<i>IL1R1</i>	1.71	2.08E-10	pCRC
iCAF	ENSG00000163739	<i>CXCL1</i>	2.99	3.24E-11	pCRC
iCAF	ENSG00000163735	<i>CXCL5</i>	2.32	0.74E-09	pCRC
iCAF	ENSG00000169429	<i>CXCL8</i>	4.26	2.34E-13	pCRC
iCAF	ENSG00000131203	<i>IDO1</i>	0.85	1.36E-09	CRPM
iCAF	ENSG00000108688	<i>CCL7</i>	2.57	0.17E-13	pCRC

iCAF	ENSG00000108691	<i>CCL2</i>	0.67	0.01E-03	CRLM
iCAF	ENSG00000108691	<i>CCL2</i>	0.52	6.42E-05	CRPM
apCAF	ENSG00000196126	<i>HLA-DRB1</i>	1.57	3.69E-16	pCRC
apCAF	ENSG00000179583	<i>CIITA</i>	1.90	2.46E-13	pCRC
apCAF	ENSG00000173762	<i>CD7</i>	1.25	2.93E-05	pCRC
apCAF	ENSG00000179344	<i>HLA-DQB1</i>	0.97	2.21E-14	pCRC
apCAF	ENSG00000237541	<i>HLA-DQA1</i>	1.69	0.02E-02	pCRC
apCAF	ENSG00000204287	<i>HLA-DRA</i>	1.70	9.12E-11	pCRC
apCAF	ENSG00000223865	<i>HLA-DPB1</i>	1.156	0.32E-03	pCRC
apCAF	ENSG00000231389	<i>HLA-DPA1</i>	1.73	0.04E-05	CRLM
apCAF	ENSG00000196126	<i>HLA-DRB1</i>	1.12	0.01E-02	CRLM

Notes: Statistical significance was determined with thresholds set at log₂Fold Change > 0.5 and an adjusted $P < 0.05$. Fold changes are detailed for the top up-regulated genes in each condition.

Abbreviations: *pCRC* Primary Colorectal cancer; *CRLM* Colorectal liver metastasis; *CRPM* Colorectal peritoneal metastasis; *FC* Fold change; *adj-P* Adjusted p-value; *apCAFs* Antigen-Presenting CAFs; *iCAFs* Inflammatory CAFs; *myCAFs* Myofibroblastic CAFs.

Supplementary Table S9. Multivariable logistic regression analysis for predicting metastasis (*SULF1* Model)

Variable	β (Coefficient)	SE	95% CI for β	OR	95% CI for OR	z-statistic	P-value
Age	-0.1134	0.0511	-0.2284- 0.0221	0.8928	0.7958- 0.9782	-2.221	0.0263
Gender	0.7768	0.7977	-0.7842- 2.4160	2.1750	0.4565- 11.200	0.974	0.3302
Tumor Location	0.3636	0.5101	-0.6397- 1.4080	1.4380	0.5275- 4.0860	0.713	0.4760
<i>SULF1</i> Expression	6.6550	1.3890	4.4000, 9.9770	776.40	81.43- 21531.0	4.791	< 0.0001
Intercept (β_0)	-10.420	3.9700	-18.950- 3.0170	2.973×10^{-5}	5.912×10^{-9} - 0.0489	-2.625	0.0087

Notes: * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Abbreviations: CI Confidence Interval; OR Odds Ratio; SE Standard Error.

Supplementary Table S10. Multivariable logistic regression analysis for predicting metastasis (*CAVIN1* Model)

Variable	β (Coefficient)	Standard Error (SE)	95% CI for β	Odds Ratio (OR)	95% CI for OR	z-statistic	P-value
Age	-0.0931	0.0320	-0.1608- 0.0347	0.9111	0.8515- 0.9659	-2.908	0.0036
Gender	0.4397	0.4588	-0.4498- 1.3600	1.5520	0.6377- 3.8970	0.958	0.3379
Tumor Location	0.0361	0.3382	-0.6265- 0.7112	1.0370	0.5344- 2.0370	0.107	0.9151
<i>CAVIN1</i> Expression	1.5100	0.3172	0.9392- 2.1890	4.5250	2.5580- 8.9290	4.760	< 0.0001
Intercept (β_0)	1.4190	2.1810	-2.7650- 5.8500	4.1340	0.0630- 347.10	0.651	0.5153

Notes: * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Abbreviations: *CI* Confidence Interval; *OR* Odds Ratio; *SE* Standard Error.

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