

Fluorescent in situ Hybridization (FISH) is a cytogenetic diagnostic technique that utilizes DNA fragments labeled with a fluorescent tag to highlight the location, presence, or rearrangement of genetic loci.

FISH probes enable clinicians and researchers to accurately determine a specific genetic abnormality. The revelation of an abnormality can answer key questions in disease diagnosis, prognosis, and enable the selection of the ideal treatment. FISH probes also aid in drug development and biomarker validation.

Empire Genomics can create custom probes using our full RP-11 library. Below is a sampling of gene-specific probes that we currently offer. If a gene you are interested in is not listed, let us know, we can design a probe to hybridize to any human gene!

## Our Probes

Empire Genomics offers a wide selection of high quality, customizable, and accurate FISH probes. We offer:

- Full customization (dye color, region, and combinations)
- High sensitivity and specificity
- Easy to follow protocols
- Rapid turnaround time

## HEMATOPATHOLOGY

### Acute Lymphoblastic Leukemia (Adult)

MYB/Con 6 (6q23.3 del)  
 ABL1 (9q34.1)  
 BCR/ABL t(9;22)  
 BCR/ABL/ASS1 (9;22)  
 PAX5 (9p13.2)  
 CDKN2A (9p21.3)  
 JAK2 (9p24.1)  
 KMT2A (11q23)  
 EPOR (19p13.2)  
 IGH (14q32)

### Acute Lymphoblastic Leukemia (Pediatric)

ABL1 (9q34.1)  
 BCR/ABL t(9;22)  
 IGH (14q32)  
 ETV6/RUNX1 t(12;21)  
 KMT2A (11q23)

### Acute Myelogenous Leukemia

MECOM (3q26.2)  
 KIT (4q12)  
 DEK/NUP214 (6;9)  
 FGFR1 (8p11.2)  
 RUNX1T1/RUNX1 t(8;21)  
 BCR/ABL/ASS1 t(9;22)  
 PML/RARA t(15;17)  
 CBFB inv(16)

### Acute Myeloid Leukemia

MECOM (3q26.2)  
 TERT (5p15.3)  
 CBFB (16q22.1)  
 MYB (6q23.3)  
 RREB1 (6p24.3)  
 NCOA2 (8q13.3)  
 WT1 (11p13)  
 KMT2A (11q23)

### Acute Myelomonocytic Leukemia

MECOM (3q26.2)  
 Del 20p20q

### Acute Promyelocytic Leukemia

CHEK1 (11q24.2)  
 PML/RARA t(15;17)  
 RARA (17q21.2)

### Burkitt Lymphoma

IGH/MYC/Con 8 t(8;14)  
 MYC (8q24.2)  
 MYC/IGH t(8;14)

### Chronic Lymphocytic Leukemia

BIRC3 (11q22.2)  
 ATM (11q22.3)  
 D13S319 (13q del)  
 RB1 (13q14.2)  
 IGH (14q32)  
 TP53 (17p13.1)  
 BCL2 (18q21.3)

### Chronic Myelogenous Leukemia (CML)

BCR/ABL1 t(9;22)  
 BCR/ABL1/ASS1 t(9;22)  
 ABL1 (9q34.1)

### Follicular Lymphoma

IGH/BCL2 t(14;18)

### Large B-Cell Lymphoma (LBCL)

BCL6 (3q27.3)  
 BCL2 (18q21.3)

### Lymphoma

ALK (2p23)  
 BCL6 (3q27.3)  
 DUSP22 (6p25.3)  
 TCRG (7p14)  
 MYC (8q24.2)  
 PD-L1 (9p24.1)  
 MALAT1 (11q13.1)  
 MYC/IGH t(8;14)  
 CCND1/IGH t(11;14)  
 IGH/BCL2 t(14;18)  
 IGH (14q32)  
 BCL2 (18q21.3)  
 NFKB2 (10q24.3)

### MALT Lymphoma

IGH (14q32)  
 MALT1 (18q21.3)  
 BCL2 (18q21.3)

### Mantle Cell Lymphoma (MCL)

BIRC3 (11q22.2)  
 CCND1/IGH t(11;14)  
 IGH (14q32)

### Multiple Myeloma

CDKN2C/CKS1B (1p1q)  
 FGFR3 (4p16.3)  
 BIRC3 (11q22.2)  
 RB1 (13q14.2)  
 IGH (14q32)  
 MAF (16q23.2)  
 TP53 (17p13.1)  
 CIC (19q13.2)  
 BRD4 (19p13.1)  
 Con 7, 9, 11, 17

### Myelodysplastic Syndrome (MDS)

5p5q (5q31 del)  
 Con 7 / 7q (7q31 del)  
 Con 8 (trisomy 8)  
 Con 9 (trisomy 9)  
 KMT2A (11q23)  
 20q- (20q12 del)

### Myeloid Neoplasms with Eosinophilia

PDGFRA/CHIC2/FIP1L1  
 PDGFRB (5q32)  
 FGFR1 (8p11.2)

### Myeloproliferative Neoplasms (MPN)

5p5q (5q31 del)  
 PDGFRB (5q32)  
 Con 7 / 7q (7q21 del)  
 Con 8 (trisomy 8)  
 Con 9 (trisomy 9)  
 RB1 (13q14.2 del)  
 20q- (20q12 del)

### NUT Midline Carcinoma

NUTM1/BRD4 (15;19)

### T-Cell Leukemia / Lymphoma

FGFR3 (4p16.3)  
 Isochromosome 7q  
 FGFR1 (8p11.2)  
 TRA (14q11.2)

For in vitro use only | CE marked in certain countries | RUO in US and all other countries

## SOLID TUMOR PATHOLOGY

### Alveolar Rhabdomyosarcoma

PAX7 (1p36.1)  
CCND1 (11q13.3)  
CDK4 (12q14.1)  
FOXO1 (13q14.1)

### Aneurysmal Cyst/ Nodular Fasciitis

USP6 (17p13.2)

### Bladder Cancer

PD-L1 (2q37)  
FGFR3 (4p16.3)  
PDGFRB (5q32)  
RREB1 (6p24.3)  
TP63 (3q28)  
FGFR1 (8p11.2)  
P16 (9p21)  
FGFR2 (10q26.1)  
KIT (4q12)  
CDK4 (12q14.1)  
CDKN2D (19p13.2)

### Breast Cancer

REL (2p16.1)  
CREB1 (2q33.3)  
WWTR1 (3q25.1)  
TERT (5p15.3)  
PHF1 (6q21.3)  
MYB (6q23.3)  
NCF1 (7q11.2)  
MET (7q31.2)  
FGFR1 (8p11.2)  
NRG1 (8p12)  
NCOA2 (8q13.3)  
PREX2 (8q13.2)  
PTEN (10q23.3)  
NFKB2 (10q24.3)  
FGFR2 (10q26.1)  
CCND1 (11q13.3)  
BIRC3 (11q22.2)  
CHEK1 (11q24.2)  
CDK4 (12q14.1)  
HMGA2 (12q14.3)  
NTRK3 (15q25)  
MAF (16q23.2)  
Con 17  
HER2 (17q12)  
TOP2A (17q21.2)  
BCL2 (18q21.3)  
CIC (19q13.2)  
ZNF217 (20q13.2)  
PDGFB (22q13.1)  
XIST (Xq13.2)

### Cervical Cancer

WWTR1 (3q25.1)  
PDGFRA (4q12)  
MYB (6q23.3)  
MET (7q31.2)  
MAML2 (11q21)  
YY1 (14q32.2)  
BCL2 (18q21.3)

### Colorectal Cancer

PD-L1 (9p24.1)  
WWTR1 (3q25.1)  
PHF1 (6p21.3)  
NCF1 (7q11.2)  
MET (7q31.2)  
PREX2 (8q13.2)  
CHEK1 (11q24.2)  
ZNF217 (20q13.2)

### Ewing Sarcoma

EWSR1 (22q12.2)

### Fibrosarcoma

COL1A1/PDGFB (17;22)

### GIST

KIT (4q12)  
PDGFRA (4q12)  
BRAF (7q34)  
KRAS (12p12.1)  
YWHAE (17p13.3)  
ZNF217 (20q13.2)

### Glioma

1p19q  
TERT (5p15.3)  
PDGFRB (5q32)  
ROS1 (6q22.1)  
SMARCB1 (22q11.2)  
PDGFB (22q13.1)

### Liver Cancer

TERT (5p15.3)  
PHF1 (6p21.3)  
NCF1 (7q11.2)  
MET (7q31.2)  
PREX2 (8q13.2)  
YWHAE (17p13.3)

### Lung Cancer

NTRK1 (1q23.1)  
EML4/ALK (2;2)  
ALK (2p23)  
CREB1 (2q33.3)  
VHL (3p25.3)  
WWTR1 (3q25.1)  
PIK3CA (3q26.3)  
TP63 (3q28)  
FGFR3 (4p16.3)  
PDGFRA (4q12)  
KIT (4q12)  
VEGFR2 (4q12)  
TERT (5p15.3)  
CD74/ROS1 (5;6)  
NPM1 (5q35.1)  
GOPC (6q22.1)  
PHF1 (6p21.3)  
ROS1 (6q22.1)  
EGFR (7p11.2)  
NCF1 (7q11.2)  
MET (7q31.2)  
BRAF (7q34)  
FGFR1 (8p11.2)  
PREX2 (8q13.2)  
PD-L1 (9p24.1)  
PD-L2 (9p24.1)  
KIF5B/RET (10;10)  
PTEN (10q23.3)  
RET (10q11.2)  
FGFR2 (10q26.1)  
WT1 (11p13)  
MAML2 (11q21)  
CCND1 (11q13.3)  
KRAS (12p12.1)  
CDK4 (12q14.1)  
HMGA2 (12q14.3)  
AKT1 (14q32.3)  
HER2 (17q12)  
BCL2 (18q21.3)  
TFE3 (Xp11.2)

### Melanoma

PAX3 (2q36.1)  
KIT (4q12)  
TERT (5p15.3)  
RREB1 (6p24.3)  
MAGI2 (7q21.1)  
PREX2 (8q13.2)  
PD-L1 (9p24.1)  
CDK4 (12q14.1)  
BCL2 (18q21.3)

### Myxoid Liposarcoma

DDIT3 (12q13.3)  
CDK2 (12q14.1)  
HMGA2 (12q14.3)

### Neuroblastoma

NTRK1 (1q23.1)  
MYCN (2p24.3)  
NTRK3 (15q25.3)

### Ovarian Cancer

GOPC (6q22.1)  
WT1 (11p13)  
CHEK1 (11q24.2)  
HMGA2 (12q14.3)  
CDKN2D (19p13.2)  
ZNF217 (20q13.2)  
XIST (Xq13.2)

### Prostate Cancer

HPC1 (1q25.3)  
CENPF (1q41)  
CREB1 (2q33.3)  
ETV5 (3q27.2)  
PHF1 (6p21.3)  
ETV1 (7p21.2)  
MAGI2 (7q21.2)  
MET (7q31.2)  
NCF1 (7q11.2)  
PREX2 (8q13.2)  
NCOA2 (8q13.3)  
MSR1 (8p22)  
HGF (7q21.1)  
ETV6/RUNX1 (12;21)  
FOXM1/CENPF (12;1)  
MAF (16q23.2)  
YES1 (18p11.3)  
ELAC2 (17p12)  
BCL2 (18q21.3)  
ERG (21q22.2)  
TMPRSS2 (21q22.3)  
ERG (22q22.2)

### Renal Cell Carcinoma

MTOR (1p36.2)  
VHL (3p25.3)  
TFEB (6p21.2)  
MET (7q31.2)  
PD-L1 (9p24.1)  
HIF1A (14q23.2)  
FLCN (17p11.2)  
YWHAE (17p13.3)  
SMARCB1 (22q11.2)

### Retinoblastoma

RB1 (13q14.2)

### Round Cell Carcinoma

WT1/EWSR1 (22;22)  
CIC (19q13.2)

### Skin Cancer

KIT (4q12)  
PDGFRA (4q12)  
RREB1 (6p24.3)  
JAK2 (9p24.1)  
CDK4 (12q14.1)  
SMARCB1 (22q11.2)  
PDGFB (22q13.1)

### Smooth Muscle Tumors

HMGA2 (12q14.3)

### Stomach Cancer

PDGFRA (4q12)  
MET (7q31.2)  
JAK2 (9p24.1)  
YWHAE (17p13.3)  
NTRK3 (15q25.3)  
ZNF217 (20q13.2)

### Synovial Sarcoma

SS18 (18q11.2)

### Testicular Cancer

PDGFRA (4q12)  
MSR1 (8p22)  
CDK4 (12q14.1)  
CDKN2D (19p13.2)  
XIST (Xq13.2)

### Thyroid Cancer

NTRK1 (1q23.1)  
PDGFRA (4q12)  
PAX8/PPARG (2;3)  
KIT (4q12)  
TERT (5p13.3)

### Uterine Cancer

KIT (4q12)  
MYB (6q23.3)  
BIRC3 (11q22.2)  
YWHAE (17p13.3)  
ERBB2 (17q12)  
BCL2 (18q21.3)  
XIST (Xq13.2)

### Vascular Tumors

CAMTA1/WWTR1 (1;3)

### Wilms Tumor

WT1 (11p13)  
NTRK3 (15q25.3)  
HMGA2 (12q14.3)  
SMARCB1 (22q11.2)

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