



Introduction to Kinexus Proteomics and Bioinformatics Services

Copyright 2025 Kinexus Bioinformatics Corporation



Corporate Profile for Kinexus



Located in Vancouver, Canada, in an 11,000 square foot lab and office facility

- Founded in July 1999 as spin-out company from the University of British Columbia
- Offers a highly integrated platform of innovative proteomics and bioinformatics services and products to foster cell signalling research
- Has provided services to over 3,500 industrial and academic labs in over 40 countries for over 26 years

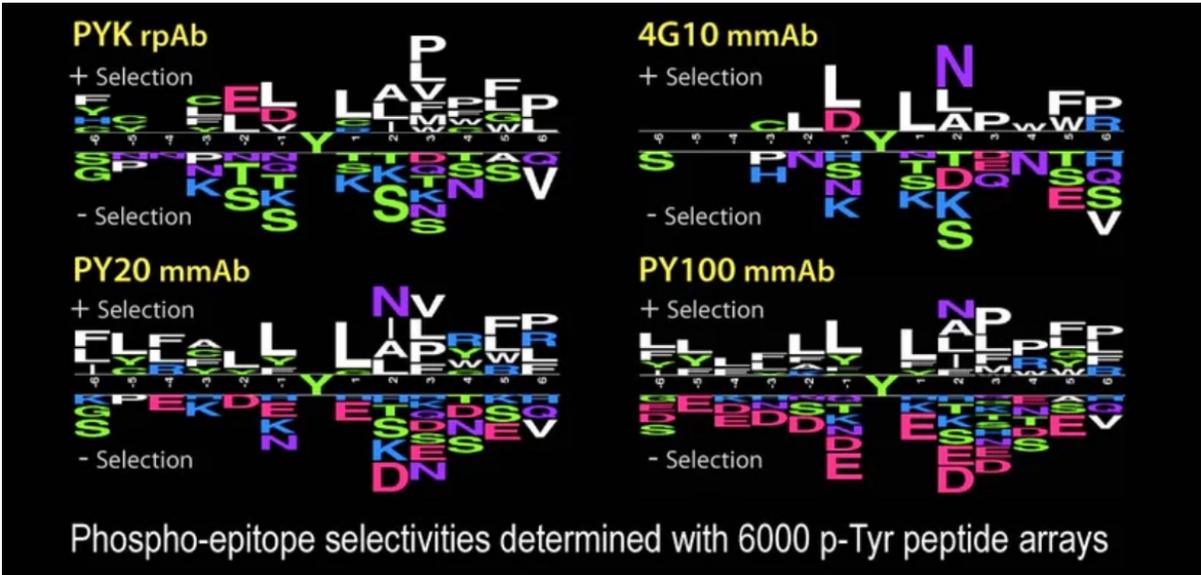


- Thousands of Kinexus antibody, peptides and tissue/cell lysates are available through

<https://kinexus-ca.myshopify.com/>

- Our quality products are offered at reasonable prices with fair representation and extensive validation

- For example, our rabbit polyclonal PYK generic phosphotyrosine antibody is priced at 100 USD for 100 µg.





Integrated Proteomics Services Discovery Platform

IN SILICO PREDICTION SERVICES

KINASE
INTERACTION
PREDICTION

PROBE PRODUCTION SERVICES

PEPTIDE
SYNTHESIS

PEPTIDE
SPOT
ARRAYS

ANTIBODY
PRODUCTION

MASS SPEC
PROTEIN ID

KINEX™ ARRAY SERVICES

ANTIBODY
MICRO-
ARRAYS

ANTIBODY
MACRO-
ARRAYS

PEPTIDE
MACRO-
ARRAYS

LYSATE
MACRO-
ARRAYS

KINETWORKS™ MULTI-BLOTTING SERVICES

WESTERN
BLOTTING

IN VITRO KINASE ASSAY SERVICES

KINASE
INHIBITOR
PROFILING

KINASE
SUBSTRATE
PROFILING

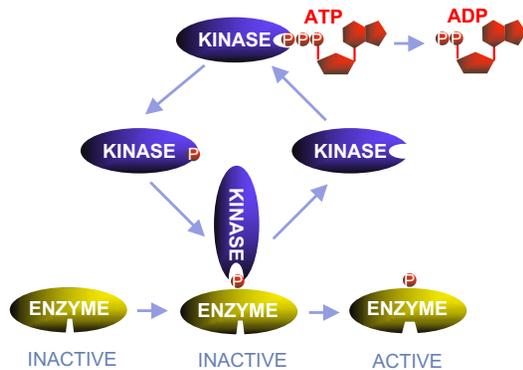
CUSTOM GRAPHICS SERVICES

CUSTOM
GRAPHICS

- Our services focus on disease biomarkers, drug targets and drug discovery for oncology, neurology and diabetes



Complexity of Intracellular Signal Transduction Systems



KINEOME

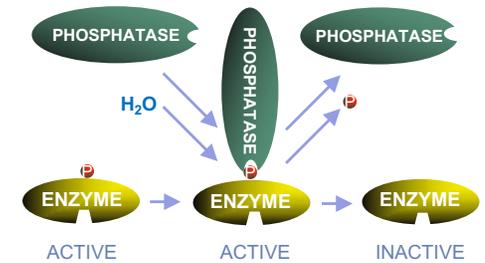
~568 protein kinase genes

>1000 catalytically active protein kinase isoforms

~21,300 total protein genes
PROTEOME

PHOSPHO-PROTEOME

~1,000,000 phosphosites
>250,000 confirmed



PHOSPHATOME

~159 protein phosphatase genes

- We specialize in the study of proteins involved in phosphorylation and cell signalling



PhosphoNET Website
www.phosphonet.ca



- One of the open-access Kinexus SigNET knowledgebases
- >177,000 confirmed and 790,000 predicted phosphosites in ~21,000 human proteins
- Functional information for ~3% of phosphosites
- Evolutionary analyses in 20 other species
- Kinase specificity prediction
- Phosphosite match identification
- Links to other related websites

IN SILICO
PREDICTION
SERVICES



Search by protein name, UniProt number, IPI number, or 15 AA P-site sequence. Updated November 2019 [Home](#) | [Kinexus](#) | [Contact](#) | [Credits](#)

Protein Info
 Short Name: AKT1
 Full Name: RAC-alpha serine/threonine-protein kinase
 Alias: AKT; Akt1; AKT1 kinase; C-AKT; EC 2.7.11.1; Kinase Akt1; PKB; PKB-alpha; PRKBA; Protein kinase B; RAC; RAC-alpha serine/threonine kinase; RAC-alpha serine/threonine kinase; RAC-PK-alpha; V-akt murine thymoma viral oncogene 1
 Type: EC 2.7.11.1; Nuclear receptor co-regulator; Protein kinase, Ser/Thr (non-receptor); AGC group; AKT family
 Mass (Da): 55686
 Number AA: 480
 UniProt ID: P31749
 International Prot ID: IPI00012866
 Sequence: Retrieve full protein sequence

GO Terms
 Cellular Component: GO:0005829 GO:0005654 GO:0005886
 Molecular Function: GO:0005524 GO:0019899 GO:0042802
 Biological Process: GO:0007186 GO:0008633 GO:0006924

External Links
 Uniprot
 PhosphoSite+
 Phosida
 STRING

Internal Links
 OncoNet
 KinaseNET
 TranscriptoNet
 Kinexus Products

Info Box
 Inhibits phosphotransferase activity.

A variety of parameters were considered in the selection of putative P-sites. Confirmed P-Sites have lower Hydrophobicity Scores. The P-site Similarity Score is lower the more that it resembles typical confirmed corresponding P-Ser, P-Thr or P-Tyr sites. The Maximum Kinase Score provides the calculated score for highest match of 500 human protein kinases for the amino acid sequence surrounding the target P-site as determined with Kinase Substrate Predictor V2. The Sum Kinase Score provides the additive sum of the positive individual Kinase Substrate Predictor V2 scores from 500 human protein kinases. The Conservation Score is the average of the percent similarity of the human P-site with the equivalent P-site in 20 other diverse species. Click the coloured buttons below to retrieve this and other information in the Info Box, or click the orange buttons for relevant links.

Phosphosites

		-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	Expt. conf.	Effect	Kinase	PPase	Kinexus Products	Ref.	Evol.	Kinase Pred.	P-site Match
Site 1	Y18	W	L	H	K	R	G	E	Y	I	K	T	W	R	P	R	■	■	■	■	■	■	■	■	■
Site 2	T21	K	R	G	E	Y	I	K	T	W	R	P	R	Y	F	L	■	■	■	■	■	■	■	■	■
Site 3	Y26	I	K	T	W	R	P	R	Y	F	L	L	K	N	D	G	■	■	■	■	■	■	■	■	■
Site 4	T34	F	L	L	K	N	D	G	T	F	I	G	Y	K	E	R	■	■	■	■	■	■	■	■	■
Site 5	Y38	N	D	G	T	F	I	G	Y	K	E	R	P	Q	D	V	■	■	■	■	■	■	■	■	■
Site 6	T65	A	Q	C	Q	L	M	K	T	E	R	P	R	P	N	T	■	■	■	■	■	■	■	■	■
Site 7	T72	T	E	R	P	R	P	N	T	F	I	R	C	L	Q	■	■	■	■	■	■	■	■	■	■

■ Our open-access PhosphoNET website provides predictions of phosphosites and the kinases that phosphorylate them



Comparison of empirical and predicted kinase specificities

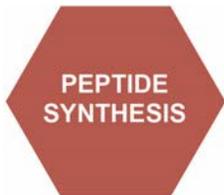
Experimental and predicted kinase consensus sequence

Kinase	Empirical											Predicted										
	-5	-4	-3	-2	-1	0	1	2	3	4	5	-5	-4	-3	-2	-1	0	1	2	3	4	5
Abl	x	n	d	x	x	Y	x	x	P	x	x	x	n	D	d	e	Y	f	r	P	x	e
Akt1	R	r	R	r	x	S	f	x	x	s	x	R	s	R	R	I	S	F	r	r	s	x
CaMK2a	I	s	R	q	x	S	I	d	x	x	x	L	s	R	q	d	S	f	d	r	s	x
CDK1	x	x	I	p	x	S	P	x	k	k	x	r	s	r	P	I	S	P	x	K	k	x
CDK2	x	x	x	p	x	S	P	g	K	k	x	r	s	R	P	I	S	P	x	K	k	p
CDK5	x	s	x	p	I	S	P	x	k	x	x	r	s	r	P	d	S	P	x	K	k	x
CK1a1	x	x	d	d	d	S	x	x	g	x	x	I	s	R	a	S	p	x	g	x	x	x
CK1d	x	x	ps	x	a	S	x	x	x	x	x	r	s	S	r	a	S	p	x	s	x	x
CK2a1	x	e	e	e	d	S	D	d	E	e	e	r	e	e	p	d	S	D	d	E	E	e
ERK1	p	p	p	P	I	S	P	t	p	t	x	p	S	P	P	L	S	P	t	p	p	t
ERK2	p	x	p	P	I	S	P	t	p	p	x	p	s	P	P	L	S	P	t	p	p	t
Fyn	x	x	x	x	v	Y	x	x	v	x	x	x	e	D	d	v	Y	p	r	p	x	x
GSK3b	x	S	p	p	p	S	P	p	p	S	p	r	s	r	P	p	S	P	p	p	s	p
InsR	x	e	x	d	d	Y	m	x	M	x	x	x	e	r	d	d	Y	v	d	v	x	x
JNK1	x	s	a	I	x	S	P	x	a	x	x	r	S	R	L	L	S	P	x	p	x	x
Lck	x	x	d	d	I	Y	x	x	v	x	x	I	e	D	d	I	Y	v	r	p	x	p
Lyn	x	x	e	n	I	Y	e	x	p	x	x	r	e	D	d	I	Y	f	x	p	t	x
p38a	x	x	x	P	I	S	P	x	x	p	x	I	S	R	P	L	S	P	x	p	p	t
PAK1	x	x	R	R	r	S	v	x	g	x	I	r	s	R	R	k	S	v	r	g	k	I
PKACa	r	x	R	R	I	S	I	x	x	x	x	R	s	R	R	I	S	I	r	s	s	t
PKCa	x	x	R	R	x	S	f	K	r	k	k	r	s	R	R	k	S	F	R	r	k	x
PKCb1	x	f	r	r	k	S	f	R	x	x	x	r	s	R	R	k	S	F	R	r	r	k
PKCd	x	x	R	R	x	S	f	R	r	x	x	r	s	R	R	k	S	F	r	r	r	x
PKCe	x	k	R	R	k	S	f	R	r	r	x	R	s	R	R	K	S	F	R	r	r	k
PKCz	x	x	r	r	x	S	F	r	r	x	x	R	s	R	R	K	S	F	R	r	r	x
PKG1	r	x	R	R	x	S	x	x	x	v	x	R	s	R	R	I	S	f	d	r	s	x
Plk1	I	x	I	d	d	S	x	v	x	x	x	r	s	R	p	d	S	f	t	p	x	x
ROCK1	r	x	r	R	x	S	x	v	x	x	x	R	s	R	R	I	S	v	k	v	s	x
Src	x	e	e	d	v	Y	g	x	v	x	x	x	e	D	d	v	Y	p	r	p	x	x
Syk	d	d	d	d	D	Y	E	x	p	x	e	r	e	D	d	D	Y	E	r	P	x	e

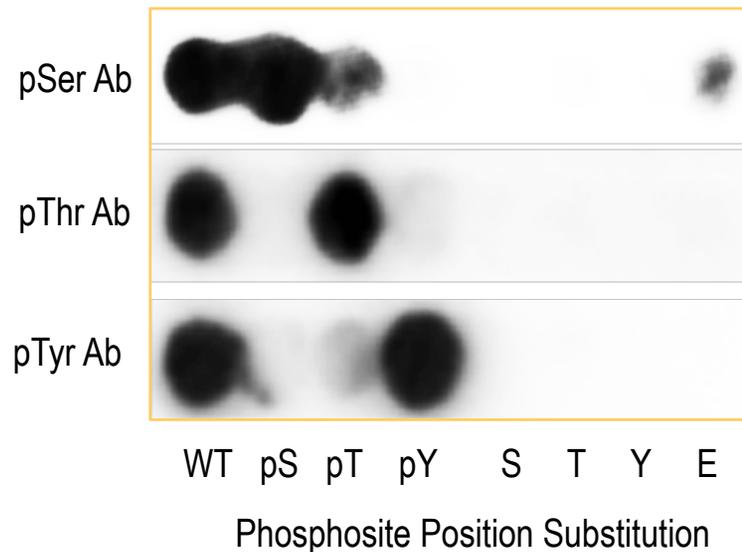


PhosphoNET Website
www.phosphonet.ca

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Amino Acid Substitution Analyses



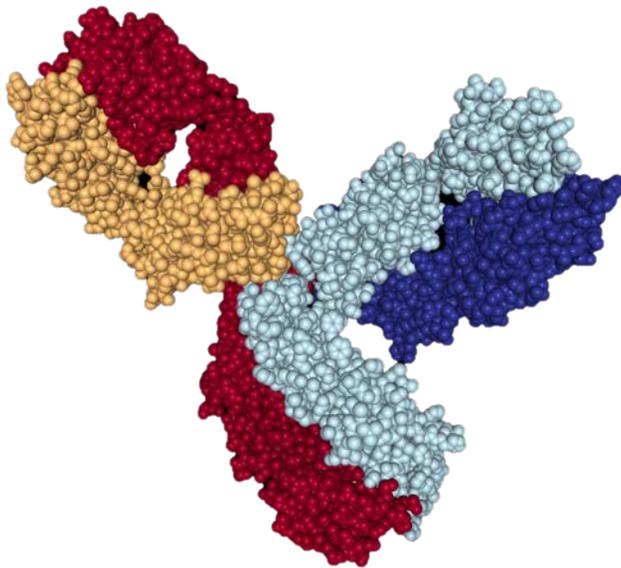
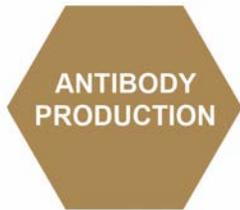
Examples of testing the phosphosite-specificity of three Kinexus antibodies

- Kinexus can synthesize soluble peptides to serve as antigens for antibody production and peptides in SPOT arrays to test the specificity of the antibodies generated with these antigenic peptides



Custom Antibody Production Service

PROBE
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IgG structure

- Antigen peptide sequences are selected from our bioinformatics program based on established functional importance, evolutionary conservation and frequency of mass spectrometry reports
- Peptides are synthesized in-house and KLH-coupled
- Rabbits are immunized every 2 weeks for 4 months before body bleed
- Antibodies are purified by peptide affinity chromatography
- Median yield is 1.5-2 mg of affinity-purified antibody

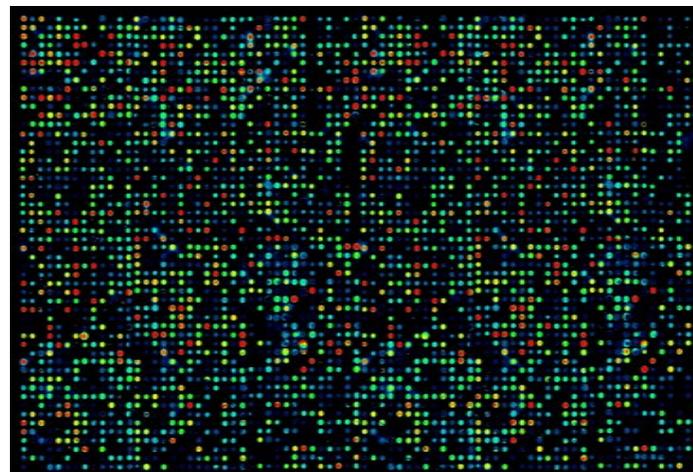
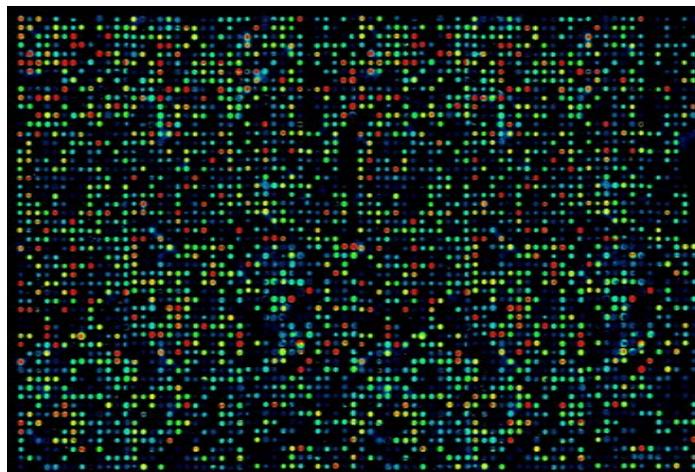


Kinex™ KAM Antibody Microarrays

ANTIBODY MICROARRAY SERVICE



KAM-2025 antibody
microarray image –
right and left fields



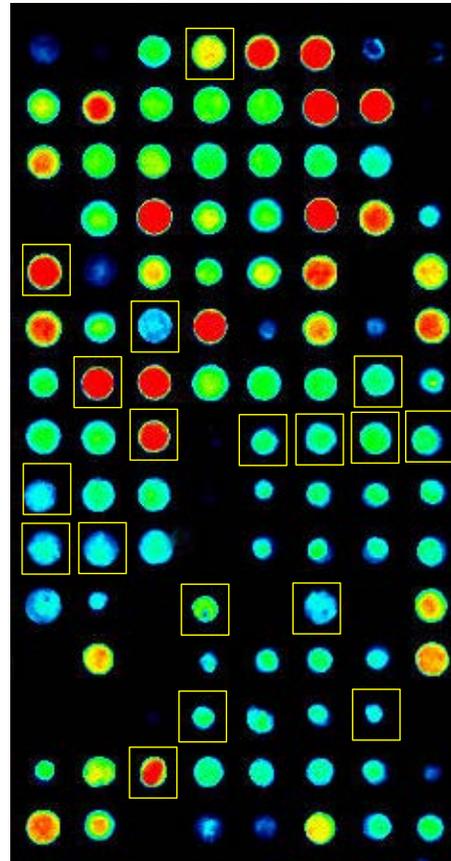
- Kinexus services use over 2,000 antibodies cherry-picked from over 26 vendors and validated in-house as well as over 1,600 antibodies produced in-house
- 1,047 of these antibodies target phosphosites
- Focus is on low abundance cell signalling proteins, including protein kinases, protein phosphatases, transcription factors, stress, cell cycle and apoptosis



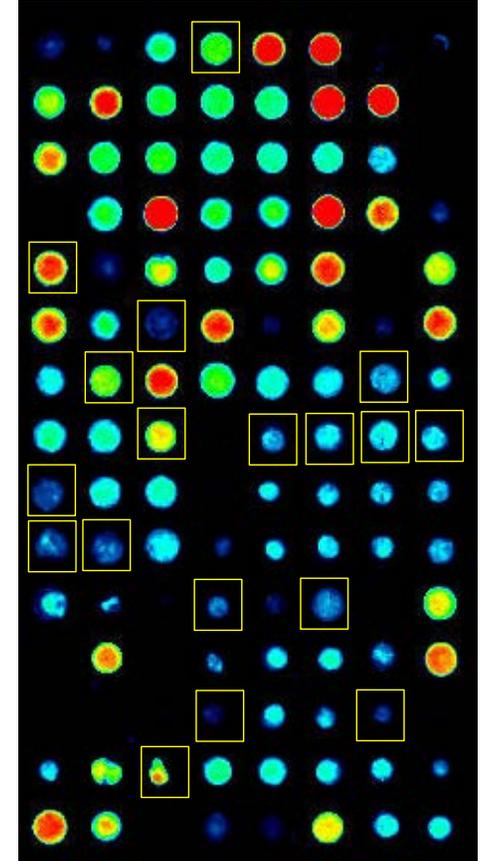
KAM-2025 Antibody Microarray

Latest Generation Microarray

- 2026 antibodies pin-printed array on 3D matrix coated glass slide @ 100-400 pg IgG/spot in quadruplicate
- Two lysate samples separately analyzed per slide in duplicate - both lysate samples are prepared with the same label
- Mean variation in duplicate samples is within $\sim 5-6\%$
- Very high signal to noise ratio
- Over 2,000-fold dynamic range



Cell mix - untreated

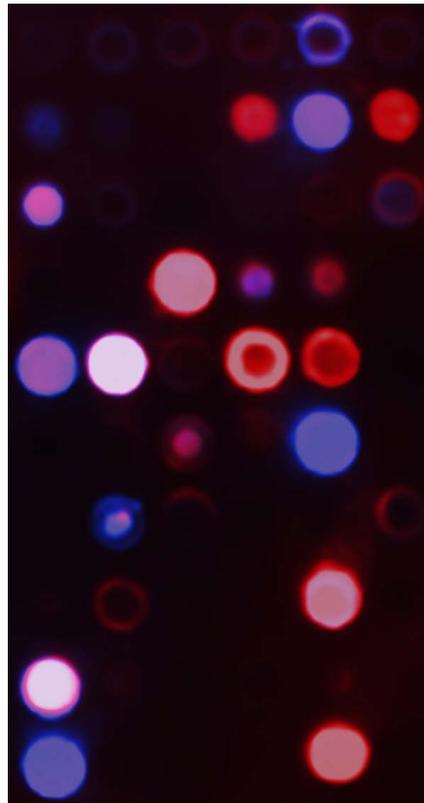
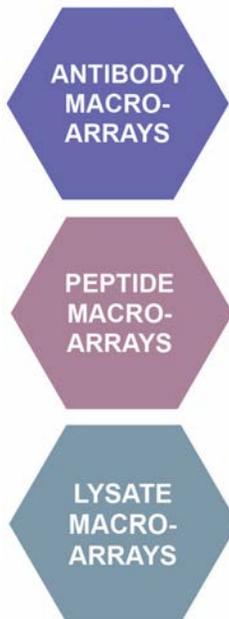


Cell mix + Alkaline
Phosphatase



Custom Macroarray Production

ANTIBODY MACROARRAY SERVICES



Close-up of overlay of two peptide arrays probed with different antibodies

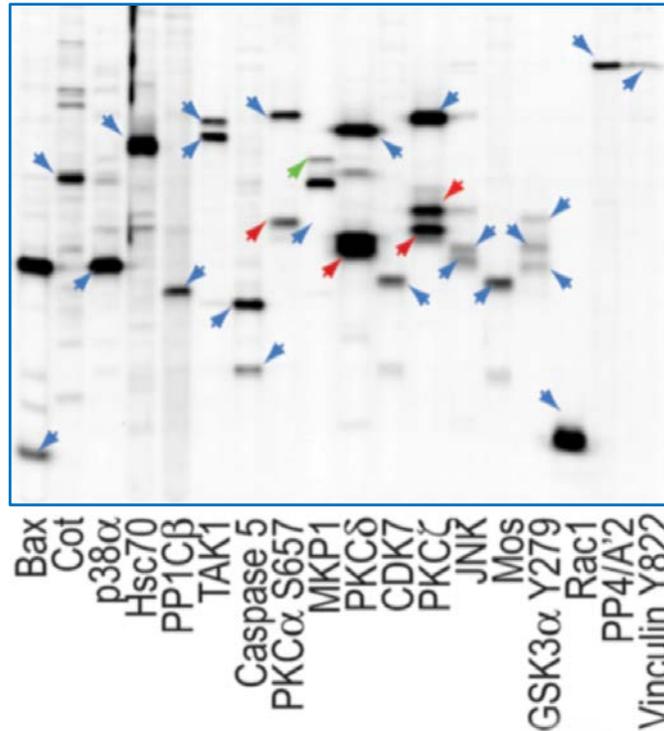
- Kinexus can produce custom arrays of 200 or more spots on to glass slides or nitrocellulose membranes
- Printing can be performed with peptides, antibodies and cell/tissue lysates
- Kinexus offers a large panel of in-house produced peptides, antibodies and cell/tissue lysates that can be used in these services



Kinetworks™ Multi-Immunoblotting

KINETWORKS™
MULTI-BLOTTING
SERVICES

WESTERN
BLOTTING



Rat Lung Custom Multi-Blot

- Uses SDS-PAGE with a single sample of cell or tissue lysate
- One wide lane across entire gel
- Proteins are resolved by SDS-PAGE and transferred to a nitrocellulose membrane
- Membrane is incubated with panels of antibodies with a multi-blotter manifold

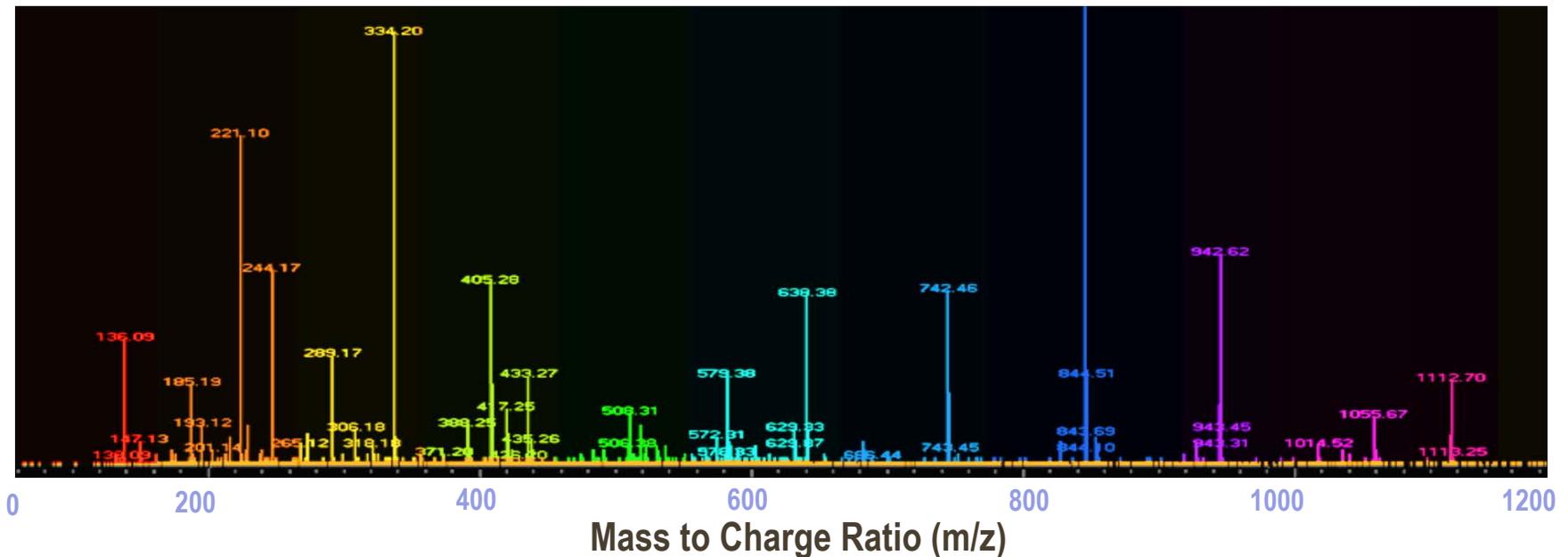


Mass Spectrometry Antibody Cross-reactive Protein ID

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MASS SPEC
PROTEIN ID

- Our antibody microarray and Western blotting services often reveal cross-reactive proteins that may be profoundly affected in expression or phosphorylation by a treatment
- Our mass spec services can identify these leads

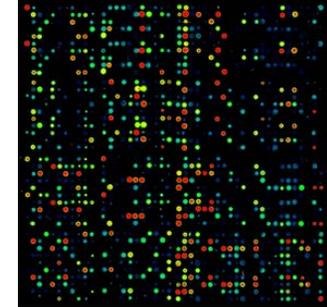




Kinexus Biomarker Platform From Discovery to Validation

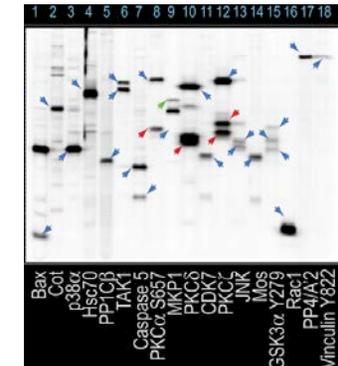
KINEX™ Antibody Microarrays

Biomarker Probe
Discovery



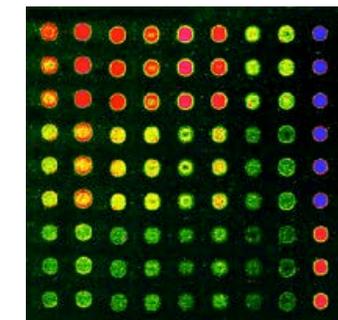
KINETWORK™ Custom Multi-Immunoblotting

Biomarker Probe
Validation



KINEX™ Custom Reverse Lysate Macroarrays

Biomarker Biological
Validation

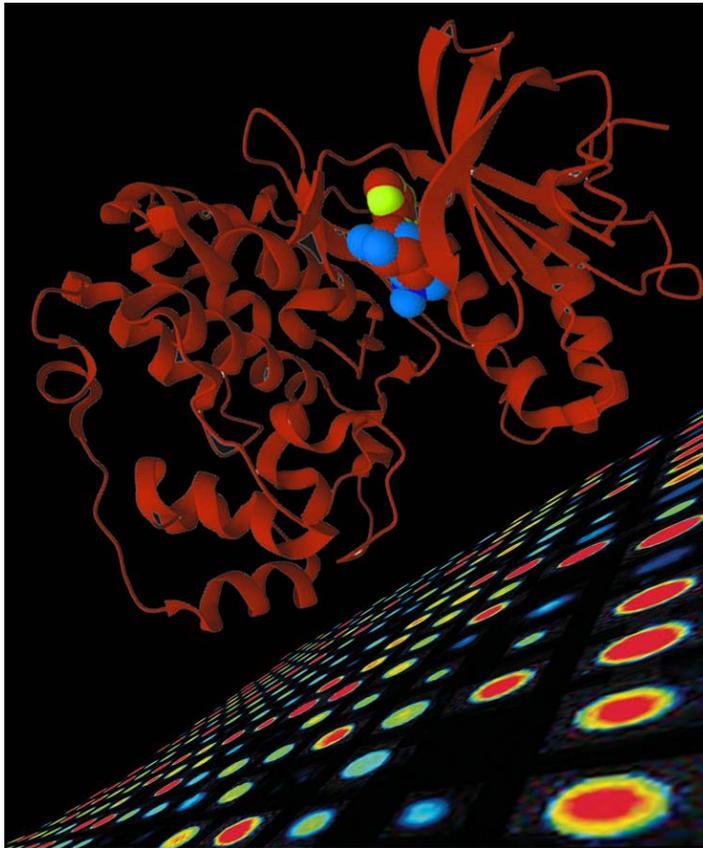




Kinase and Phosphatase Substrate Profiling with Immunoglobulin Microarray Analysis (SPIMA)

IN VITRO
KINASE ASSAY
SERVICES

KINASE
SUBSTRATE
PROFILING



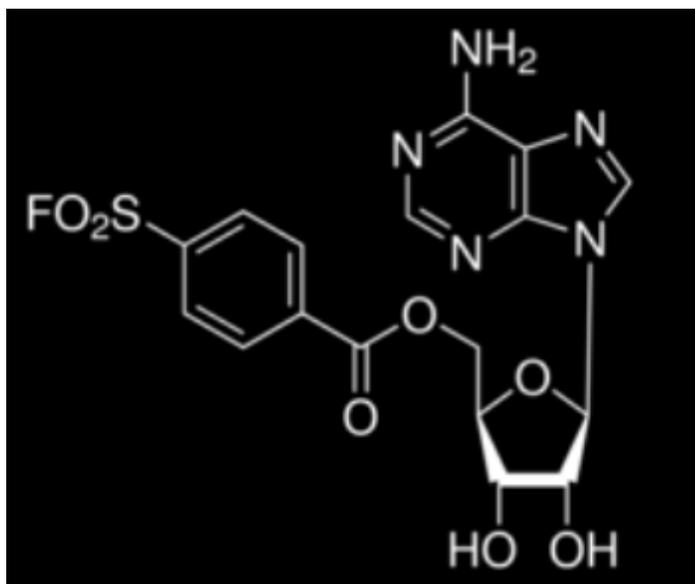
- Identifies substrates of selected kinases or phosphatase in cell or tissue lysates
- Over 350 kinases and phosphatases available
- Initial microarray screen with 1047 phosphosite-specific antibodies for phosphorylation changes with added kinase
- Final *in silico* prediction filter to identify high quality substrate leads



Kinase Inhibitor Displacement Microarray-based Screen (KIDMAS)

IN VITRO
KINASE ASSAY
SERVICES

KINASE
INHIBITOR
PROFILING



- FSBA is an ATP analogue that covalently binds to proteins that interact with ATP via its reactive FO₂S group (which reacts with free amines)
- Kinase inhibitors block binding of FSBA

- Most kinase inhibitors are ATP analogues
- KIDMAS identifies with active kinases captured on antibody microarrays test compounds that competitively inhibit binding of FSBA-biotin
- Hundreds of kinases can be screened simultaneously against a compound for inhibition



- Open access human protein kinase drug knowledgebase
- Features experimental results for over 105,000 kinase drug pairs (>450 kinases, >850 compounds that inhibit kinases)
- Features predictive data for another 200,000 kinase-drug pairs
- Information and links to other websites provided about each drug
- Identification of critical kinase residues in drug interactions from 3D structural information



Interaction Summary:

Kinase Residue	# of Interactions with Drug Atom	Average Distance of Interaction(A)	Interaction:Distance Ratio
ASP-381	198	4.24	46.7
PHE-382	137	4.36	31.4
TYR-253	118	4.40	26.8
PHE-317	111	4.34	25.6
MET-290	102	4.27	23.9
THR-315	91	4.12	22.1
LEU-370	83	4.40	18.9
MET-318	72	4.05	17.8
GLU-286	70	4.22	16.6
HIS-361	67	4.28	15.7
ALA-380	67	4.40	15.2
LYS-271	64	4.33	14.8
ILE-360	57	4.11	13.9

Full Interaction List:

Distance(A)	Kinase Name	Kinase Chain	Kinase Atom	Kinase Residue	Kinase Residue#	Compound Atom
2.524	Abi1	D	N	MET	318	N3
2.606	Abi1	D	O	ILE	360	N51
2.723	Abi1	A	O	ILE	360	N51
2.75	Abi1	B	O	ILE	360	N51
2.775	Abi1	B	N	ASP	381	O29
2.783	Abi1	C	O	ILE	360	N51
2.824	Abi1	B	N	MET	318	N3
2.853	Abi1	D	OE2	GLU	286	N21
2.919	Abi1	C	O	MET	318	C2
2.927	Abi1	D	O	MET	318	C2
2.937	Abi1	A	N	MET	318	N3
2.968	Abi1	A	OD2	ASP	381	C52
2.973	Abi1	B	OE2	GLU	286	C17
2.979	Abi1	A	O	HIS	361	C52
2.981	Abi1	A	N	ASP	381	O29
2.994	Abi1	C	CG1	VAL	299	O29
3.004	Abi1	D	OG1	THR	315	N13
3.011	Abi1	C	N	MET	318	N3
3.014	Abi1	A	OG1	THR	315	N13
3.035	Abi1	A	OD2	ASP	381	C53
3.038	Abi1	B	OE2	GLU	286	N21
3.04	Abi1	C	N	ASP	381	O29
3.051	Abi1	B	O	MET	318	C2
3.071	Abi1	C	OG1	THR	315	N13
3.077	Abi1	D	O	ILE	360	C54
3.088	Abi1	C	OE2	GLU	286	N21
3.089	Abi1	A	OE2	GLU	286	N21
3.106	Abi1	C	OD2	ASP	381	C52
3.12	Abi1	A	O	HIS	361	N51
3.137	Abi1	D	O	ILE	360	C50
3.142	Abi1	A	O	MET	318	C2
3.167	Abi1	B	O	ILE	360	C54
3.177	Abi1	D	N	ASP	381	O29

- Generates 2 downloadable tables
- Interaction Summary table identifies the most critical kinase residues involved in drug interaction
- Full Interaction List identifies the distances in Angstroms between each amino acid residue atom and each drug atom



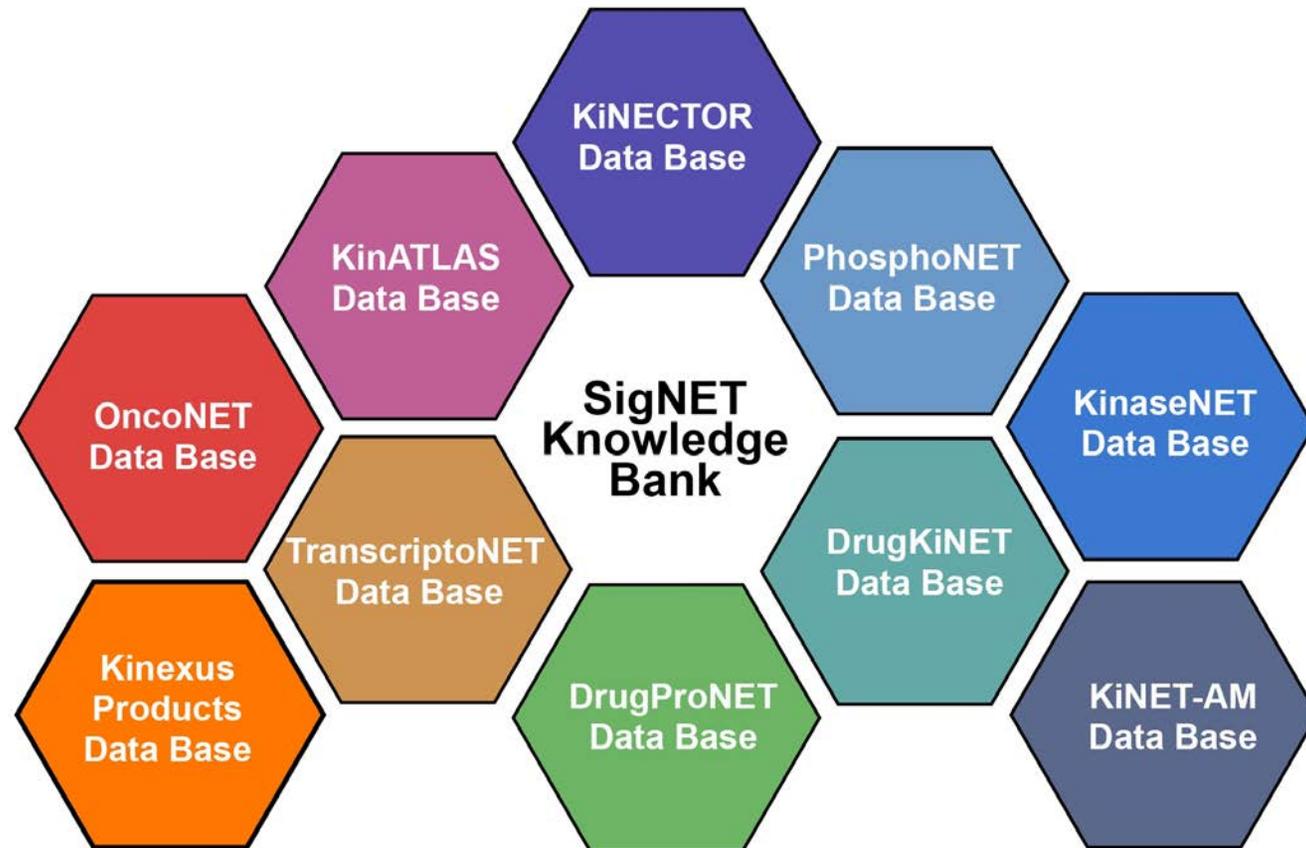
DrugProNET KnowledgeBase
www.drugpronet.ca

DRUGPRONET

- DrugProNET features comprehensive information on over 2000 compounds that have been co-crystallized with over 480 different human proteins in over 4400 protein-compound structures retrieved from the RCSB Protein Databank. In addition, information is also available for an additional 748 compounds that are inhibitors of protein kinases
- The bond distances in Angstroms between the closest protein and drug atoms in each crystal complex are provided. Single nucleotide variants (SNV's) that would affect these critical amino acid residues involved in drug interactions are also predicted in DrugProNET



Other Kinexus Bioinformatics Websites



- Kinexus has created a series of open-access “omics” data-bases under the SigNET umbrella related to cell signalling



- Open-access KinaseNET features comprehensive information on over 530 human protein kinases, including their structures, regulation, substrates, tissue distribution, evolutionary conservation, sensitivities to compounds, and linkages to other related websites



OncoNET and TranscriptoNET Websites

www.transcriptonet.ca

and www.onoconet.ca

TRANSCRIPTONET

- Open-access TranscriptoNET features information on the mRNA expression levels from DNA microarray studies for over 20,000 genes in about 600 types of human organs, tissues and cells from over 900 studies with 6,000 biological specimens deposited in the NCBI GEO website

ONCONET

- Open-access OncoNET is a cancer protein-focused knowledgebase with data on the expression levels and mutations in about 3,000 human proteins that are linked to cancer in diverse human tissues and tumour cell lines



KiNECTOR

- Open-access KiNECTOR features over 22,000 direct kinase-substrate relationships as well as indirect connections between kinases and phosphoproteins within four degrees of connectivity in signalling maps with direct links to other informative website
- The new CytoNET module of KiNECTOR documents over 4,000 human cell receptor interactions (RIs) directly with extracellular mediators and intracellular proteins



Showing page 1 of 28 pages [Next](#)

Kinase P31749 Connections Map

Figure Legend

Protein Type

- Ser/Thr Kinase
- Tyr Kinase
- Phosphatase
- Adapter/Scaffold
- Regulatory
- Transcription
- Metabolic
- Structural
- Unclassified

Interaction Type

- Inhibitory
- Stimulatory
- Unknown

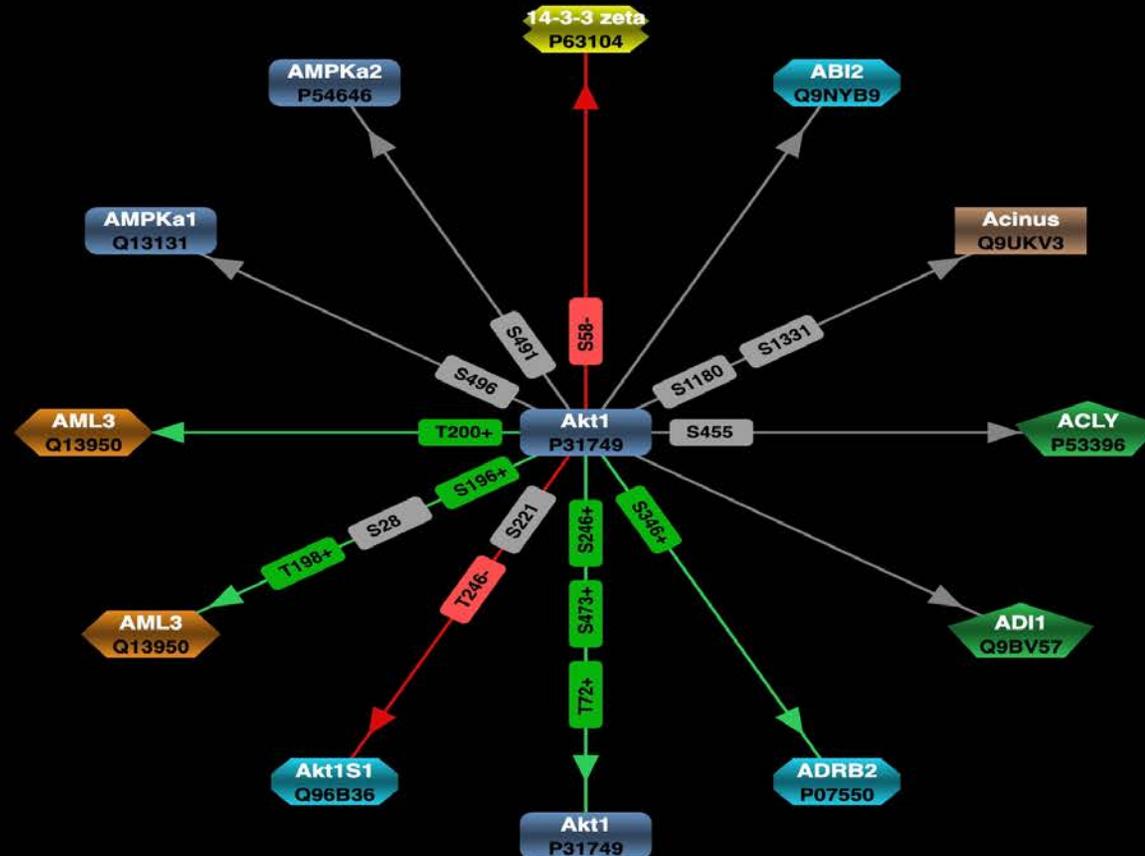


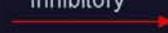
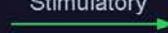


Figure Legend

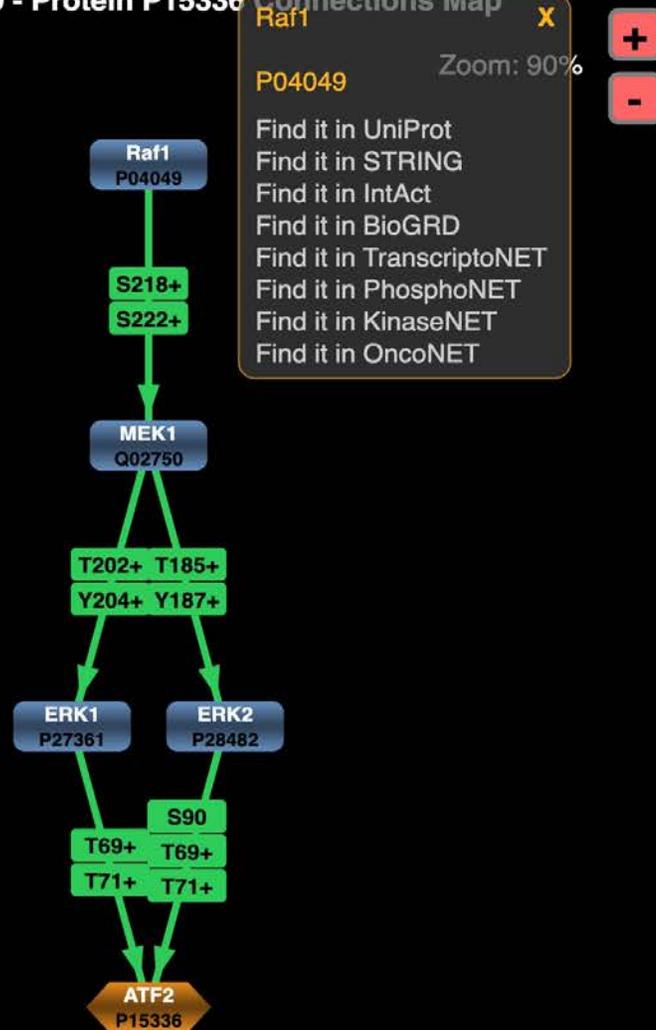
Protein Type

-  Ser/Thr Kinase
-  Tyr Kinase
-  Phosphatase
-  Adapter/Scaffold
-  Regulatory
-  Transcription
-  Metabolic
-  Structural
-  Unclassified

Interaction Type

-  Inhibitory
-  Stimulatory
-  Unknown

Kinase P04049 - Protein P15336 Connections Map



Connections Map x

Raf1

P04049 Zoom: 90%

[Find it in UniProt](#)
[Find it in STRING](#)
[Find it in IntAct](#)
[Find it in BioGRD](#)
[Find it in TranscriptoNET](#)
[Find it in PhosphoNET](#)
[Find it in KinaseNET](#)
[Find it in OncoNET](#)

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