Advanced Cell Diagnostics

RNAscope® Probes for Cancer Genes

Get quantitative molecular detection with morphological context in a single assay.

Above: Human breast cancer: *HPRT1*, *POLR2A*, *PPIB* and *PGK* mRNA expression in FFPE tissue

Partial list of publications using RNAscope® Technology in cancer research:

A collagen-remodeling gene signature regulated by *TGF-ß* signaling is associated with metastasis and poor survival in serous ovarian cancer.
Cheon *et al.* (2014)
PMID: 24218511

Possible role of *Cdx2* in the serrated pathway of colorectal cancer characterized by *BRAF* mutation, high-level CpG Island methylator phenotype and mismatch repair-deficiency.
Dawson *et al.* (2014)
PMID: 24166180

In situ Tumor *PD-L1* mRNA expression is associated with increased TILs and better outcome in breast carcinomas.
Schalper *et al.* (2014)
PMID: 24647569

Utility of *PAX8* mouse monoclonal antibody in the diagnosis of thyroid, thymic, pleural, and lung tumors: a comparison with polyclonal *PAX8* antibody.
Toriyama *et al.* (2014)
PMID: 24592933

RNAscope® with
MD+MC

Molecular Detection visualizes what genes are expressed.

Morpholocical Context localizes where those genes are expressed.

Cancer RNA Biomarkers

A cancer RNA biomarker refers to a coding or non-coding RNA that is indicative of the presence of cancer—either expressed by a tumor or expressed as a specific response of the body to the presence of cancer. Cancer researchers apply RNAscope® *in situ* hybridization to study the following:

Tumor heterogeneity—There is a tremendous amount of inter-tumor and intra-tumor heterogeneity. RNAscope's single-molecule sensitivity with single-cell resolution along with intact morphological context allows for visualization of differential gene expressions in morphologically similar tumor cells.

Tumor microenviroment—A tumor is a complex organ comprised of many different cell types. Its communication with neighboring normal cells, extracellular matrix, and signaling molecules like chemokines, cytokines and growth factors is a major driver of cancer progression and metastasis. RNAscope ISH is particularly suited for dissecting complex autocrine and paracrine communication mechanisms.

Circulating tumor cells—The unprecedented high-fidelity signal amplification and multiplexing capability of RNAscope make it possible to simultaneously detect and characterize viable CTCs in the background of millions of blood cells.

RNAscope ISH enables visualization of RNA biomarkers while preserving tissue context with single-cell resolution. It is an essential solution in a multitude of cancer research applications including risk assessment, diagnosis, prognosis, patient stratification, therapy and epidemiology.

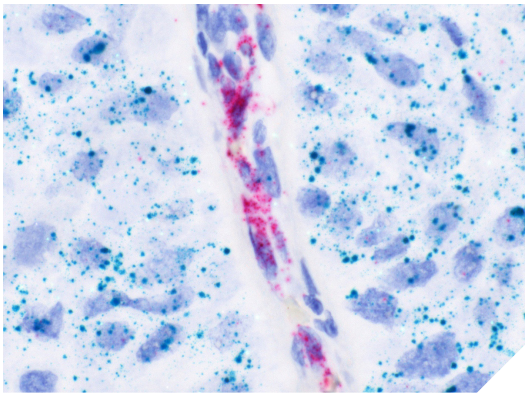

Figure 1. Human breast cancer: *EPCAM1* (red) & *EGFR* (green) expression in FFPE tissue; RNAscope 2-plex Chromogenic Kit

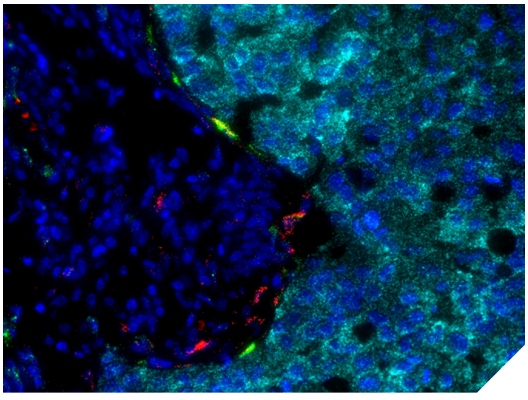

Figure 2: Human breast cancer: *PanCK*, *uPA* and *PAI-1* expression in FFPE tissue; RNAscope Multiplex Fluorescent Kit

Visualize RNA biomarkers in your cancer tissues today **acdbio.com/cancer**

RNAscope® Human Cancer Gene List

Human Cancer Gene List—Probe details are available at acdbio.com/probesearch

ABCB1	*B2M*	*CD38*	*COL1A1*	*EGF*	*FGFR3*	*FOXC2*	*HPGD*	*IL3*	*LAG3*	*MUC2*	*PDGFD*	*PTGES2*	*SLC18A2*	*TBP*	*TRIM29*
ACACA	*BACH1*	*CD3G*	*COL3A1*	*EGFL7*	*FLG*	*FOXM1*	*HPRT1*	*IL33*	*LAPTM4B*	*MUC4*	*PDGFRA*	*PTGS1*	*SLC24A4*	*TCF7*	*TRPA1*
ACSL4	*BBC3*	*CD4*	*CSF1*	*EGFR*	*FLI1*	*FOXP1*	*HRH3*	*IL4*	*LCN2*	*MUC5AC*	*PDGFRA*	*PTGS2*	*SLC29A1*	*TERC*	*TSC2*
ACTA2	*BCAR4*	*CD40*	*CSF1R*	*EN2*	*FLT4*	*FOXP2*	*HTR3A*	*IL5*	*LEPR*	*MUC6*	*PDGFRB*	*PTH1R*	*SLC34A2*	*TAGLN*	*TSLP*
ACTB	*BCL2*	*CD40LG*	*CSF2*	*ENPP2*	*FN1*	*FSHR*	*HTRA1*	*IL6*	*LGR5*	*MYC*	*PDPN*	*PTK7*	*SLC39A6*	*TAS2R38*	*TSPY1*
ADAM10	*BCL2L1*	*CD44*	*CTAG1B*	*EPCAM*	*FOLR1*	*FTL*	*ICAM1*	*IL6R*	*LIN28A*	*NAMPT*	*PECAM1*	*PTPRC*	*SLC6A4*	*TBK1*	*TTF1*
ADRM1	*BCL6*	*CD47*	*CTGF*	*EPGN*	*FOLR2*	*GAL*	*ICOS*	*IL7R*	*LIN28B*	*NANOG*	*PGF*	*PVRL1*	*SLFN11*	*TBP*	*TUBB*
AGTR1	*BCR*	*CD68*	*CTLA4*	*EPHA2*	*FOS*	*GALR1*	*IDH1*	*ITGA11*	*LOXL2*	*NCSTN*	*PGK1*	*PVT1*	*SMAD2*	*TCF7*	*TUBB3*
AICDA	*BDNF*	*CD8A*	*CTNNB1*	*EPHB2*	*FOXC2*	*GAPDH*	*IDH2*	*ITGA6*	*LPAR1*	*NDRG4*	*PGR*	*PYCARD*	*SMAD3*	*TERC*	*TWIST1*
ALB	*BIN1*	*CDA*	*CXADR*	*EPHB3*	*FOXM1*	*GATA3*	*IDO1*	*IL8*	*LRIG1*	*NGF*	*PHLDA3*	*RAF1*	*SMAD4*	*TERT*	*TXNIP*
ALDH1A1	*BIRC7*	*CDH1*	*CXCL10*	*EPHB4*	*FOXP1*	*GATA4*	*IFNG*	*ILDR1*	*LTA*	*NGFR*	*PIF1*	*RARRES3*	*SMC1A*	*TFF2*	*UBB*
ALDH1A2	*BMI1*	*CDH2*	*CXCL13*	*EPOR*	*FOXP2*	*GATA5*	*IFNL1*	*INS*	*MACC1*	*NID1*	*PIK3CA*	*REG1A*	*SMO*	*TFF3*	*UBC*
ALK	*BRAF*	*CDH3*	*CXCR3*	*ERBB2*	*FSHR*	*GATA6*	*IGF1*	*INSR*	*MAGEA10*	*NOTCH1*	*PIK3CD*	*REG1B*	*SNAI1*	*TGFA*	*UCHL1*
ALOX12	*BRCA1*	*CDH9*	*CXCR4*	*ERBB3*	*FTL*	*GDF15*	*IGF2*	*IRAK1*	*MAGEB2*	*NQO1*	*PIK3CG*	*REG3A*	*SNAI2*	*TGFB1*	*UNC5C*
AMACR	*BRCA2*	*CDKN1A*	*CYP3A43*	*ERBB4*	*GAL*	*GDF2*	*IGF2BP3*	*ITGA11*	*MALAT1*	*NR4A2*	*PIM1*	*REG4*	*SNCA*	*TGFB2*	*UPK2*
ANGPT2	*BRD4*	*CDKN1B*	*CYP3A5*	*ERCC1*	*GALR1*	*GDF3*	*IGFBP2*	*ITGAM*	*MAP3K5*	*NRF1*	*PLAUR*	*RIPK1*	*SOS1*	*TGFBR2*	*VEGFA*
ANKRD30A	*BTC*	*CDKN1C*	*DCBLD1*	*EREG*	*GAPDH*	*GFAP*	*IGFBP3*	*ITGB6*	*MAP3K8*	*NRG1*	*PMP22*	*RLN1*	*SOX2*	*TLR2*	*VHL*
ANXA10	*BTG2*	*CDKN2A*	*DCK*	*ERG*	*GATA3*	*GLDC*	*IGFBP7*	*ITGB7*	*MAPT*	*NTM*	*PODXL*	*RNF43*	*SOX9*	*TLR3*	*VIM*
ANXA6	*BTLA*	*CDKN3*	*DCLK1*	*ESR1*	*GATA4*	*GLI1*	*IGKC*	*ITGB8*	*MCAM*	*NTRK1*	*POLR2A*	*ROR1*	*SPRY2*	*TLR4*	*VWF*
APOA1	*CA9*	*CDX2*	*DCN*	*ETV1*	*GATA5*	*GLP1R*	*IL10*	*JAG1*	*MCL1*	*NTRK2*	*POSTN*	*ROR2*	*SPRY4*	*TLR7*	*WNT2*
APOBEC3A	*CALCA*	*CEACAM6*	*DDB2*	*ETV4*	*GATA6*	*GNLY*	*IL12A*	*JAK2*	*MDM2*	*NTRK3*	*POU5F1*	*RORC*	*SST*	*TLR8*	*WNT5A*
APOBEC3B	*CALR*	*CELA2A*	*DDIT3*	*ETV5*	*GDF15*	*GNRHR*	*IL12B*	*KCNA3*	*MDM4*	*OCLN*	*PPIB*	*ROS1*	*SSTR1*	*TMEM45A*	*WNT7A*
APOC3	*CAST*	*CELA3B*	*DDR1*	*EWSR1*	*GDF2*	*GRB7*	*IL13*	*KDM5A*	*MEG3*	*OGN*	*PPM1D*	*RPS27L*	*SSTR2*	*TNF*	*ZEB1*
APOH	*CBFA2T3*	*CES1*	*DDR2*	*EZH1*	*GDF3*	*GREM1*	*IL13RA2*	*KDR*	*MET*	*OLFM4*	*PRAME*	*RRM1*	*SSTR3*	*TNFRSF1A*	*ZEB2*
AR	*CBR3*	*CES2*	*DEFA6*	*EZH2*	*GFAP*	*GUCA2A*	*IL17A*	*KIT*	*MGMT*	*OSGIN1*	*PRF1*	*RTN4*	*SSTR4*	*TNFRSF10B*	
AREG	*CCK*	*CFB*	*DEFB4A*	*F2RL1*	*GLDC*	*GUCY2C*	*IL17F*	*KITLG*	*MITF*	*P2RX7*	*PRKAB1*	*S100A11*	*SSTR5*	*TNFRSF12A*	
ARG1	*CCKAR*	*CFLAR*	*DES*	*F3*	*GLI1*	*H19*	*IL18*	*KLF5*	*MKI67*	*PAF1*	*PRL*	*S100B*	*ST8SIA1*	*TNFRSF13C*	
ARG2	*CCKBR*	*CFTR*	*DICER1*	*FBLN5*	*GLP1R*	*HAS2*	*IL1A*	*KLF9*	*MMP2*	*PAX6*	*PRLR*	*S100P*	*STK39*	*TNFRSF14*	
ARID1A	*CCL5*	*CHGA*	*DLL4*	*FBXW7*	*GNLY*	*HAVCR2*	*IL1B*	*KLK3*	*MMP3*	*PAX8*	*PRNCR1*	*S1PR1*	*STK4*	*TNFRSF17*	
ARPC5	*CCND1*	*CHI3L1*	*DRD2*	*FCGR2A*	*GNRHR*	*HES1*	*IL1RL1*	*KLRC1*	*MMP9*	*PBRM1*	*PROCR*	*S1PR3*	*SULF1*	*TNFRSF8*	
ASAP1	*CCR1*	*CHRM1*	*DUOX2*	*FDXR*	*GRB7*	*HEY1*	*IL2*	*KRAS*	*MMP13*	*PCA3*	*PROM1*	*S1PR4*	*SYP*	*TNFSF13*	
ASCL2	*CCR5*	*CHRNA7*	*DUOXA2*	*FERMT2*	*GREM1*	*HGF*	*IL20RB*	*KRT17*	*MMP14*	*PCAT1*	*PROX1*	*SAT1*	*TAC1*	*TNFSF13B*	
ATF4	*CCR6*	*CLDN6*	*DUSP22*	*FFAR1*	*GUCA2A*	*HIF1A*	*IL21*	*KRT18*	*MPO*	*PCNA*	*PRUNE2*	*SCN9A*	*TACC3*	*TNFSF15*	
ATP4A	*CCR8*	*CLU*	*DUSP6*	*FGF19*	*GUCY2C*	*HMGB2*	*IL22*	*KRT19*	*MST1R*	*PDCD1*	*PTCH1*	*SEC61B*	*TACR1*	*TP53*	
AVP	*CD22*	*CMKLR1*	*EDNRB*	*FGF2*	*H19*	*HMOX1*	*IL22RA1*	*KRT20*	*MTA2*	*PDCD1LG2*	*PTEN*	*SERPINB5*	*TACSTD2*	*TP63*	
AXIN2	*CD24*	*CNR1*	*EFNA3*	*FGF23*	*HAS2*	*HOTAIR*	*IL23A*	*KRT5*	*MTNR1A*	*PDGFA*	*PTENP1*	*SERPINE1*	*TAGLN*	*TPBG*	
AXL	*CD274*	*CNR2*	*EFNA4*	*FGFR1*	*HAVCR2*	*HOXA13*	*IL23R*	*KRT7*	*MUC1*	*PDGFB*	*PTGER2*	*SFRP4*	*TAS2R38*	*TP63*	
AZGP1	*CD34*	*COL11A1*	*EFNB3*	*FGFR2*	*HBEGF*	*HOXC6*	*IL24*	*KRT8*	*MUC13*	*PDGFC*	*PTGER4*	*SHH*	*TBK1*	*TRIM23*	

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