

# Phosphorylation Assays

ELISAs, Arrays & Reagents for Detecting Phosphorylated Proteins

SIGNALING PATHWAY PROFILING / TOTAL & PHOSPHORYLATED PROTEIN ANALYSIS / FULL TESTING SERVICES

## DISCOVER YOUR PATHWAY

OVER 350 PHOSPHORYLATION PRODUCTS

Sandwich ELISAs

Cell-Based ELISAs

Phosphorylation Arrays

> 5,000 Activators & Inhibitors

Auto-Western Service

# Phosphorylation ELISAs

Browse  
phospho  
ELISA:



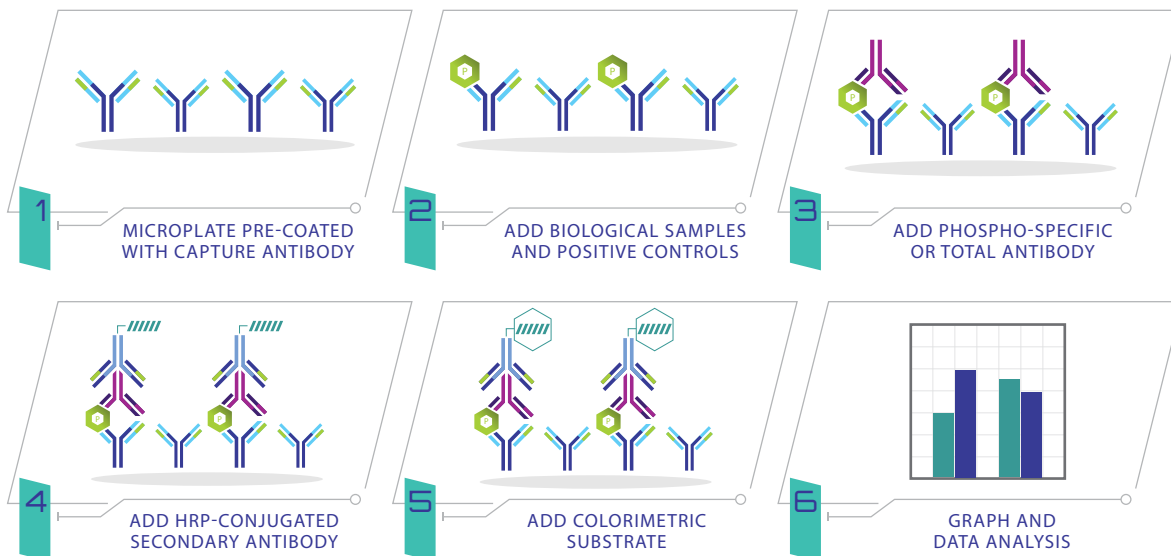
**RayBio® Phosphorylation ELISA kits** are rapid, convenient, and sensitive.

They allow the researcher to monitor the activation of biological pathways in cell or tissue lysates, or to directly detect protein phosphorylation in cultured cells. Many of our ELISAs can analyze total and phosphorylated protein levels simultaneously.

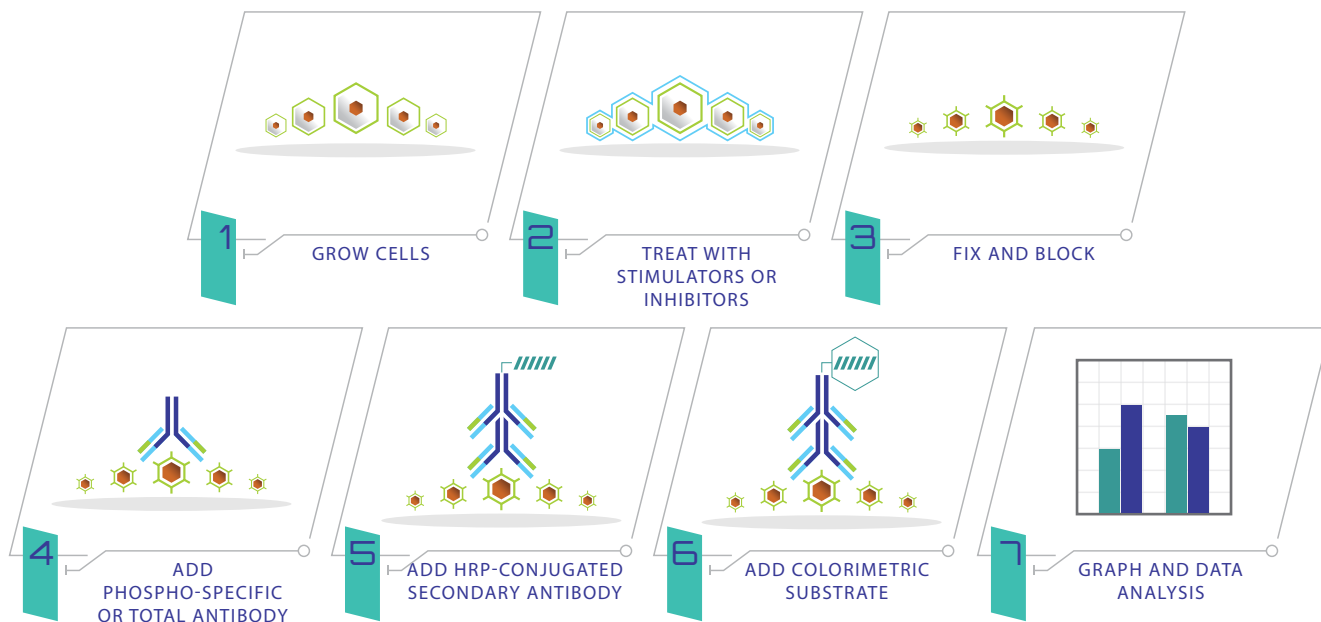
## how they work



### SANDWICH-BASED PHOSPHORYLATION ELISA



### CELL-BASED PHOSPHORYLATION ELISA



# Phosphorylation ELISAs by research area



human



mouse



rat



sandwich



cell-based

\* Not all phosphorylated targets available in all formats.



## FULL TESTING SERVICES

Send us your samples, we'll send you results



## 100% GUARANTEED

We stand by our ELISA products



## TOTAL & PHOSPHORYLATION ANALYSIS

available on one plate

### Alzheimer's Disease

APP (T668)

### AMPK Signaling

4EBP1 (Thr36)  
ACCC1 (S79)  
AMPKA (S487)  
CYCLINB1 (S126)  
INSR (Y1189)  
LKB1 (S428)  
mTOR (S2448)  
P70S6K (T421)

### Angiogenesis

eNOS (S1177)  
IGF1R (Y1165)  
PDGFRA (Y)  
PDGFRB (Y)  
PDGFRb (Y751)  
SMAD2 (S245)  
TIE1 (Y)  
TIE2 (Y)  
VEGFR2 (Y)  
VEGFR2 (Y996)  
VEGFR3 (Y)

### Apoptosis

ATM (S1981)  
ATR (T1989)  
BAD (S112)  
Chk1 (S280)  
Chk2 (T68)  
HSP27 (S82)  
RSK1 (S380)  
RSK2 (S386)

### Autophagy

AMPKA (S487)  
mTOR (S2448)  
PRAS40 (T246)  
ULK1 (S556)

### B Cell Receptor Signaling

AFT2 (T69)  
BTK (Y)  
BTK (Y551)  
IKBa (S32)  
NFKBP65 (S536)  
PLCG2 (Y753)  
PTEN (S380)  
PYK2 (Y)  
PYK2 (Y402)  
Raf1 (S301)  
SHC (Y427)  
SHIP (Y1020)  
SHIP1 (S591)  
SHIP2 (Y542)

### Cell Adhesion

Caveolin (Y14)  
FAK (Y)  
FAK (Y397)  
FYN (Y530)  
SRC (Y419)

### Cell Cycle

ABL1 (Y245)  
ATR (T1989)  
CDK1 (T161)  
Chk1 (S280)  
Chk2 (T68)  
CYCLINB1 (S126)  
FOXO3 (S253)  
HDAC2 (S394)  
P27 (T198)  
P53 (S15)  
PKMYT1 (T495)  
RB (T826)

### Cytoskeletal Reorganization

PAK2 (S20)

### DNA Damage

ABL1 (Y245)  
ATM (S1981)  
ATR (T1989)  
CDK1 (T161)  
Chk1 (S280)  
Chk2 (T68)  
CYCLINB1 (S126)  
H2AX (S139)  
Nbs1 (S343)  
P53 (S15)  
PKMYT1 (T495)  
RSK1 (S380)  
RSK2 (S386)

### Epigenetics/Chromatin Remodeling

HDAC4 (S632)

### HER/ErbB Family

ABL1 (Y245)  
C-Fos (T232)  
EGFR (S1070)  
EGFR (Y)  
EGFR (Y1045)  
EGFR (Y1068)  
EGFR (Y1086)  
EGFR (Y845)  
EGFR (Y992)  
ERBB2 (Y)  
ErbB3 (Y)  
ErbB3 (Y1262)  
ERBB4 (Y)  
PLCG2 (Y753)  
Raf1 (S301)  
SHC (Y427)  
SHP2 (Y542)

### Inflammation

IKBa (S32)  
NFKBP65 (S536)

### Insulin Signaling

AKT (S473)  
AMPKA (S487)  
eIF4E (S209)  
GSK3a (S21)  
GSK3b (S9)  
IGF1R (Y)  
IGF1R (Y1165)  
INSR (Y1189)  
INSULINR (Y)  
LKB1 (S428)  
P70S6K (T421)  
SHIP (Y1020)  
SHP2 (Y542)

### JAK/STAT Signaling

JAK1 (Y)  
JAK1 (Y1022)  
JAK2 (Y)  
JAK2 (Y1007)  
JAK3 (Y)  
STAT1 (S727)  
STAT1 (Y)  
STAT1 (Y701)  
STAT2 (Y689)  
STAT3 (Y)  
STAT3 (Y705)  
STAT4 (Y)  
STAT5 (Y)  
STAT5A (Y694)  
STAT6 (Y)  
STAT6 (Y641)  
TYK2 (Y)

### MAPK Signaling

AFT2 (T69)  
C-Fos (T232)  
CREB (S133)  
ERa (S118)  
Erk (T202)  
ERK12 (Y)  
ERK2 (T185)  
FOXO3 (S253)  
JNK (T183)  
JNK (Y)  
JUN (S63)  
MEK (S217)  
MEK (Y)  
MKK3 (S189)  
MKK6 (S207)  
MSK1 (S376)  
MSK2 (S360)  
P38 (T180)  
P38 (Y)  
PAK2 (S20)  
Raf1 (S301)  
RSK1 (S380)  
RSK2 (S386)  
SHC (Y427)  
TAK1 (S412)  
WNK1 (T60)

### mTOR Signaling

AKT (S473)  
GSK3a (S21)  
GSK3b (S9)  
P70S6K (T421)  
PRAS40 (T246)

### Neuroscience

CREB (S133)  
NGFR (Y)

### NF-κB Signaling

HDAC2 (S394)  
IKBa (S32)  
MSK1 (S376)  
NFKBP65 (S536)  
TAK1 (S412)  
TBK1 (S172)

### PI3K-AKT Signaling

4EBP1 (Thr36)  
AKT (S473)  
eNOS (S1177)  
GSK3a (S21)  
GSK3b (S9)  
mTOR (S2448)  
PDK1 (S241)  
PRAS40 (T246)  
Rictor (T1135)  
RPS6 (S235)

### PKC Signaling

Marcks (S152)

### Protein Folding

HSP27 (S82)

### Stem cell

SMAD1 (S463)  
SMAD2 (S245)  
SMAD4 (T277)  
SMAD5 (S463)

### T cell Receptor

C-Fos (T232)  
IKBa (S32)  
LAT (Tyr112)  
LAT (Tyr112)  
LCK (Y)  
LCK (Y394)  
NFKBP65 (S536)  
ZAP70 (Y)

### TGF-β

SMAD1 (S463)  
SMAD2 (S245)  
SMAD4 (T277)  
Smad5 (S463)

### Toll-like Receptors

IRF3 (S386)

### Translation

4EBP1 (Thr36)  
eIF2a (S52)  
eIF4E (S209)  
LKB1 (S428)  
Rictor (T1135)  
RPS6 (S235)

### Tyrosine Kinase Family

ACK1 (Y)  
ALK (Y)  
AXL (Y)  
AXL (Y779)  
BLK (Y)  
BMX (Y)  
BTK (Y)  
BTK (Y551)  
CSK (Y)  
DDR1 (Y792)  
DDR2 (Y740)  
DTK (Y)  
EGFR (Y)  
EPHA1 (Y)  
EPHA2 (Y)  
EPHA3 (Y)  
EPHA4 (Y)  
EPHA5 (Y)  
EPHA6 (Y)  
EPHA7 (Y)  
EPHA8 (Y)  
EPHB1 (Y)  
EPHB2 (Y)  
EphB3 (Y)  
EPHB4 (Y)  
EPHB6 (Y)  
ERBB2 (Y)  
ErbB3 (Y)  
ERBB4 (Y)  
FAK (Y)  
FAK (Y397)  
FER (Y)  
FGFR1 (Y)  
FGFR2 (Y)  
FGR (Y)  
FLT3 (Y589)  
FRK (Y)  
FYN (Y)  
FYN (Y530)  
HCK (Y) IGF1R (Y)  
IGF1R (Y1165)  
iNOS (Y)  
INSR (Y1189)  
INSULINR (Y)  
ITK (Y)

ITK (Y)  
JAK1 (Y)  
JAK1 (Y1022)  
JAK2 (Y)  
JAK2 (Y1007)  
LCK (Y)  
LCK (Y394)  
LTK (Y)  
LYN (Y)  
MATHK (Y)  
MCSFR (Y)  
MET (Y)  
Met (Y1234)  
MUSK (Y)  
NGFR (Y) NGFR (Y)  
PDGFRA (Y)  
PDGFRB (Y)  
PDGFRb (Y751)  
PTEN (S380)  
PYK2 (Y)  
PYK2 (Y402)  
RET (Y)  
ROR1 (Y)  
ROR2 (Y)  
ROS (Y)  
RYK (Y)  
SCFR (Y)  
SRC (Y419)  
SRMS (Y)  
SYK (Y)  
TEC (Y)  
TIE1 (Y)  
TIE2 (Y)  
TNK1 (Y)  
TRKB (Y)  
TXK (Y)  
TYK2 (Y)  
TYK2 (Y1054)  
TYRO10 (Y)  
VEGFR2 (Y)  
VEGFR3 (Y)  
ZAP70 (Y)  
ZAP70 (Y493)

## CATALOG NUMBERING:

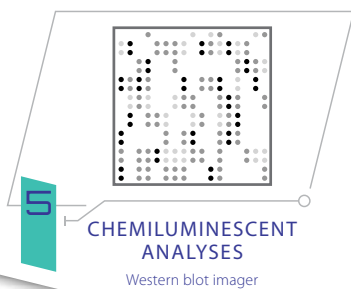
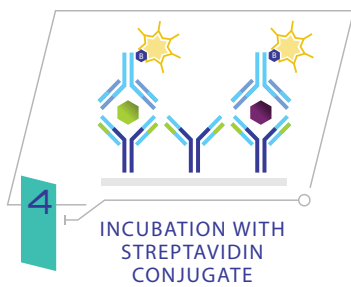
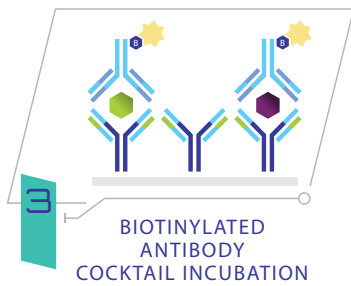
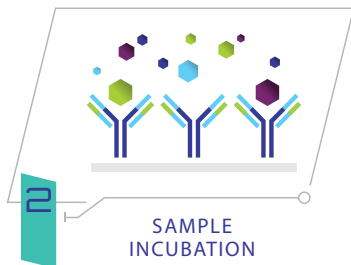
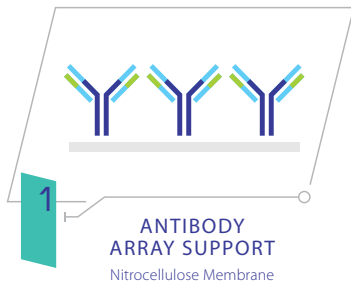
PEL- : sandwich ELISA  
CBEL- : cell-based ELISA  
-T: total and phospho

# Phosphorylation Arrays

Browse arrays:



## how it works



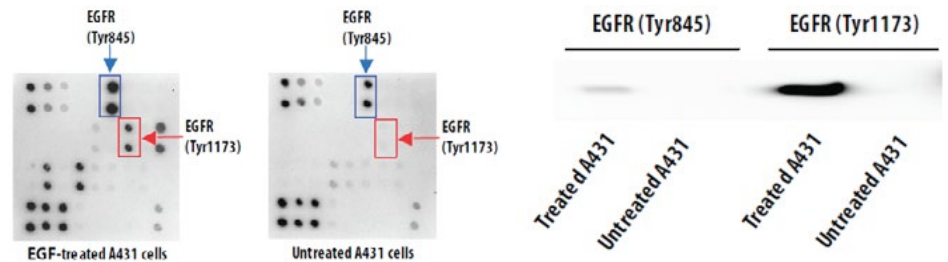
## RayBio® Phosphorylation Arrays

are specifically designed to identify the relative levels of phosphorylated proteins across multiple proteins simultaneously. Our arrays utilize the sandwich immunoassay principle, wherein a panel of capture phospho-antibodies is spotted onto a solid support. Signal readouts allow densitometry data collection and calculation of fold changes for each detected protein.



## HUMAN EGFR PATHWAY PHOSPHORYLATION ARRAY

A431 cells from a human epidermal carcinoma cell line were serum-starved overnight, then stimulated with 100 ng/mL EGF for 20 min at 37°C. Control cells were not incubated with EGF. EGFR phosphorylation was analyzed with RayBio EGFR Phosphorylation Arrays (left) and Western blots using phospho-EGFR (Tyr845 or Tyr1173) antibodies (right). Array and Western blot signals were visualized by chemiluminescence.



## FULL TESTING SERVICES

Send us your samples, we'll send you results

## BIostatistics SERVICES

Get a deeper understanding of your data

## ARRAYS BY RESEARCH AREA

Pick your pathway

# Phosphorylation Arrays by research area



## Human/Mouse AKT Signaling Array

AKT (S473)  
AMPKA (T172)  
BAD (S112)  
4E-BP1 (T36)  
ERK1 (T202/204)  
ERK2 (Y185/187)  
GSK3A (S21)  
GSK3B (S9)  
mTOR (S2448)  
P27 (T198)  
P53 (S15)  
P7056K (T421/S424)  
PDK1 (S241)  
PRAS40 (T246)  
PTEN S380  
RAF1 (S301)  
RPS6 (S235/236)  
RSK1 (S380)  
RSK2 (S386)

## Human Apoptosis Array

AKT (S473)  
ATM (S1981)  
BAD (S112)  
Caspase-3 (Cleaved D175)  
Caspase 7 (Cleaved D198)  
CHK1 (S296)  
CHK2 (T68)  
eIF-2a (S52)  
ERK1 (T202/204)  
ERK2 (Y185/187)  
HSP27 (S82)  
IKBA (S32)  
JNK (T183/185)  
NFKBP65 (S536)  
PARP1 (Cleaved D214/G215)  
P27 (T198)  
P53 (S15)  
SMAD2 (S245/250/255)  
TAK1 (S412)

## Mouse Apoptosis Array

AKT (S473)  
ATM (S1981)  
BAD (S112)  
Caspase-3 (Cleaved D175)  
Caspase 7 (Cleaved D198)  
CHK1 (S296)  
eIF-2a (S52)  
ERK1/2 (T202)  
HSP27 (S82)  
IKBA (S32)  
JNK (T183)  
NFKBP65 (S536)  
P27 (T198)  
P38 (T180/182)  
P53 (S15)  
SMAD2 (S245)  
TAK1 (S412)

## Human/Mouse MAPK Signaling Array

AKT (S473)  
CREB (S133)  
ERK1 (T202/204)  
ERK2 (Y185/187)  
GSK3A (S21)  
GSK3B (S9)  
HSP27 (S82)  
JNK (T183)  
MEK (S217/221)  
MKK3 (S189)  
MKK6 (S207)  
MSK2 (S360)  
mTOR (S2448)  
P38 (T180/182)  
P53 (S15)  
P7056K (T421/S424)  
RSK1 (S380)  
RSK2 (S386)  
ABL1  
ACK  
ALK1  
AXL  
BLK  
BMX  
BTK  
CSK  
DTK  
EGFR  
EphA1  
EphA2  
EphA3  
EphA4  
EphA5  
EphA6  
EphA7  
EphA8  
EphB1  
EphB2  
EphB3  
EphB4  
EphB6  
ERBB2  
ERBB3  
ERBB4  
FAK  
FER  
FGFR1  
FGFR2  
FGFR2A  
FGR  
FRK  
FYN  
HCK  
HGFR  
IGF-1R  
Insulin R (CD220)  
ITK  
JAK1  
JAK2  
JAK3  
LCK  
LTK

## Human Tyrosine Kinase Receptors\* Array

LYN  
MATK  
M-CSFR  
MUSK  
NGFR (TNFRSF16)  
PDGFRA  
PDGFRB  
PYK2  
RET  
ROR1  
ROR2  
ROS  
RYK  
SCFR (CD117/c-KIT)  
SRMS  
SYK  
TEC  
TIE-1  
TIE-2  
TNK1  
TRKB  
TXK  
TYK2  
TYRO10 (DDR2/TKT)  
VEGFR2  
VEGFR3

## Human TGF- $\beta$ Array

ATF2 (T69/71)  
C-FOS (T232)  
C-JUN (S73)  
SMAD1 (S463/465)  
SMAD2 (S245/250/255)  
SMAD4 (T277)  
SMAD5 (S463/465)  
TAK1 (S412)

## Human EGFR Array

EGFR (Y845/887/992/1045/1068/1086/1148,1173)  
EGFR (S1046/1047/1070)  
ERBB2 (Y877/1112/1221/1222/1248)  
ERBB2 (T686)  
ERBB2 (S1113)  
ERBB3 (Y1289)  
ERBB4 (Y1284)

## Human JAK/STAT Signaling Array

EGFR (S1070)  
JAK1 (Y1022)  
JAK2 (Y1007/1008)  
SHP-1 (S591)  
SHP-2 (Y542)  
SRC (Y419)  
STAT1 (S727)  
STAT2 (Y689)  
STAT3 (Y705)  
STAT5 (Y694)  
STAT6 (Y641)  
TYK2 (Y1054)

## Human NF- $\kappa$ B Signaling Array

ATM (S1981)  
eIF-2a (S52)  
HDAC2 (S394)  
HDAC4 (S632)  
IKB-alpha (S32)  
MSK1 (S376)  
NF- $\kappa$ B (S536)  
STAT1 (S727)  
TAK1 (S412)  
TBK1 (S172)  
ZAP70 (Y292)

## Human Insulin Signaling Array

eIF-4E (S209)  
FOXO-3 (S413)  
IGF-1R (Y1165)  
Insulin (Y1189)  
IRS-1 (S318)  
LKB1 (S428)  
SCH (Y427)  
SHIP1 (Y1020)  
SHP2 (S542)

\*phosphorylated tyrosine



## activators & inhibitors

RayBiotech now offers over 5,000 natural and synthesized compounds with a variety of protein-modulating activities to aid your signaling pathway research. Our catalog of small molecules target proteins that are involved in:

- Apoptosis
- Angiogenesis
- Autophagy
- Cell cycle
- Cell metabolism
- Cytoskeleton
- DNA damage
- Endocrinology
- Epigenetics
- GPCR signaling
- Inflammation
- JAK/STAT pathway
- MAPK pathway
- Membrane transporters
- Neuronal signaling
- NF- $\kappa$ B pathway
- PI3K-AKT pathway
- and more!



## auto-western service

RayBiotech's Auto-Western Service uses our state-of-the-art capillary immuno-blotting system with our vast phospho-antibody catalog\*.

### Service features

- Affordable
- Low sample volume (5  $\mu$ L)
- High sensitivity (ng – pg)
- Our antibody or yours
- Full analysis report
- Absolute quantitation available

Electropherogram peaks are digitally rendered as a "virtual blot."

*\* includes ELISA and array phospho-antibodies*



## other PTM ELISAs

Sandwich and cell-based ELISA kits are available for detection of other post-translational modifications such as acetylation, hydroxylation, and cleavage, involved in:

- Apoptosis
- Angiogenesis
- Cytoskeletal reorganization
- DNA damage
- mTOR signaling

