Version
2018 September

KINEXUS

ANTIBODY MICROARRAY SERVICES
INFORMATION PACKAGE

KiNEX™ KAM-1325

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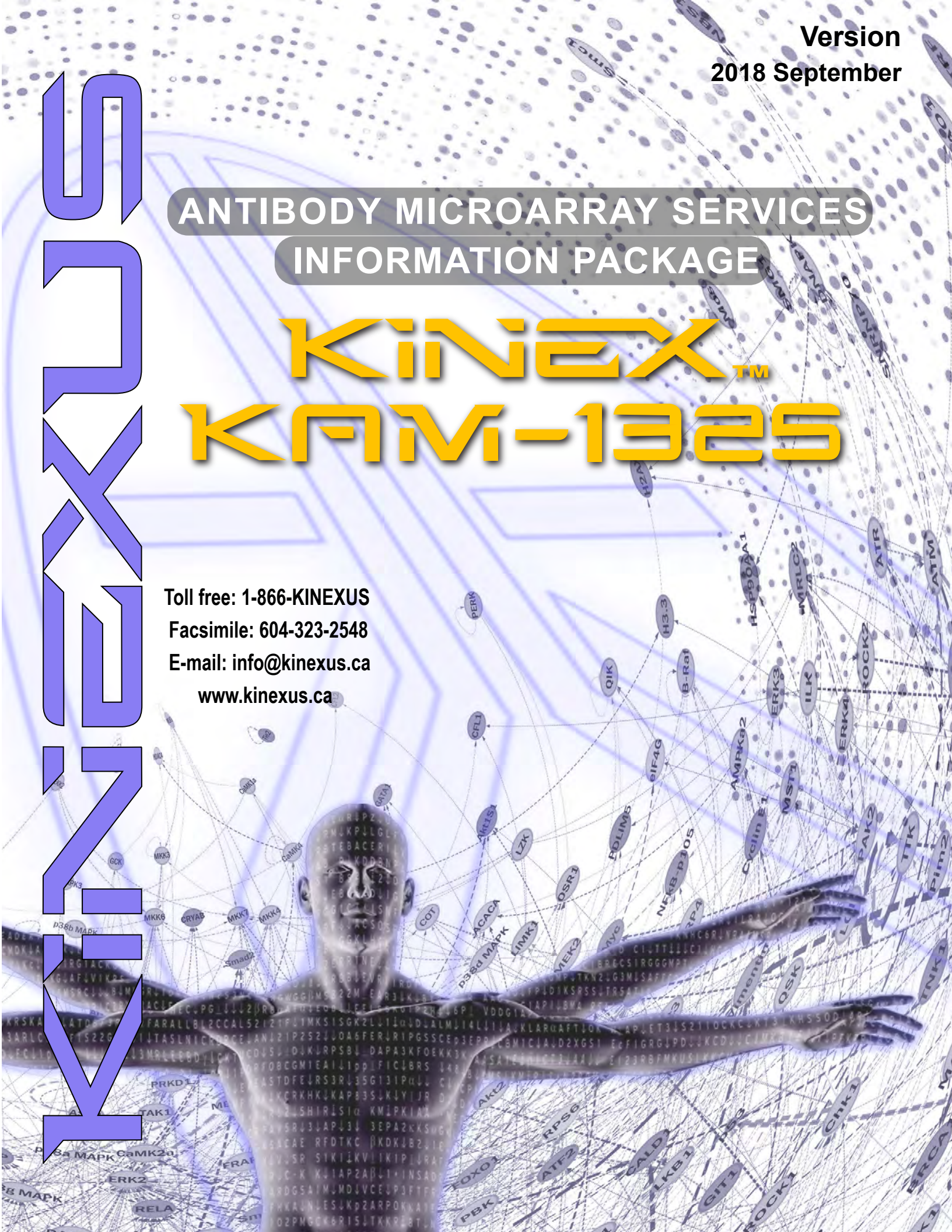

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Overview of Kinex™ KAM-1325 Antibody Microarray Services

1. INTRODUCTION

Our Kinex™ KAM Antibody Microarray Services empower our clients to have their cell and tissue lysates from their experimental model systems investigated for the discovery of biomarker leads with the highest content antibody microarrays available in the field today. Our antibody microarrays are convenient and very cost-effective tools to explore in a directed manner the expression and phosphorylation states of hundreds of key cell signalling proteins simultaneously with minute amounts of specimens. Samples suitable for analyses include unfractionated cell extracts, fresh or frozen tissues and biofluids such as serum and cerebral spinal fluid. As little as 25 µg of lysate protein is sufficient. The results can provide novel and useful insights into differences in protein expression, covalent-modification and protein-protein interactions, and define antibody reagents that enable follow up on these findings with other immunological-based methods such as Western blotting, immunoprecipitation, ELISA and immunohistochemistry.

Our integrated platform of well-established proteomics and bioinformatics services and proprietary technologies make the Kinex™ KAM antibody microarrays superior to any other commercially available antibody microarrays. Some of the key advantages of our antibody microarray include highly validated antibody probes (most of which are generated in-house), wide coverage of cell signalling proteins and pathways, extensive follow-up services for validation, and supporting bioinformatics analyses for comparison purposes.

In this comprehensive information package, we explain the vulnerabilities of antibody microarrays in general, and the versatility and power of the KAM-1325 antibody microarray to work with different formats and overcome these issues to effectively advance your research programs. This latest generation antibody microarray benefits from more than 10 years of continuous research and development to improve sample preparation, microarray antibody coverage, background reduction, signal detection and data analyses. With the KAM-1325 microarray, we have developed a range of alternative detection strategies to track protein expressions, covalent modifications, protein-protein and protein-drug interactions. Presently, we offer two services with this microarray that permit detections of changes in protein expression and phosphorylation at specific phosphosites (KAM-1325) and protein-tyrosine phosphorylation (KAM-1325-pY). Clients should contact us regarding alternative formats for detection of other types of covalent modifications, and protein- and drug-interactions.

Kinexus offers full service to our clients with cell and tissue specimens shipped to our facility in Vancouver, British Columbia, Canada. We provide fully confidential services as well as non-confidential services with significant discounts. For those clients that are even more cost conscious, the KAM-1325 antibody microarray is also available in convenient do-it-your-self kits. Clients can mail us the developed KAM-1325 slides for subsequent scanning, quantitation and data analysis for a reduced fee.

This Service Information Package provides extensive information and all of the forms that will enable you to take advantage of our unique proteomics services. For a general review on the applications of antibody microarrays for biomarker discovery, we recommend our recent publication with open-access in the on line journal *Advances in Proteomics and Bioinformatics* with the following download url: https://www.gavinpublishers.com/articles/Review-

Article/Advances-in-Proteomics-and-Bioinformatics/Applications-of-High-Content-Antibody-Microarrays-for-Biomarker-Discovery-and-Tracking-Cellular-Signaling

Should you have any questions, call or e-mail our technical service representatives and we would be pleased to assist you in developing the best strategy to cost-effectively put our proteomics platform to work for you.

2. HIGHLY VALIDATED ANTIBODIES

Kinexus presently offers two different Kinex™ KAM antibody microarray services that utilize complementary antibody microarray chips. The KAM-1325 antibody microarray features at least 875 phosphosite-specific antibodies (for phosphorylation) and 451 pan-specific antibodies (for expression levels of these phosphoproteins). The KAM-1150 antibody microarray uses approximately 1150 pan-specific antibodies. When used together, the KAM-1325 and KAM-1100 chips permit screening of cell and tissue lysates with over 2000 non-redundant antibodies. These microarrays are the culmination of continuous on-going efforts to steadily improve the power and accuracy of our antibody microarrays for over 10 years. Kinexus has already performed over 3000 antibody microarray analyses for our clients.

The antibodies deployed on the KAM-1325 and KAM-1150 chips have been selected from more than 6000 different commercial antibodies sourced from over 26 companies that have been independently tested in-house by Kinexus to identify many of the best immunological reagents available today to track important signal transduction proteins. The top 20% of these antibodies that performed well in Western blotting applications have been incorporated into our Kinex™ Antibody Microarrays. Such cherry-picking is apparently not performed by other microarray companies, which rely only on one or a few suppliers with dubious information about individual antibody performance. In addition, Kinexus has produced its own panel of highly characterized cell signalling antibodies, many of which are incorporated into the KAM-1325 and KAM-1150 antibody microarrays. Over 880 of the antibodies on the KAM-1325 microarray were developed at Kinexus and many of these are against unique phosphosites on target proteins.

When our clients utilize the KAM-1325 and KAM-1150 antibody microarray services, upon request, we are pleased to disclose their commercial sources and most of these antibodies are available directly from Kinexus at very affordable prices in smaller 25 µg pack sizes. Immunoblots images with the antibodies sold by Kinexus are available for easy viewing on our Products website (www.kinexusproducts.ca). A complete listing of all the antibodies printed on the KAM-1325 chip in MS-Excel format is downloadable from the Kinexus website and also included in Appendix 1 at the back end of this information package. In particular, at least 627 unique signalling proteins and their targets are tracked with these antibodies. We often use multiple antibodies that recognize different epitopes on the same target proteins to permit internal cross-validation of changes in protein expression or modification that are evident on the microarrays. The antibodies in our microarrays have been optimized to work in human, mouse and rat model systems, but have also been shown commonly to work in cow, pig, dog, chicken, frog, sea star and many other diverse model systems. We have targeted phosphorylation sites that are highly conserved in these different species. The classes of targeted phosphoproteins and their phosphosites on the KAM-1325 antibody microarrays are listed in Table 1 below.

Table 1. Antibodies with their protein and phosphosite targets printed the KAM-1325 antibody microarray slides. These statistics may be slightly altered in future print runs of these microarray chips. A complete listing of the antbodies is provided in Appendix 1.

Protein Category	All Ab	All Non-redundant Ab	All Pan-specific Ab	Non-redundant Pan-specific Ab	Redundant Pan-specific Ab
All antibodies	1326	1154	451	418	133
All protein kinases	844	688	379	248	131
Protein-Tyr kinases	244	204	87	54	33
Protein-Ser/Thr kinases	600	482	292	194	98
All protein phosphatases	35	35	7	7	0
Protein-Tyr phosphatases	23	23	3	3	0
Protein-Ser/Thr-phosphatases	12	12	4	4	0
Transcription factors	188	179	20	18	2
Metabolic enzymes	85	81	11	9	2
Stress proteins	9	9	4	4	0
Adapter proteins	25	25	4	4	0
Other	147	141	27	25	2

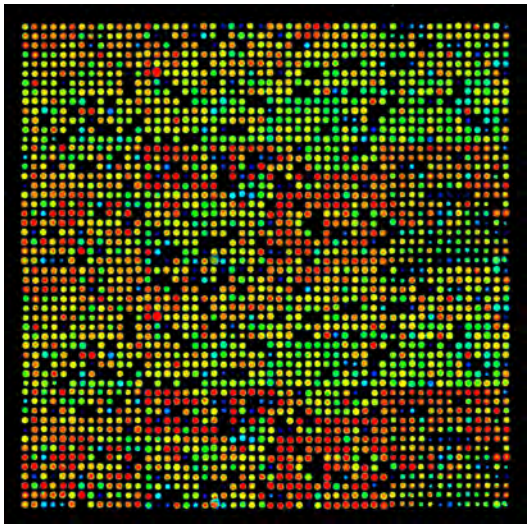
Protein Category	All Phosphosite-specific Ab	Non-redundant Phosphosite-specific Ab	Redundant Phosphosite-specific Ab	Unique Target - Pan Ab Paired with One or More Phosphosite-specific Ab	Total Unique Phosphosite Ab Paired with One or More Pan-specific Ab
All antibodies	875	836	39	230	459
All protein kinases	465	438	27	170	334
Protein-Tyr kinases	157	150	7	49	122
Protein-Ser/Thr kinases	308	288	20	121	212
All protein phosphatases	28	28	0	5	8
Protein-Tyr phosphatases	20	20	0	3	6
Protein-Ser/Thr-phosphatases	8	8	0	2	2
Transcription factors	168	161	7	17	50
Metabolic enzymes	74	72	2	9	21
Stress proteins	5	5	0	3	4
Adapter proteins	21	21	0	4	6
Other	120	116	4	23	37

3. QUALITY CONTROL PROCEDURES

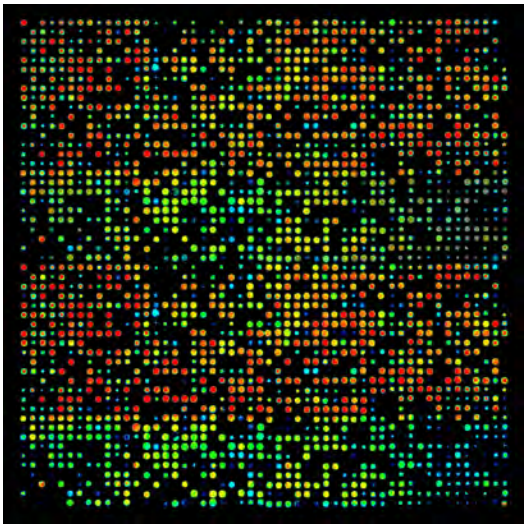
The antibodies on the KAM-1325 microarray are deposited in two replicate fields on 3D-matrix-coated glass (Nexterion-P) slides with a quill-printing contact microarrayer. A deposition volume of 1 nanolitre with 0.1 to 0.4 mg/ml antibody solution are printed in each spot. These microarrays are subjected to stringent quality control measures designed to ensure optimum antibody activity, printing consistency, and consistent intra-slide and inter-slide variability. The specific printing of individual antibodies at the expected positions on our microarrays are validated by probing with dye-labelled anti-rabbit, anti-mouse, and anti-goat secondary antibodies as well as direct dye-labelling of the capture antibodies on the microarray. Figure 1 provided scanned images of one of the two fields on a KAM-1325 chip. The top set of antibodies are separately reprinted in the bottom half of the field to reduce the chances of duplicate spots experiencing contamination or other issues.

Figure 1. Scanned images of one of two fields printed on the KAM-1325 antibody microarray that is visualized by direct dye-labelling with fluorescent dye (Cy3) (Panel A), probing with dye-labelled anti-rabbit IgG (Panel B; green spots in Panel D) and probing with dye-labelled anti-mouse IgG (Panel C; red spots in Panel D). Decreasing signal intensity corresponds with a red to orange to yellow to green to blue transition in Panels A-C. Panel D showns an overlay of colourized Panels B and C.

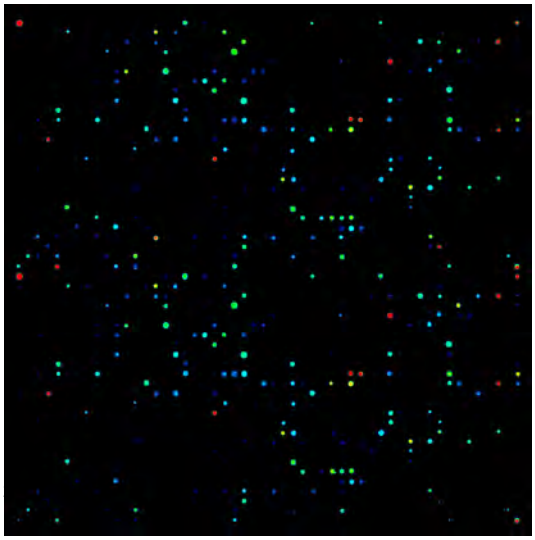
A. Direct Dye Labelling



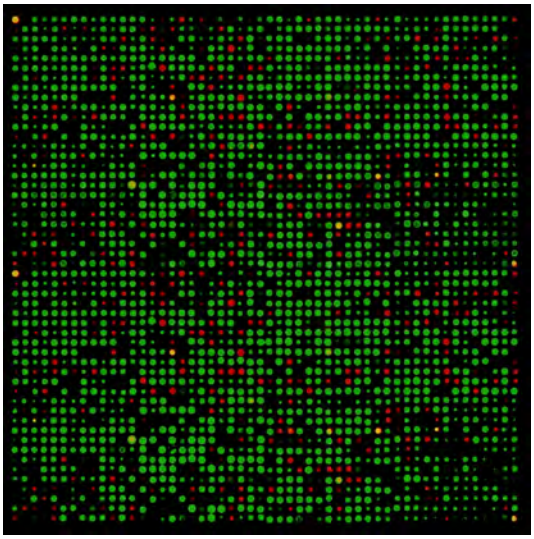
B. Probing with Anti-Rabbit IgG



C. Probing with Anti-Mouse IgG



D. Overlay of Anti-Mouse and Anti-Rabbit IgG



Each KAM-1325 microarray also has loading controls to ensure the amount of deposited antibody is consistent on all fields. Each microarray provides for semi-quantitative analyses of the expression and phosphorylation status of cell signalling proteins in two separate specimens of cell or tissue lysates. The quantitative analysis of the strength of the fluorescence signals for each captured target protein is based on duplicate measurements in this case. We also employ a normalization step to take into account any minor differences in protein loading on to our microarrays. If quadruplicate replicate measurements are required, then a whole KAM-1325 chip can be utilized with only one lysate sample per chip.

In our Kinex™ KAM Microarray Quantitation and Report Service, we provide a Microsoft Excel spreadsheet that includes the (average) percent change from the control sample (%CFC), and the percent error in duplicate measurements from the average, which can be used to determine which target proteins to follow up. In internal studies with our KAM-1325 series antibody microarrays, we determined that the spread between duplicate measurements with the same antibody in printed spots on the same slide corresponded to a median standard deviation of 8% (calculated from 20 separate KAM-1325 microarrays tested). The frequency of flagged antibody spots dues to dust or misprinting was less than 2%. The dynamic range between the highest and lowest fluorescent dye-signals of captured lysate proteins from these KAM-1325 chips was over 8,000-fold after subtraction of background signals.

We strongly believe that our KAM-1325 antibody microarrays are the best commercial high content antibody arrays that are available in the market place today for tracking signalling protein expression and phosphorylation. Our Kinex™ KAM chips consistently out-performed the leading antibody microarrays from at least three other suppliers when tested side-by-side in our hands. In fact, most of our competitors, including Thermo-Fisher, Becton Dickinson, Clontech, Sigma-Aldrich and Takeda have since discontinued offering their antibody microarray products.

The performance of the KAM-1325 antibody microarray is exemplified in Figures 2 and 3, which utilize two separate detection formats as outlined in the next section. In these figures, lysates from overnight serum-starved human A431 cells epidermoid carcinoma cells treated with and without 100 ng/ml of epidermal growth factor (EGF) for 5 minutes prior to harvesting were used. In Figure 2, the lysates were subjected to cysteine chemical cleavage, whereas in Figure 3, the cells were extracted with 1% Triton X-100 in the presence of 5 mM sodium vanadate and other protein phosphatase inhibitors. Figure 2 applied our standard KAM-1325 service in which lysates are biotinylated, captured on the microarray, and then probed with a dye-labelled anti-biotin antibody. Figure 3 shows some of the results with our KAM-1325-pY service in which the captured lysate proteins on the microarray are probed with our dye-labelled PYK anti-phosphotyrosine antibody (Cat. No. AB-PG001). Figures 2 and 3 show closeups of the same two regions of KAM-1325 slide. Comparison of these images reveal many changes in protein phosphorylation in response to the EGF treatment. A431 cells over-express the EGF receptor, which is protein-tyrosine kinase that is activated upon ligand binding. Appendix 2 provides quantitation data for over two hundred antibodies that showed enhanced tyrosine phosphorylation of lysate proteins in the experiment shown in Figure 3. These include the EGF receptor and its related kinases ErbB2 and ErbB3 as well as several of the MAP kinases, which are well documented in the scientific literature to become tyrosine phosphorylated in response to EGF in this cell line. In the next section, the principles of these two detection systems are explained in greater detail.

Figure 2. Close ups of scanned Kinex™ KAM-1325 images of replicate fields (A+C, B+D) corresponding to two regions in the same antibody grid. The slide was incubated with cysteine chemically cleaved, biotinylated lysates from overnight serum-starved A431 cells that were treated without (A,C) and with 100 ng/ml EGF for 5 minutes (B,D). The captured lyste proteins on the microarray were then probed with a dye-labelled anti-phosphotyrosine antibody (PYKu, Cat. No. AB-PG001) prior to scanning. Decreasing signal intensity corresponds with a red to orange to yellow to green to blue transition. Short term EGF exposure altered the phosphorylation of several A431 cell proteins.

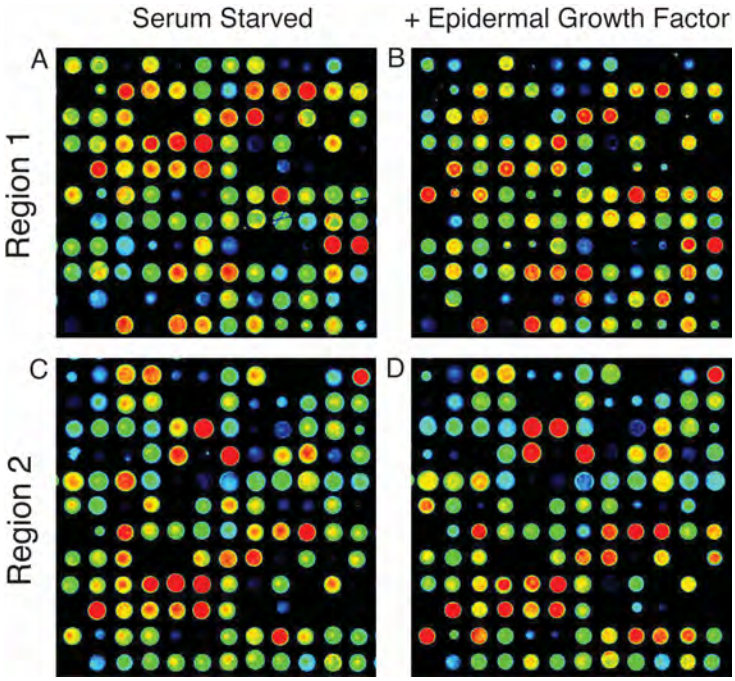
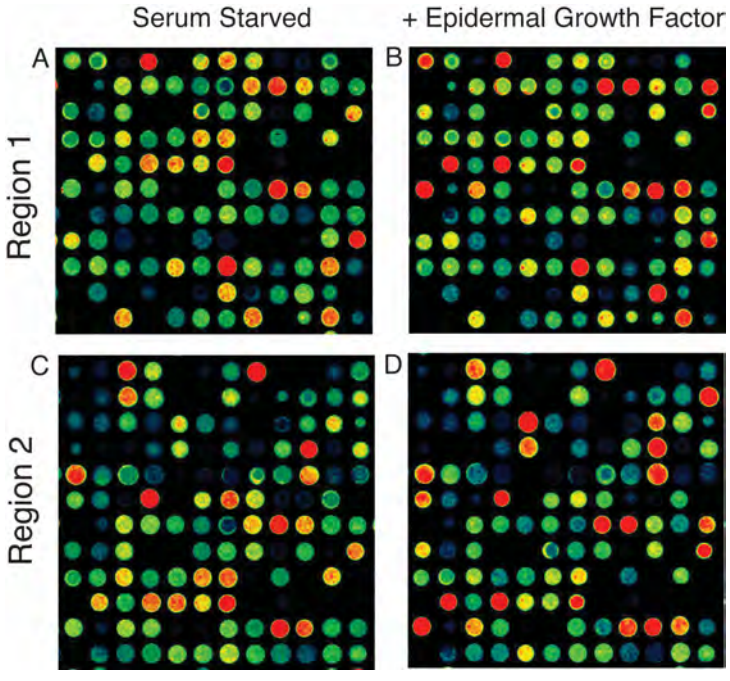


Figure 3. Close ups of scanned Kinex™ KAM-1325-pY images of replicate fields (A+C, B+D) corresponding to two regions in the same antibody grid. The slide was incubated with 1% Triton X-100 solubilized lysates from overnight serum-starved A431 cells that were treated without (A,C) and with 100 ng/ml EGF for 5 minutes (B,D). The captured lysate proteins on the microarray were then probed with a dye-labelled anti-phosphotyrosine antibody (PYK, Cat. No. AB-PG001) prior to scanning. EGF treatment can be seen to increase the tyrosine phosphorylation states of several A431 cell proteins. These are the same regions shown in Figure 2.



4. NON-COMPETITIVE SINGLE FLUORESCENT DYE COMBINATION LABELLING

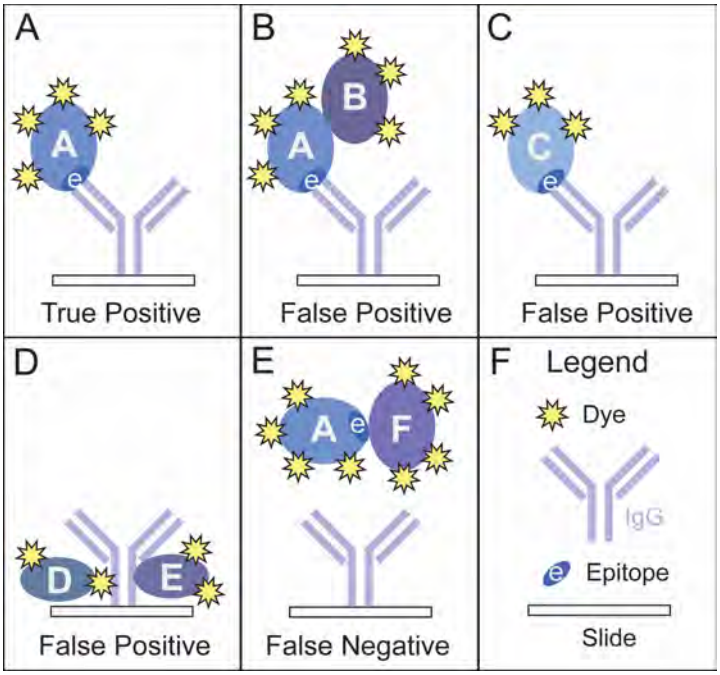
One key advantage of our antibody microarrays is that lysate samples from control and treated cells are labelled with a mix of the same dye combination to eliminate dye-related differences in binding to proteins. In our experience, the use of a two dye, competitive binding system, in which a control sample is labelled with a different dye from the treatment sample and the two samples are mixed and co-incubated with the same regions of the same chips, generates a higher rate of false leads as well as lower signal detection, since each antibody spot must bind the target proteins from both samples. Unlike oligonucleotides such as DNA and RNA, proteins display strong individual differences in their relative affinities for dyes. It should be appreciated that this problem also significantly impacts other proteomics approaches such as DIGE 2D gel analysis where two samples that are labelled with different dyes are mixed prior to electrophoresis. Colour changes seen with spots evident on a DIGE 2D gel may not be related to differences in protein expression but rather dye binding to individual protein species. Since signalling proteins are typically present at concentrations that are 100- to 1,000-fold lower than structural proteins and metabolic pathway enzymes, these low abundance proteins are usually not evident on 2D gels without some type of special pre-enrichment. This is why we feel that antibody-based detection of proteins with our Kinex™ KAM antibody microarrays and our follow-up Kinetworks™ custom Western blotting services are superior and complementary methods to undertake broad studies of proteins for signalling network analyses.

5. DETECTION OF PROTEIN EXPRESSION AND SITE-SPECIFIC PHOSPHORYLATION WITH THE KAM-1325 ARRAY

Historically, lysate proteins are commonly directly dye-labelled prior to capture on antibody microarrays in most published studies. However, as illustrated in Figure 4, there are many opportunities for false negatives and false positives following standard procedures. Since most proteins reside in complexes, dye signal can also arise from associated proteins (Fig. 4B), from cross-reactivity with off-target proteins that share similar epitopes (Fig. 4C), and from the direct binding of the proteins to other regions in the immobilized capture antibodies (Fig. 4D). A very significant amount of non-specific interactions can arise from direct binding to the dye used to label lysate proteins. False negatives may also be produced, if the epitope on the target protein is masked through interaction with an associated protein (Fig. 4E).

Another problem is that it is critical to remove the free dye after the lysate protein labelling reaction. This usually involves the use of a Sephadex G25 spin-column to resolve the dye-labelled proteins from the remaining, unbound free dye, and the presence of ethanolamine and/or hydroxylamine during the incubation with the antibody microarray to quench any free dye that is unresolved from the dye-labelled proteins following the gel filtration step. However, despite these precautions, we find that there is still some direct dye labelling of the capture antibodies on the microarray, and this can contribute to higher backgrounds for some of the antibodies that are printed in a more concentrated form. However, the bulk of the non-specific binding appears to be primarily mediated through the protein-bound dye that is used to label the lysate proteins or reporter antibodies (Fig. 4D). This can contribute to over 80% of the signal arising from antibody spots on microarrays.

Figure 4. False positive and false negative signals that may be generated with standard antibody microarray protocols.

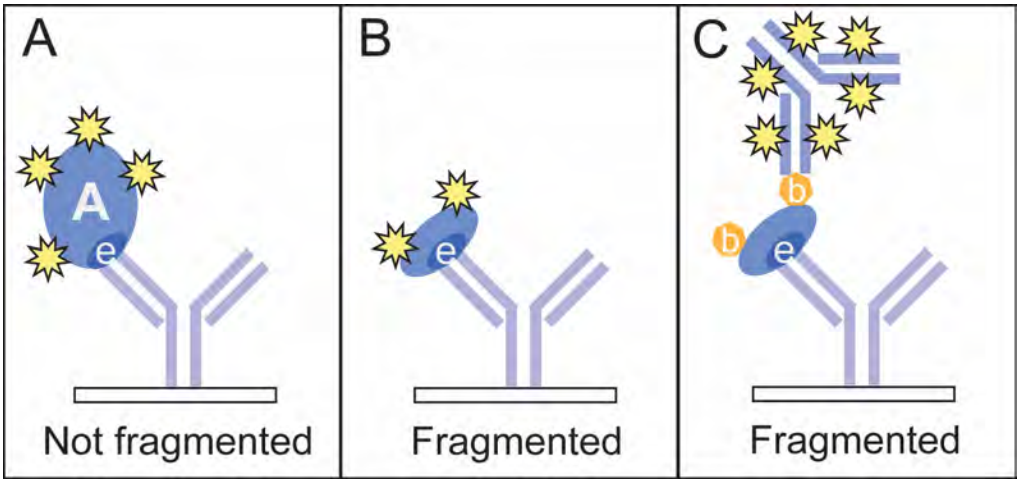


Since non-denatured proteins are commonly analyzed by antibody microarrays historically to preserve antibody-antigen interactions, there is increased opportunity for false positives and false negatives due to antibody cross-reactivity and blocked epitopes in protein complexes. Under non-denaturing conditions, many apparent changes in protein expressions or phosphorylations with antibody microarrays may arise instead from alterations in protein-protein interactions. In our internal studies with cells from different cells, tissues and species, only between 30 to 45% of the protein changes detected on a protein microarray were reproduced by immunoblotting. In addition, about 20 to 30% of the protein changes could not be validated either way by immunoblotting, because no detectable immunoreactive proteins were evident in these studies as antibody microarrays appear to be around 100-times more sensitive than standard Western blotting. It should be appreciated that this high rate of false positives is an inherent problem with all commercial antibody microarrays due to the reliance on non-denaturing conditions for immune capture of target proteins. We believe that all of these various aforementioned issues have compromised much of the findings from the use of antibody microarrays in the past and hindered their adoption.

To help mitigate the problem of target proteins residing in complexes, we have developed a sample preparation method that involves fragmentation of the lysate proteins by chemical cleavage at cysteine (CCC) residues using Tris (2-carboxyethyl) phosphine hydrochloride (TCEP) and 2-Nitro-5-thiocyanatobenzoic acid (NTCB) (Fig. 5). This fragmentation leads to dissociation of complexes, but does not destroy most of the epitopes recognized by pan and phosphosite-antibodies. This is because we avoid the use of cysteine residues in the immunogenic peptides that we use for antibody production. Furthermore, the chemical cleavage step permits more even dye-labelling of the similarly sized target protein fragments that is much less reflective of the initial size of these proteins, which can vary by more than 20-fold.

The CCC treatment not only dissociates protein complexes and cleaves the proteins, but in doing so, it abolishes the activities of endogenous kinases, phosphatases, proteases and other enzymes, resulting in more stable peptide samples and better preservation of protein phosphorylation and other forms of covalent modification. However, it should be appreciated that some epitopes may still be blocked by internal interactions amongst amino acid residue side chains even within the same chemically cleaved fragment; for example, a phosphorylated residue with a neighbouring arginine or lysine residue. The resulting lysate peptide solutions following CCC may be shipped and stored for several weeks at ambient temperature without the need for refrigeration. With this method, CCC treatment is best performed at the time of homogenization of cells and tissues. But CCC can also be carried out at a later date prior to labelling of the lysate proteins with a fluorescent dye. Another advantage of the CCC method, is that the cleavage of lysate proteins reduces competition of different capture antibodies for the same target proteins, since the targeted epitopes may reside in different fragments of the proteins. This results in higher signals for the captured lysate peptides on the microarray that are in low abundance or need to bind to lower affinity antibodies.

Figure 5. Chemical cleavage of lysate proteins at cysteine residues and detection.

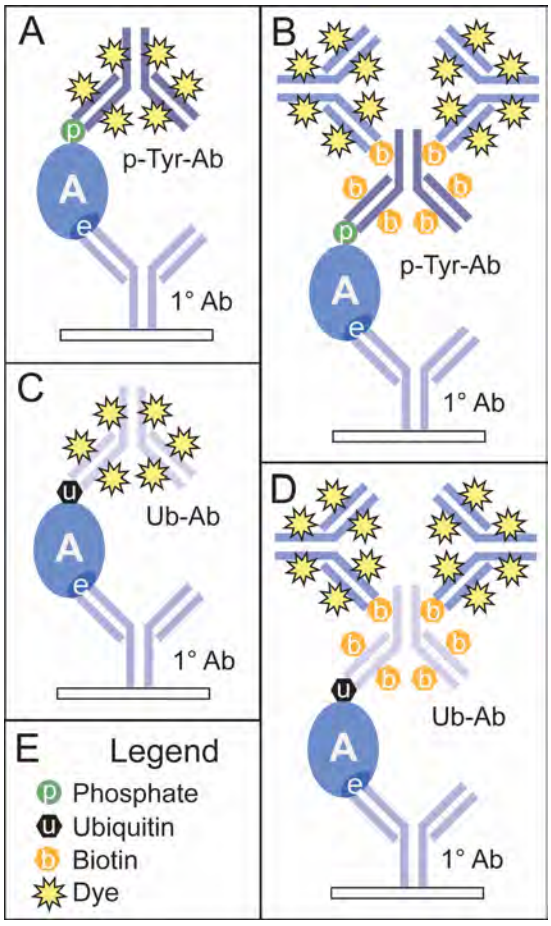


Lysate proteins can be directly labelled with a fluorescent dye after CCC and then captured on the KAM-1325 antibody microarray. However, many of the proteins targeted on the KAM-1325 slide are normally produced at levels that are thousands of times lower than structural proteins and housekeeping metabolic enzymes. Furthermore, most protein phosphorylation, when it occurs in cells, is usually substoichiometric. To improve the sensitivity for detection of low abundance phosphoproteins, we usually tag lysate proteins or peptides with biotin first rather than directly dye labelling them. We find that this produces much lower background signals than observed with the direct-dye labelling approach. After capture of the biotinylated proteins on the microarray, the array is then probed with a dye-labelled anti-biotin antibody. Unlike one of our major competitors, we do not recommend using dye-labelled streptavidin for detection of captured biotinylated proteins, since we have observed a significant amount of non-specific interactions of avidin directly with captured antibodies on our microarrays. Furthermore, since IgG is about three-times larger than streptavidin, this allows for much more dye signal generated from the reporter antibody than from streptavidin. The configuration represented in Figure 5C, with a dye-labelled anti-biotin antibody represents the protocol that we normally follow using the KAM-1325 slide in our services.

6. DETECTION OF COVALENT MODIFICATIONS WITH THE KAM-1325 ARRAY

The Kinex™ KAM-1325 antibody microarray can also be used in a sandwich antibody microarray approach to monitor various types of covalent modifications or protein-interactions of captured lysate protein in complexes following probing of the microarray with an appropriate reporter antibody. It can be more informative not to subject the lysates proteins to chemical cleavage at the time of homogenizing in these instances, since sites of post-translational covalent modification outside of the sequence encompassed by the cleaved peptide fragment with the capture epitope will be lost. However, changes in covalent modification of lysate proteins that are evident following chemical cleavage can help to localize these modifications. For example, captured lysate proteins can be probed with a fluorescent dye-labelled version of our rabbit polyclonal anti-phosphotyrosine antibody PYK (Cat. No. AB-PG001) to reveal changes in total phosphorylation on tyrosine residues (Figure 3). Figure 6 illustrates the expected configurations of primary capture (1° Ab) and reporter antibodies binding to different epitopes on the same target protein using either a phosphotyrosine-specific antibody (Fig. 6A and 6B) or a ubiquitin-specific antibody (Fig. 6C and 6D) as the reporter antibodies. In principle, most generic antibodies for different types of covalent modifications should be compatible with this detection strategy.

Figure 6. Possible configurations for tracking phosphorylation or ubiquitination of lysate proteins with the Kinex™ KAM-1325 antibody microarray. In Panels A and C, the reporter antibody is directly labelled with a fluorescent dye. In Panels B and D, respectively, amplified detection is achieved by using a biotinylated reporter antibody specific for phosphotyrosine (p-Tyr) and ubiquitin, and subsequent probing with a dye-labelled anti-biotin antibody.

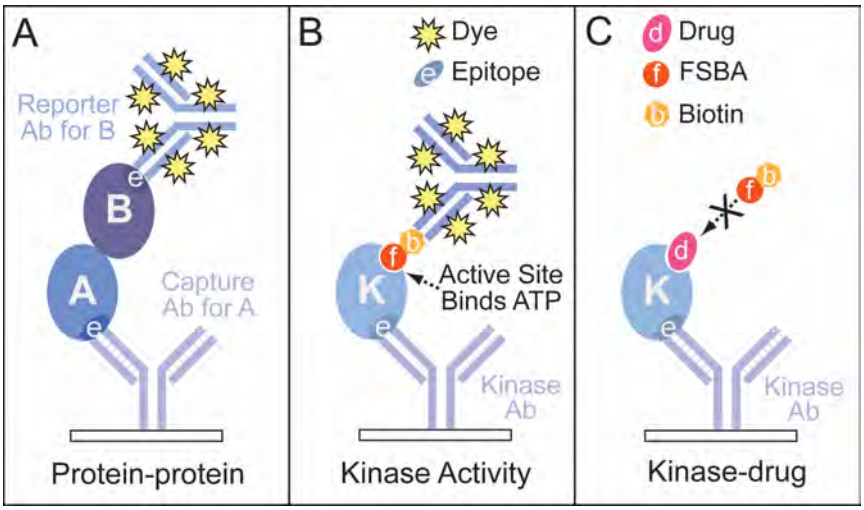


Presently, Kinexus offers our Kinex™KAM-1325-pY Antibody Microarray Services to track global tyrosine phosphorylation of captured cell and tissue lysate proteins on this microarray using the configuration in Fig. 6A. Clients interested in tracking ubiquitination and other types of covalent modifications for which primary antibodies are available should contact our technical services representatives for feasibility and pricing. Appendix 2 provides a sampling of the increases in protein-tyrosine phosphorylation that was evident with more than 200 capture antibodies using the KAM-1325-pY system. It is noteworthy that many of these capture antibodies were specific for tyrosine-phosphorylation sites on their target proteins.

7. DETECTION OF PROTEIN-PROTEIN INTERACTIONS WITH THE KAM-1325 ARRAY

The sandwich antibody microarray format can also be adapted to identify partners of adapter, scaffolding and chaperone proteins, and how these interactions are affected, for example, by diverse treatments of cells in culture. Fig. 7A outlines the possible configuration of capture and reported antibodies for two different proteins that reside in stable complexes. This assay system could be used to investigate how protein-protein interactions may be affected by phosphorylation or other types of covalent modifications. Due to the possible actions of cysteine chemical cleavage conditions to disrupt protein-protein interactions, we strongly recommend not using protein fragmentation conditions for exploring protein complexes. While this methodology for exploring protein-protein interactions on microarrays has not yet really been exploited in the past, we believe that it should prove to be very fruitful.

Figure 7. Possible strategies used with the Kinex™ KAM-1325 antibody microarray to examine protein-protein interactions (Panel A), protein kinase activation (Panel B), and protein kinase-drug interactions. In Panel A, detection of a fluorescent signal denotes the successful interaction of a protein of interest (Protein B) to one of the proteins (Protein A) captured on the antibody microarray. The active site of a captured protein kinase on an antibody microarray can become covalently bound to a biotinylated version of the ATP analogue FSBA if the kinase is in an open, active conformation (Panel B). Preincubation of active, captured protein kinases on antibody microarrays with inhibitory drugs can sterically block subsequent access of the FBSA-biotin probe, and through a reduction of signal from dye-conjugated anti-biotin antibody binding observed in the absence of the inhibitor reveal those kinases that are sensitive to the drug (Panel C).



8. DETECTION OF PROTEIN KINASE ACTIVATION AND DRUG INTERACTIONS WITH THE KAM-1325 ARRAY

Antibody microarrays can be adapted to monitor the activity states of proteins, especially as more biosensor molecules become available that selectively detect the inhibited or activated forms of enzymes. One of the most promising opportunities in this direction is for tracking the activation states of protein kinases. Assaying the enzymatic activity of protein kinases in crude cell and tissue lysates is a formidable task without some sort of affinity purification. At least 536 different human protein kinases are documented on our open-access KinaseNET (www.kinasenet.ca) website, and they have highly overlapping substrate specificities. Approximately 484 typical protein kinases of the human kinome feature a common catalytic domain that includes a highly conserved lysine residue in the kinase subdomain II region in the "AXK" motif, which is located in the active site of these kinases and is critical for phosphotransferase activity by transferring the gamma-phosphate of ATP on to the hydroxyl group of phosphorylatable residues on protein substrates. Affinity labelling with the ATP analogue 5'-(p-flurosulphonylbenzoyl) adenosine (FSBA) inhibits protein kinases by covalently modifying the kinase subdomain II lysine residue. The active site of protein kinases need to be open and accessible for FSBA to bind, so it can be a useful probe to determine whether kinases are in a state when they may be catalytically active. We have successfully used a biotinylated version of FSBA to interrogate the activation states of protein kinases as illustrated in Fig. 7B on our antibody microarrays. Over 330 different protein kinases are targeted on the KAM-1325 antibody microarray, of which 76 are protein-tyrosine kinases.

By using preparations of cell lysates in which the endogenous protein kinases have been preactivated *in vivo*, and able to bind FSBA, it is also feasible to identify subsets of protein kinases that may be sensitive to inhibition by test compounds. As documented in our open-access DrugKiNET website (www.drugkinet.ca), most of the known protein kinase inhibitors bind directly to the active sites of protein kinases, and are partly analogues of ATP. Preincubation of captured protein kinases on an antibody microarray with a kinase inhibitor that occupies the active sites of sensitive kinases will pre-empt the binding of the biotinylated FSBA (Fig. 7C). The reduction of biotinylated FSBA binding to the array can be monitored with dye-labelled anti-biotin antibody. Such approaches could be very useful for counter screening promising kinase inhibitor leads with hundreds of kinases for off target effects. It is also possible that the biotinylated FSBA probe may be helpful for identifying possible peptide and protein substrates of kinases, since the binding of these substrates may also interfere with the interaction with the biotinylated FSBA.

Clients interested in utilizing the KAM-1325 antibody microarrays should directly contact our technical services representatives about these novel applications of our microarrays.

9. KAM-1325 ANTIBODY MICROARRAY REPORTS

The Kinex™ KAM services also permit our clients to move from "pixels" to "pathways". As part of our KAM Antibody Microarray services, Kinexus quantifies the intensities of dye-signals from captured proteins on the KAM Antibody

Microarray using Imagene Version 9.0 software, and then we use our proprietary software to normalize for differences in protein loading and dye-labelling, average the intensities recorded for each duplicate measurement of antibody spots to calculate the differences between the control and treated lysate samples. This includes calculations of percent changes from control (%CFC), and identification of the most promising leads for followup studies such further validation by immunoblotting. The Analysis Report is in PDF and MS-Excel formats.

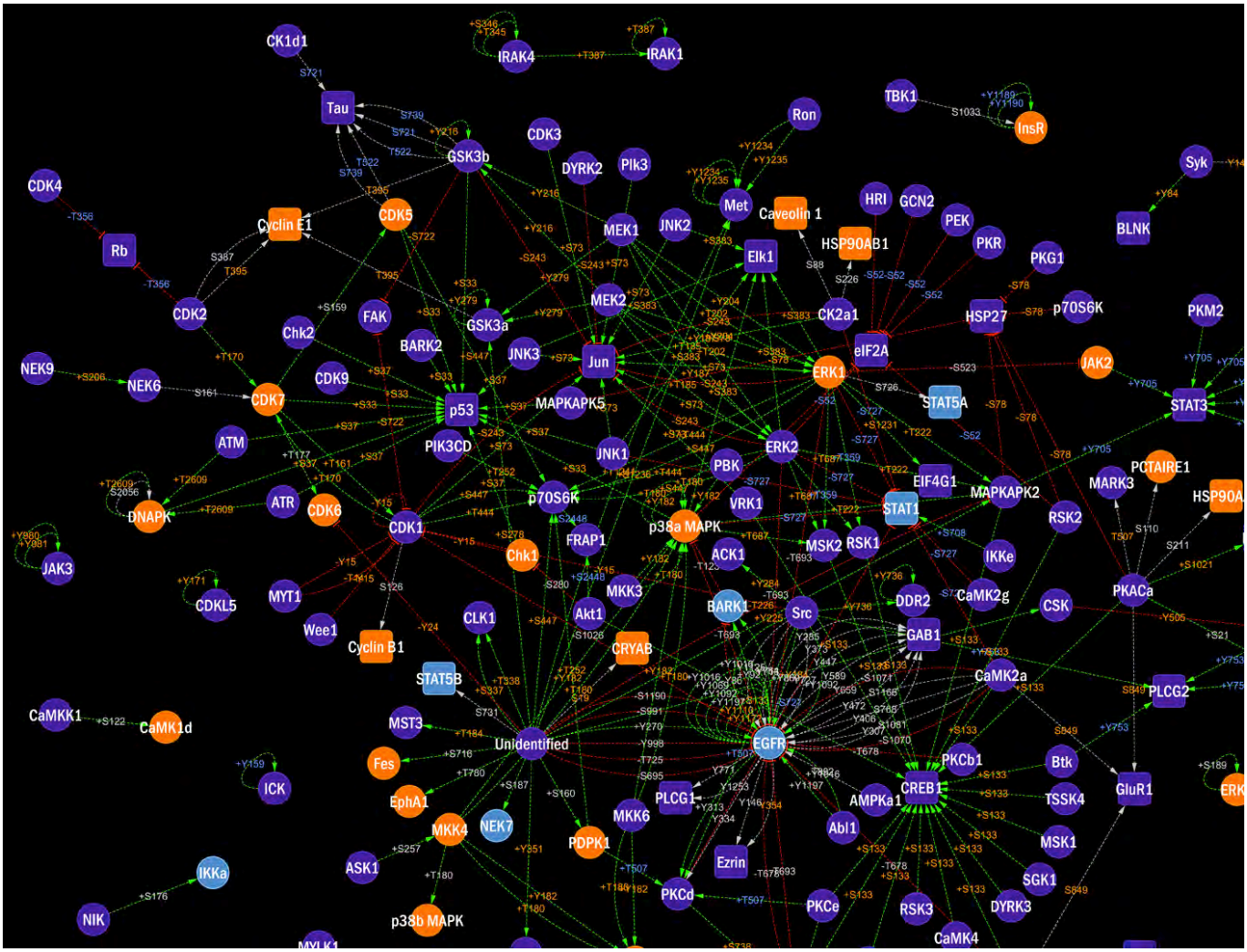
To provide a sense of the typical performance of individual antibodies on the Kinex™ KAM-1325 antibody microarrays and enable comparison of the specific results obtained with a tested customer cell/tissue lysate, our Analysis Report also includes summary data obtained from the analyses of many other different cell or tissue lysates samples with chemical cleavage. This includes the minimum, maximum, average, median and standard deviation values of the globally normalized signal intensities across these other studies. It also indicates which antibodies printed on the KAM-1325 chips can be ordered directly from Kinexus for follow up to experimentally validate key leads from the antibody microarray analyses. The performance of several of the antibodies in previous KAM antibody microarray studies with other experimental model systems is also available for comparison on our www.kinet-am.ca website.

The Analysis Report also provides extensive information of the antibodies deployed on the KAM-1325 microarray and the proteins and phosphosites that they target. This includes direct hyperlinks to our SigNET Knowledgebases (www.phosphonet.ca, www.kinasenet.ca, www.onconet.ca), UniProt, and PhosphoSitePlus. Direct hyperlinks are also provided for downloading over 200 Kinections Pathway Maps (in MS-PowerPoint format) for many of the phosphoproteins and phosphosites tracked on the KAM-1325 antibody microarrays. With the MS PowerPoint format, these Kinections signalling pathway maps can be custom tailored for the specific needs of the users. Clients can also use our open-access KinATLAS website (www.kinatlas.ca) to identify protein-protein interactions between the proteins monitored on our microarrays.

Kinexus also offers our custom KiNetscape Network Mapping service to connect the leads from our Kinex™ KAM-1100 analyses into protein phosphorylation network maps. We have produced a database of over 15,000 experimentally confirmed kinase-substrate relationships (KSR's), for which a specific protein kinase phosphorylates a specific phosphosite in a substrate protein in a KSR. For many of these KSR's, the functional consequence of the phosphorylation is known or highly predictable. These KSR's are available for viewing in the KinaseNET (www.kinasenet.ca) website. For those KSR entries from the KinaseNET database where the effects of a treatment on cells or animals generate significant changes from the antibody microarray analyses, we use the Cytoscape 3.4 program (The Cytoscape Consortium) with our customized settings to rapidly create publishable phosphorylation network maps. Figure 8 shows an example of a portion of a qualitative KiNetscape map. Custom qualitative KiNetscape maps are priced at US$250 each. Clients should directly contact Kinexus for further details if they wish to utilize this service.

Figure 8. KiNetscape qualitative representation of the key EGF-induced changes in protein expression or phosphorylation from a Kinex™ KAM-900P antibody microarray analyses of the lysates from serum-starved A431 cells that were treated without or with 100 ng/ml EGF for 5 minutes. Lysates were prepared by directly homogenizing the cells into CCC buffer and subsequently biotinylated (**Method 4**). Relevant kinase-substrate relationships were imported into the Cytoscape 3.4 program (The Cytoscape Consortium). With this style of protein signalling map, protein kinases are represented with circular icons and other proteins with rounded box icons (nodes). Activating

phosphorylation events are shown with green dotted lines and arrows, inhibitory phosphorylations with red dotted lines and phosphorylations with undefined effects with grey dotted lines (edges). Proteins that showed increased expression changes greater than 45% are coloured orange, but appear blue if there was decreased expression greater than 45%. Protein expression changes less than 45% are not identified and these protein icons are coloured purple. If the phosphorylation of a site on a protein was induced more than 45%, then the text for this phosphosite is coloured orange. If its phosphorylation was reduced more than 45% in response to EGF, the text is colored blue. Changes in phosphorylation less than 45% are not indicated and the text for these phosphosites appears grey. The appearance of a positive or negative sign in front of the phosphorylation site text shows if the site is known to be stimulatory or inhibitory, respectively. A portion of the full map is shown.



10. PRICING INFORMATION

Kinexus offers the Kinex™ services at different pricing levels depending on the level of confidentiality required for your samples. With the full analysis with ~1325 pan-specific antibodies and full confidentiality, our regular price for the Kinex™ KAM-1325 Antibody Microarray Services is US $2996 per slide for two cell or tissue lysate samples submitted and analyzed in duplicate. At this pricing level, only the species needs to be disclosed. To receive a further 35% discount off of these prices (i.e., US $1950) Kinexus requires the Non-Confidential Sample Description Form (NSDF-LY) to be completed in full including species, organ, tissue, cell, cell state, fractionation, perturbation, and treatment for each sample being analyzed. The Kinex™ KAM-1325-pY Antibody Microarray Services are priced at US $2996 for the full Confidential service and US $1996 for the Non-Confidential service. The KAM-1325 antibody microarray is also available in a do-it-yourself kit for US $999 and the followup scanning, quantitation and Analysis Report preparation for US $375.

The philosophy behind the non-confidential data pricing is to accelerate signal transduction research and knowledge within the scientific community. After a one year hold, Kinexus is permitted to post the results of a Non-Confidential analyses on its KiNET-AM website if it chooses to do so. Please note that at any time, clients can change the status of their order from Non-Confidential to Confidential by paying the difference in price. To receive a quotation or for a volume discount on large orders, please contact the Director of Sales & Marketing at 1-866-KINEXUS or 1-604-323-2547 (Extension 11) or e-mail sales@kinexus.ca .

11. FOLLOW-UP SERVICES

We highly recommend that all interesting leads generated with the Kinex™ KAM-1325 Antibody Microarray should be validated by Western blotting before proceeding to other follow-up work. Such validation is really essential with any commercial or custom produced antibody microarray. To assist in this regard, Kinexus offers two convenient and cost-effective custom immunoblotting services.

Clients can use the Kinetworks™ Custom KCPS 1.0 (Multi-Antibody) Protein Screen, where any 18 antibodies used on the KAM-1325 chip can be selected, and we can test whether they correctly detect their target proteins and phosphosites in your experimental model system. If there are a large number of lysate samples to test, it is often advisable to have a pre-screen performed where equal aliquots of sample lysates are pooled and then tested to confirm the antibodies are detected on a Western blot. Alternatively, with the Kinetworks™ Custom KCSS 1.0 (Multi-Sample) Protein Screen, up to 8 different samples can be probed with up to 3 different antibodies, provided the molecular masses are significantly separated by SDS-PAGE. Lysate samples for Kinetworks™ analyses may be shipped without refrigeration to Kinexus if they are boiled and stored in SDS-PAGE sample buffer. More information about these Kinetworks™ services and the necessary forms can be download from our website at http://www.kinexus.ca/ourServices/immunoblotting/custom_profiling/custom_profiling.html

The availability of these Kinetworks™ Custom screens is another important distinguishing feature of our antibody microarray services as clients can have their research leads conveniently and cost-effectively confirmed. The cost savings arising from the use of the Kinexus discovery platform becomes immediately apparent when one considers the purchase costs of individual antibodies and the labour necessary to confirm key antibody results obtained with other antibody microarrays. In addition, once the results are confirmed by Western blotting, clients can correlate their data with thousands of other data points from hundreds of different model systems using our KiNET-AM database, which contain the results from thousands of previous Kinex™ Antibody Microarray analyses. Over 500 scientific publications have been published that reference the Kinexus Services, of which more than 150 are directly related to the Kinex™ Antibody Microarray Services.

In addition to the Kinetworks™ Custom Immunoblotting Services to validate leads, Kinexus can assist with many other aspects of your research project from start to finish. Other services that can be used in combination with our Kinex™ Antibody Microarray services include the following:

- *In vivo* services – send us your experimental compounds, proteins or oligonucleotides and we will perform the treatment of cells according to your specification and generate lysates for testing with our microarrays;
- Tissue or cell pellet processing – send us your cell pellets or tissues and we will prepare lysates for you;
- Mass spectrometry identification of antibody cross-reactive proteins;
- Custom Graphics – we can prepare pathway charts and bar graphs for your scientific publications;
- Custom Antibody Microarrays – we can print custom microarrays with hundreds of antibodies selected from our antibody library or supplied by you for your own internal research programs;
- Custom Antibody Macroarrays – we can print custom nitrocellulose or glass slide arrays with 10 to 100 or more antibodies from our antibody library or provided by you;

- Custom Reverse Phase Lysate Microarrays – we can print custom microarrays with hundreds of cell or tissue lysates to allow for further evaluation of the biological robustness of biomarkers identified through our Kinex™ Antibody Microarray services. These can be sourced from Kinexus or supplied by you;
- Custom Lysate Macroarrays – we can print custom nitrocellulose or glass slide arrays with 10 to 100 or more cell/tissue lysates slected from our library or supplied by you; and
- Kinase and phosphatase substrate or compound inhibitor profiling services with more than 450 active protein kinases and phosphatases to choose from.

Kinexus also offers free services and open access on-line databases to clients which include the following:

- KiNET™ Antibody Microarray (KiNET-AM) DataBase (www.kinet-am.ca) – clients can directly compare their Kinex™ Antibody Microarray results with lysates from thousands of other experimental model systems analysed with the same methodology;
- PhosphoNET KnowledgeBase (www.phosphonet.ca) – clients can compare interesting phosphosites identified by our microarrays with over 180,000 confirmed and 790,000 additional predicted human phosphosites to learn about their evolutionary conservation in up to 20 different species as well as the top 50 kinases predicted to phosphorylate these sites;
- KinaseNET KnowledgeBase (www.kinasenet.ca) – clients can retrieve comprehensive information on over 536 human protein kinase.
- DrugKiNET KnowledgeBase (www.drugkinet.ca) – clients can identify the most potent inhibitors experimentally verified for all of the human protein kinases tracked on our microarrays as well as predicted inhibitors for off target kinases.
- OncoNET KnowledgeBase (www.onconet.ca) – clients can obtain information about the expression and mutation of many of the proteins tracked on our microarrays in diverse types of human cancers.
- TranscriptoNET KnowledgeBase (www.transcriptonet.ca) – clients can compare expression levels identified by our microarrays with the mRNA levels for over 20,000 human genes in 600 different human organs, tissues and cell lines.
- KinATLAS (www.kinatlas.ca) - clients can identify protein-protein interactions in a cell and tissue specific manner with this pathway mapping site that also tracks kinase-drug interactions.

12. QUANTITY OF LYSATE

The amount of protein recommended for the Kinex™ KAM-1325 Antibody Microarray services is 200 μg per sample at an approximate concentration of 2-3 mg/ml. If your samples have a higher concentration, we recommend sending it without further dilution and Kinexus will adjust the concentration as required during processing. In this case, we prefer a minimum volume of approximately 50 μl. If your samples have a lower concentrations, there are alternate steps that can be undertaken for ensuring optimum results. This includes concentrating your samples or providing additional dye-labeling reactions to your samples. We have been able to successfully use 50 μg or less with our microarrays where the amount of sample has been limiting. Please contact a Kinexus Technical Service Representative for more information on how to proceed and the additional costs involved if your sample concentrations are too low.

13. LYSIS BUFFER

The standard ingredients for our lysis buffer are listed below, however other lysis buffers commonly used for protein lysate preparation with non-ionic detergents should be compatible with the service. **However any lysis buffers containing Tris or reagents carrying reactive amine groups are not acceptable alternatives**. These will interfere with lysate protein labelling. Please contact Kinexus for more information on the appropriate types of lysis buffers to use or email info@kinexus.ca to request an aliquot of our lysis buffer to be sent at no cost. We only require a courier account number to cover the shipping expenses. Your cell pellets or tissues should be homogenized in ice-cold lysis buffer.

The reagents in the Kinexus Lysis Buffer (pH 7.2) include:

1. 20 mM MOPS (pH 7.0)
2. 2 mM EGTA (to bind calcium);
3. 5 mM EDTA (to bind magnesium and manganese);
4. 50 mM sodium fluoride (to inhibit protein-serine phosphatases);
5. 60 mM β-glycerophosphate, pH 7.2 (to inhibit protein-serine phosphatases);
6. 25 mM sodium pyrophosphate (to inhibit protein-serine phosphatases);
7. 5 mM sodium orthovanadate (to inhibit protein-tyrosine phosphatases);
8. 50 nM phenylarsine oxide
9. 1% Triton X-100 * (can be substituted with 1% Nonidet P-40)
10. 0.05% sodium dodecylsulphate (SDS)

NOTE: *Detergents (Triton X-100 and SDS) are required for preparing total detergent-solubilized lysates. The detergents should be omitted from the lysis buffer if a subcellular fractionation is to be performed.*

For chemical cleavage harvesting only:

10. 10 mM TCEP (Tris(2-carboxyethyl)phosphine hydrochloride)
11. 100 mM NTCB (2-nitro-5-thiocyanatobenzoic acid) (added after sonication)

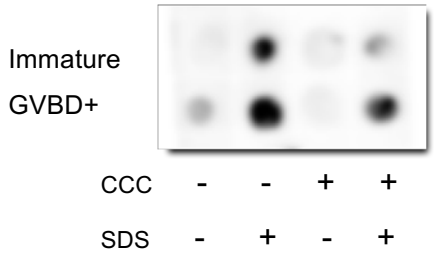
Protease Inhibitors and Dithiothreitol

12. 0.5 μM aprotinin (to inhibit proteases);
13. 3 mM benzamidine (to inhibit proteases);
14. 1 mM Petabloc (to inhibit proteases);
15. 10 μM leupeptin (to inhibit proteases); and
16. 1 mM dithiothreitol (to disrupt disulphate bonds).

The protease inhibitors and dithiothreitol (DTT) must be added to lysis buffer immediately before use and samples should be processed as quickly as possible. Not all protease inhibitors are required, but it is optimal to use as many as possible. For convenience, the Roche Complete Mini Inhibitor Cocktail tablet can be used to replace the individual protease inhibitors. If the lysate proteins are to remain in their native structure and not denatured, the chemical cleavage step should not be used, and the samples must be frozen and shipped to Kinexus on dry ice. Samples that have been subjected to chemical cleavage or homogenized directly into 1X SDS-PAGE sample buffer can be sent to Kinexus without the need for refrigeration or freezing during shipping.

Note that if the samples are only subjected to chemical cleavage at the time of lysate preparation, it is still feasible for us to perform dot blotting with the chemical cleaved lysates to evaluate whether a treatment was effective in producing a change in the expression or phosphorylation of a marker protein such as ERK2 MAP kinase. Chemically-cleaved lysate samples are unsuitable for SDS-PAGE and Western blotting. However, they can be used for Bradford Protein assays, provided that the carry over of detergent is compensated for in derivation of the protein standard curve for bovine serum albumin, since these components can interfere with this protein assay. Figure 9 below shows the stimulation of ERK1 phosphorylation during meiotic maturation of sea star oocytes on a dot blot.

Figure 9. ERK2 pT185+pY187 phosphosite-specific antibody dot blot of lysates from sea star oocytes that have been induced to undergo meiotic maturation. Lysates from immature oocytes (blocked at prophase) and maturing oocytes (treated with 10 µM 1-methyladenine for 60 minutes) were spotted onto a nitrocellulose membrane following incubations with and without cysteine chemical cleavage (CCC) for 30 min at 45°C, and with and without the addition of 1% sodium dodecylsulphate (SDS) prior to deposition. This antibody (Cat. No. AB-PK621) cross-reacts with ERK1, which undergoes increased phosphorylation during oocyte maturation at the time of germinal vesicle breakdown (GVBD).



Important points to remember include:

1. The cells or tissues should be processed quickly at 4°C or less if the samples are not subjected to cysteine chemical cleavage at the time of homogenization. This is especially critical for detection of protein-tyrosine phosphorylation with the KAM-1325-pY analyses;
2. Add the protease inhibitors and DTT to the lysis buffer just before processing samples;
3. Ensure the contents are completely dissolved and store on ice;
4. Homogenization should be performed in small volumes of lysis buffer to obtain protein lysates at high concentrations, ideally at 2-3 mg/ml or higher. The concentrations can be diluted later if required;
5. The detergent-soluble fraction should be obtained as quickly as possible after the cells or tissues are homogenized;
6. Sonication is required for optimal results (do not over sonicate);
7. The highest centrifugal forces available should be used to generate the detergent-soluble fraction;
8. The supernatants should be frozen as quickly as possible if a protein assay cannot be performed immediately. Lysates should be stored at -70°C, unless these have been subjected to chemical cleavage or processed in SDS-PAGE sample buffer.
9. We recommend harvesting cells and tissues with the chemical cleavage reagents (TCEP and NTCB) to help reduce the number of false positives that can arise from the use of non-denatured proteins on the antibody microarray. If you choose to prepare samples without the chemical cleavage method, then omit the sections below outlined in red. However, you should let us know and we can include the chemical cleavage step for you prior to probing your lysates on the microarray. Note that the best results are obtained if the chemical cleavage is performed during initial lysate preparation.

14. FRACTIONATIONS

There are many different types of fractionations that can be performed, and the choice of lysis buffer used will vary depending on the type of fractionation you are considering to prepare. The simplest type of lysate preparation is the total cellular extract obtained as a total detergent-solubilized fraction. To obtain just the soluble cytoplasmic proteins, detergent should not be included in the homogenizing buffer. The remaining microsomal pellet obtained following ultracentrifugation after removal of the cytoplasmic supernatant fraction can be re-sonicated in homogenizing buffer with detergent and re-ultracentrifuged to obtain the detergent-soluble membrane fraction.

Total Cellular Extract:

For quantitation of total cellular levels of cell signalling proteins, lysis and homogenization should be performed in the presence of a non-ionic detergent and a low concentration (0.05%) of an anionic detergent such a SDS. We recommend the use of 1% Triton X-100 or 1% Nonidet P40, but comparable detergents are acceptable. This is the most common type of fractionation prepared by clients and is optimal for monitoring changes in total protein expression. However, if proteins are re-distributed between cellular compartments as a consequence of a perturbation of an experimental model system, this will not be evident.

Subcellular Fractionation:

Detergents should be omitted from the homogenization buffer if the subcellular distribution of cell signalling proteins is to be examined. If a particulate-solubilized fraction is to be analyzed, a microsomal pellet should be obtained

following the initial homogenization and ultracentrifugation in the absence of detergent and subsequent removal of the cytosolic supernatant. In this instance, the cytosolic extract should be removed and the microsomal pellet should then be resuspended in the homogenization buffer with 0.05% SDS containing 1% Triton X-100 or 1% Nonidet P-40 and subjected to homogenization and ultracentrifugation once again. The resulting detergent-solubilized microsomal fraction should be removed and immediately assayed for its protein concentration.

Other Fractionations:
At this time, we do not recommend you send samples from immunoprecipitation or antibody affinity pull-down experiments for the Kinex™ KAM Antibody Microarray Services unless you consult with us first.

15. PROTEIN LYSATE PREPARATION WITH AND WITHOUT CHEMICAL CLEAVAGE

The optimum amount of protein recommended for the Kinex™ KAM-1325 Antibody Microarray is 200 μg per sample at a concentration of 3.0 mg/ml or higher. We recommend preparing extra lysate, if possible, for follow-up studies. If the concentration of the lysate is below 2.0 mg/ml concentration, the sample can be concentrated using an Amicon Ultra-0.5 Ultracel-3 Membrane Centrifugal Filter with a M.W. cut-off of 3,000 (Catalog Number: UFC500308, Millipore, Billerica, MA). For more information about how to concentrate samples, please contact a Kinexus Technical Services representative at info@kinexus.ca or call 1-866-546-3987. It is possible to obtain reliable results with as little as 50 μg of lysate protein sample is the tissue or cell extract is limiting.

It is highly recommended to use the Kinexus Lysis Buffer included with this kit for protein lysate preparation, as it has been optimized for the use with KAM Antibody Microarray as well as any follow-up services. Other lysis buffers commonly used for protein lysate preparation containing detergents may be compatible with the KAM-Antibody Microarray. **However, no lysis buffer containing Tris or reagents carrying reactive amine groups such as glycine and ammonia should be used to prepare lysates for the KAM Antibody Microarray as these may interfere with the protein labelling.** The Kinexus Lysis Buffer contains phosphatase inhibitors and the Lysis Buffer Cocktail contains protease inhibitors and DTT. Immediately prior to use, transfer the content of the Kinexus Lysis Buffer into the Lysis Buffer Cocktail. Invert the tube several times to make sure the contents are completely dissolved and store on ice. Prepare the cell or tissue lysates according to protocols listed below. The resulting protein lysate samples prepared must be frozen at -70°C or below after protein quantification unless they are to be immediately subjected to protein labelling and purification.

It is also highly recommended to harvest cells and tissues at the time of homogenization with the chemical cleavage reagents (TCEP and NTCB) to help reduce the number of false positives that can arise from the use of non-denatured proteins on the antibody microarray. Samples prepared with the cysteine chemical cleavage (CCC) method are stable at room temperature for at least 2 weeks. Use the appropriate set of instructions that follow depending on the type of cells or tissues to be analyzed and whether the CCC method is desired or not.

A) Preparation of Lysates from Cells with Chemical Cleavage

i) Adherent Cells:

1. Remove medium from culture dishes containing approximately 1×10^6 to 2×10^6 cells for each sample to be analyzed using the KAM-1325 microarray.
2. Rinse the cells in the dishes twice with ice-cold Phosphate Buffered Saline (PBS) to remove medium residue (serum must be completely removed) and aspirate as much PBS as possible after the last rinse.
3. Mix the components in the **Kinexus Lysis Buffer** as listed in Section 11. Invert the tube several times to ensure the contents are completely dissolved and store on ice. Add 200 µl of the ice-cold Kinexus Lysis Buffer to a 150-mm culture dish, or add 100 µl ice-cold Kinexus Lysis Buffer to a 100-mm culture dish. Also, add 25 µl of 10 mM TCEP to 500 µl of lysis buffer for a final concentration of 0.5 mM TCEP. Adjust the pH of the lysis buffer containing 0.5 mM TCEP to pH 9 (approximately 2 µL of 10 N NaOH per 1 mL buffer).
4. Scrape the cells in Kinexus Lysis Buffer, collect the resulting cell suspension from dishes and transfer it into a 1.5-ml microcentrifuge tube. Check to make sure that the pH is 9.0.
5. Sonicate using a microprobe sonicator 4 times for 10 seconds each with 10-second intervals on ice to rupture the cells and to shear nuclear DNA. Alternatively, passing the cell suspension through a 26-gauge needle until the sample is no longer viscous is also acceptable if a sonicator is not accessible. This step is crucial and cannot be omitted. Add 6 µL of 100 mM NTCB per 100 µL cell homogenate for a final concentration of 6 mM NTCB, and make sure that the pH is 9.0 and adjust with 10 N NaOH if necessary). Incubate the homogenate at 45°C in a water bath for 30 minutes.
6. Centrifuge the resulting lysate homogenate at 90,000 x g or above for 30 minutes at room temperature in a Beckman Table Top TL-100 ultracentrifuge, Beckman Airfuge or equivalent. Alternatively, clearing homogenates at maximum speed (15,000-17,000 rpm) on a benchtop microcentrifuge for 30 minutes at room temperature is also acceptable.
7. Transfer the resulting supernatant to a new 1.5-ml microcentrifuge tube.
8. Remove a small aliquot and determine its protein concentration using a commercial Bradford assay reagent (available from Bio-Rad, catalogue number 500-0201) or following the standard protocol of Bradford (Bradford, M.M. (1976) A rapid and sensitive method for quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. Anal. Biochem. 72:248-254). Bovine serum albumin (BSA) is used as the protein standard. The protein concentration obtained should be approximately 3.0 mg/ml or higher. If the concentration obtained is less than 1.0 mg/ml, samples should be concentrated using an Amicon Ultra-0.5 Centrifugal Filter (Millipore).
9. Check the pH of the lysates and adjust to pH 7.0-7.4 with 1 M HCl if necessary. Aliquot and set aside 200 µg for each lysate to be analyzed with the KAM-1325 chip.
10. If you wish to have Kinexus perform the custom immunoblotting follow-up analysis, aliquot 350-500 µg of cell lysate for each 18 antibodies to be tested, and boil in SDS-Sample Buffer following the protocols specified on our website. Note that such lysates must be from cells that are not subjected to cysteine chemical cleavage during homogenization and sample preparation. Chemically cleaved lysates are stable at ambient temperature for more than 2 weeks. Store any remaining lysates at -70°C for subsequent validation studies.

ii) Suspension Cells:

1. Transfer cells with medium from cell culture flasks into appropriate sized tubes and centrifuge at 500 x g for 2 minutes at 4°C in a swinging bucket benchtop centrifuge. Remove as much medium from the cell pellet as possible without disrupting cells.
2. Wash the pellet by gently resuspending the cells in ice-cold PBS, followed by centrifugation as above. Repeat this step once to ensure complete removal of serum. Remove as much PBS as possible after the final wash.
3. Mix the components in the **Kinexus Lysis Buffer** as listed in Section 11**.** Invert the tube several times until dissolved and store on ice. Add 25 µl of 10 mM TCEP to 500 µl of lysis buffer for a final concentration of 0.5 mM TCEP, and adjust the pH to 9 (which is approximately 2 µL of 10 N NaOH per 1 mL buffer). Add an adequate amount of the ice-cold Kinexus Lysis Buffer to the sample based on the number and type of cells to achieve a final total protein concentration of approximately 3.0 mg/ml.
4. Follow Steps # 5 through 10 as described in the Adherent Cells Section above.

B) Preparation of Lysates from Cells without Chemical Cleavage

i) Adherent Cells:

1. Remove medium from culture dishes containing approximately 1×10^6 to 2×10^6 cells for each sample to be analyzed using the KAM-1325-pY microarray.
2. Rinse the cells in the dishes twice with ice-cold Phosphate Buffered Saline (PBS) to remove medium residue (serum must be completely removed) and aspirate as much PBS as possible after the last rinse.
3. Mix the components in the **Kinexus Lysis Buffer** as listed in Section 11. Invert the tube several times to ensure the contents are completely dissolved and store on ice. Add 200 µl of the ice-cold Kinexus Lysis Buffer to a 150-mm culture dish, or add 100 µl ice-cold Kinexus Lysis Buffer to a 100-mm culture dish.
4. Scrape the cells in Kinexus Lysis Buffer, collect the resulting cell suspension from dishes and transfer it into a 1.5-ml microcentrifuge tube.
5. Sonicate using a microprobe sonicator 4 times for 10 seconds each with 10-second intervals on ice to rupture the cells and to shear nuclear DNA. Alternatively, passing the cell suspension through a 26-gauge needle until the sample is no longer viscous is also acceptable if a sonicator is not accessible. This step is crucial and cannot be omitted.
6. Centrifuge the resulting lysate homogenate at 90,000 x g or above for 30 minutes at 4°C in a Beckman Table Top TL-100 ultracentrifuge, Beckman Airfuge or equivalent. Alternatively, clearing homogenates at maximum speed (15,000-17,000 rpm) on a benchtop microcentrifuge for 30 minutes at 4°C is also acceptable.
7. Transfer the resulting supernatant to a new 1.5-ml microcentrifuge tube. The following steps should be performed as quickly as possible with the supernatant fraction kept in an ice bath.
8. Remove a small aliquot and determine its protein concentration using a commercial Bradford assay reagent (available from Bio-Rad, catalogue number 500-0201) or following the standard protocol of Bradford (Bradford, M.M. (1976) A rapid and sensitive method for quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. Anal. Biochem. 72:248-254). Bovine serum albumin (BSA) is used as the protein standard. The protein concentration obtained should be approximately 3.0 mg/ml or higher. If the concentration

obtained is less than 1.0 mg/ml, samples should be concentrated using an Amicon Ultra-0.5 Centrifugal Filter (Millipore).

9. Aliquot and set aside 200 μg for each lysate to be analyzed with the KAM-1325-pY chip.
10. Store any remaining lysates at -70°C for subsequent validation studies. If you wish to have Kinexus perform the custom immunoblotting follow-up analysis, aliquot 350-500 μg for each 18 antibodies to be tested, and boil in SDS-Sample Buffer following the protocols specified on our website. Label and freeze remaining lysates.

ii) Suspension Cells:

1. Transfer cells with medium from cell culture flasks into appropriate sized tubes and centrifuge at 500 x g for 2 minutes at 4°C in a swinging bucket benchtop centrifuge. Remove as much medium from the cell pellet as possible without disrupting cells.
2. Wash the pellet by gently resuspending the cells in ice-cold PBS, followed by centrifugation as above. Repeat this step once to ensure complete removal of serum. Remove as much PBS as possible after the final wash.
3. Mix the components in the **Kinexus Lysis Buffer** as listed in Section 11**.** Invert the tube several times until dissolved and store on ice. Add an adequate amount of the ice-cold Kinexus Lysis Buffer to the sample based on the number and type of cells to achieve a final total protein concentration of approximately 3.0 mg/ml.
4. Follow Steps # 5 through 10 as described in the Adherent Cells Section above.

C) Preparation of Lysates from Tissues with Chemical Cleavage

1. Mix the components in the **Kinexus Lysis Buffer** as listed in Section 11**.** Add 25 μl of 10 mM TCEP to 500 μl of lysis buffer for a final concentration of 0.5 mM TCEP. Invert the tube several times until dissolved and adjust the pH of the lysis buffer containing 0.5 mM to pH 9 (which is approximately 2 μL of 10 N NaOH per 1 mL buffer) and store on ice. Use approximately 1 ml of the Kinexus Lysis Buffer per 250 mg wet tissue.
2. Cut the tissue into smaller pieces and rinse them in ice-cold PBS three times to remove any blood contaminants.
3. Homogenize the tissue on ice with 15 strokes of a glass douncer (or 3 times for 15 seconds each time with a Brinkman Polytron Homogenizer or with a French Press as alternative).
4. Sonicate the homogenate 4 times for 10 seconds on ice each time to shear nuclear DNA.
5. Add 6 μL of 100 mM NTCB per 100 μL cell homogenate for a final concentration of 6 mM NTCB, and adjust the pH to 9.0 with 10 N NaOH if necessary. Incubate the homogenate at 45°C water bath for 30 minutes.
6. Centrifuge the homogenate at 90,000 x g or higher for 30 minutes at room temperature in a Beckman Table Top TL-100 ultracentrifuge, Beckman Airfuge or equivalent. Alternatively, clients can also centrifuge at maximum speed (15,000 – 17,000 rpm) on a benchtop microcentrifuge for 30 minutes at room temperature.
7. The following steps should be performed as quickly as possible once the supernatant fraction is obtained. Check that the pH of the lysates, which should be close to neutral (pH 7.0-7.4) and adjust with 1 M HCl if necessary.
8. Transfer the resulting supernatant fraction to a new tube and subject it to a protein assay using a commercial Bradford assay reagent or using the standard protocol of Bradford. BSA should be used as the protein standard. The protein concentration obtained should be approximately 15-20 mg/ml or higher, but a final concentration of only 3 mg/ml for the antibody microarray is needed. If the concentration obtained is less than 1.0 mg/ml, samples should be concentrated using an Amicon Ultra-0.5 Centrifugal Filter (Millipore).

8. Aliquot 200 μg for each lysate to be analyzed with the KAM-1325 antibody microarray.
9. Chemically cleaved lysates are stable at ambient temperature for at least 2 weeks. Store any remaining lysates at -70°C for subsequent validation studies.

D) Preparation of Lysates from Tissues without Chemical Cleavage

1. Mix the components in the **Kinexus Lysis Buffer** as listed in Section 11**.** Invert the tube several times until dissolved and store on ice. Use approximately 1 ml of the Kinexus Lysis Buffer per 250 mg wet tissue.
2. Cut the tissue into smaller pieces and rinse them in ice-cold PBS three times to remove any blood contaminants.
3. Homogenize the tissue on ice with 15 strokes of a glass douncer (or 3 times for 15 seconds each time with a Brinkman Polytron Homogenizer or with a French Press as alternative).
4. Sonicate the homogenate 4 times for 10 seconds on ice each time to shear nuclear DNA.
5. Centrifuge the homogenate at 90,000 x g or higher for 30 minutes at 4°C in a Beckman Table Top TL-100 ultracentrifuge, Beckman Airfuge or equivalent. Alternatively, clients can also centrifuge at maximum speed (15,000 – 17,000 rpm) on a benchtop microcentrifuge for 30 minutes at 4°C. The following steps should be performed as quickly as possible once the supernatant fraction is obtained.
6. Transfer the resulting supernatant fraction to a new tube, which is kept in an ice bath, and subject it to a protein assay using a commercial Bradford assay reagent or using the standard protocol of Bradford. BSA should be used as the protein standard. The protein concentration obtained should be approximately 15-20 mg/ml or higher. If the concentration obtained is less than 1.0 mg/ml, samples should be concentrated using an Amicon Ultra-0.5 Centrifugal Filter (Millipore).
7. Aliquot 200 μg for each lysate to be analyzed with KAM-1325 and keep it on ice if it is to be used immediately.
8. Store any remaining lysates at -70°C for subsequent validation studies. Label the microcentrifuge tubes and freeze them immediately.

E) Additional Notes for KAM-1325 Lysate Preparation

1. Note all cell lines are different so the suggested number of 1×10^6 to 2×10^6 cells for each sample is an estimate based on commonly used cell lines. For the validation immunoblotting service, you will need to prepare about 10 times more cells (1×10^7 to 2×10^7 cells).
2. Cells or tissues should be processed in a timely fashion at 4°C or below if the chemical cleavage step is not used.
3. The Kinexus Lysis Buffer with its phosphatase and protease inhibitors should be completely dissolved and kept over ice just prior to use.
4. Protein concentration of each sample should preferably be at or above 3.0 mg/ml.
5. 200 μg of lysate is recommended to be used, especially with the KAM-1325-pY chip, since the phosphorylation of target proteins at specific sites is often found with very low stoichiometry. However, if sample material is difficult to obtain, as little as 50 μg of lysate has been successfully used. (Note: The same amount of protein from each sample to be analyzed together must be applied to each microarray for optimal comparison purposes).

6. To minimize the volume and maximize the protein concentration of lysates, the lysis buffer used to recover the scraped cells from a culture dish can be transferred to the next dish if multiple dishes of cells for the same sample are to be used for lysate preparation. It is advised to use the *minimal amount* of lysis buffer for lysate preparation to achieve the protein concentration required for the KAM-1325 antibody microarray analysis.
7. Nuclear DNA shearing by sonication or needle passing is necessary and cannot be omitted.
8. The highest centrifugal forces achievable on a microcentrifuge should be used to prepare the detergent-soluble fraction.
9. Detergents should be initially omitted from the lysis buffer if a particulate-solubilized fraction is to be prepared and analyzed.
10. Supernatants should be separated from pelleted precipitates and frozen as quickly as possible if the chemical cleavage is not performed. Removal of an aliquot for the protein assay is suggested so that the bulk of the lysate sample can be frozen quickly to preserve the phosphorylation state of the proteins in the extract.

Once we have received your lysate samples at Kinexus, they will undergo extensive processing according to your specifications. To get a sense of how they might be handled, demonstration videos are also available for viewing on our company's You-Tube Channel at https://www.youtube.com/channel/UC_GL-BCsGRrnKiQ_6qV1jeA

16. PREPARATION OF CELL AND TISSUE PELLETS

An additional charge of $200 per sample will apply for submission of cell pellets to be processed at Kinexus. A sufficient number of cells (>2 x 10^6 cells) should be provided for each sample to be subjected to KAM-1325 analysis. If Kinetworks™ multi-immunoblotting is desired for validation of the KAM-1325 results, the number of cells required is ten-fold higher (>2 x 10^7 cells).

A) Adherent Cells

1. Remove the medium and rinse the cells in dish with ice-cold PBS once;
2. Detach cells with trypsin as one does in passaging cells or scrape the cells with a rubber policeman, followed by the addition of equal volume of medium;
3. Collect cells in a 15-ml conical tube and centrifuge at 500 x g for 2 minutes at 4°C in a swinging bucket benchtop centrifuge;
4. Wash the pellet twice with ice-cold PBS thoroughly, (the presence of serum from medium could skew the protein assay) and remove as much PBS as possible (the presence of liquid residue dilutes the sample and may also result in the damage of cells during freezing process); and
5. Freeze the pellets for shipping. Pellets must be shipped on dry ice.

B) Suspended Cells

Simply follow Steps 3-5 above for "*A) Adherent Cells"* and freeze the cell pellet immediately. Pellets must be shipped on dry ice.

C) Tissues

An additional charge of $200 per sample will apply for submission of tissue samples to be processed at Kinexus. Freshly harvested tissues are preferred if possible. When harvesting, the tissues should be cut into small pieces on the surface. Wrap the tissues individually in tinfoil and snap freeze them in liquid nitrogen for 10 minutes before storing them at -80 °C. The tissues should be shipped on dry ice.

Shipping Information

17. STORAGE OF SAMPLES

The final protein concentration of the cell/tissue samples should be approximately 3 mg/ml. Please record the actual concentration and volume of each sample on the Sample Description Form (KAM-NSDF or KAM-CSDF). We request ideally **300 µg** of cell or tissue lysate for each sample submitted for analysis with the Kinex™ Antibody Microarray. (If possible, it is also recommended to send an additional 10-15 µL aliquot of each sample specifically for the Bradford assay). It is possible to use as little as 50 µg of lysate protein for our analyses.

If any of our custom validation immunoblotting studies are to be performed based on the analysis of your Kinex™ results, we recommend sending additional lysate at this time to save on future shipping costs. We need ~350-500 µg of additional material for every 18 antibodies selected for validation Western blotting.

Samples should be stored in screw cap vials. The vials should be clearly labelled with an indelible marker with a unique identification number, parafilmed to protect against leakage, and put into another support structure such as a small box or a 50-ml conical or centrifuge tube to provide extra protection during shipping. **All samples that have not been subjected to chemical cleavage at the time of homogenization or prepared in SDS-PAGE sample buffer must be shipped on dry ice.** Approximately 5% of the time, it has been necessary for clients to re-send samples to Kinexus due to thawed samples at the time of arrival. This is most often due to insufficient dry ice for shipping or inadequate completion of shipping documentation. If the lysate samples have been prepared with chemical cleavage reagents at the time of cell or tissue lysis, they are stable for over 2 weeks at room temperature and special refrigeration or freezing is not necessary during shipping.

18. DRY ICE SHIPMENTS

Shipments sent within North America normally arrive at our facility the following day. Therefore, we recommend shipping from Monday to Wednesday to allow sufficient time to arrive safely at our facility in case of delays due to Customs or weather. For shipments from outside of North America, we recommend sending your package on Monday as shipments can take up to 5 days to arrive depending on location. You should pack enough dry ice to last a minimum of 3 days in transit (for within North America) or 5 days (for outside of North America) and preferably use large dry ice chunks mixed with nuggets to fill in the extra spaces. Dry ice sublimes at a rate of 10 to 30% (or 5-10 pounds) every 24 hours depending on the thickness of the Styrofoam container used and the size and weight of the

dry ice. Pack the dry ice just before shipping to help preserve its shelf-life. Appropriate dry ice labels must be placed on the outside of the box and the weight of dry ice in kilograms written inside the label.

19. SHIPPING DETAILS

The aforementioned procedure has been designed to reduce the use of shipping materials and courier costs, and to ensure that your precious samples arrive in a safe and stable form at our laboratory facilities. Note that clients are responsible for payment of courier costs. Frozen sample vials should be sent to the address listed below by any express courier that accepts dry ice shipments. We recommend Federal Express for shipments originating in North America, and World Express is the preferred courier choice outside of North America. Ship the samples to the following address and e-mail info@kinexus.ca with the courier details so we can track your package for you while it is in transit:

Kinex™ Screening Services
Kinexus Bioinformatics Corporation
Suite 1, 8755 Ash Street
Vancouver, B.C. Canada V6P 6T3

Telephone: 604-323-2547
Facsimile: 604-323-2548
Email: info@kinexus.ca

FORMS REQUIRED

20. FORMS TO BE COMPLETED

Fillable MS-Word versions of our forms are directly downloadable from the Kinexus website or by request. Customers are required to complete the following forms for each order placed. The forms can be printed and included with your samples.

A. Service Order Form (KAM-1325-SOF)

Please ensure:

- Address and contact name and numbers are specified
- Billing or accounting information is completed
- Any quotations are listed in the billing sections
- Include a Purchase Order, Visa or MasterCard number for payment
- The form is signed and dated

B. Service Identification Form (KAM-1325-SIF)

For each sample submitted, please ensure the following:

- At least 200 µg of protein is provided for each sample to be analyzed, 1 sample per screen
- In Section A, the customer must assign a unique Client Screen Identification Name to correlate the proteins to be analyzed for each sample submitted
- In Section B, the type of analysis (Kinex™ Screen Name) for each sample is specified.
- For Section C, your sample(s) are identified by completion of Client Supplied Non-Confidential (NSDF-LY) or Confidential (CSDF-LY) Sample Description Forms. Make sure that the Client Screen ID Name in Box A of these forms, matched the Client Screen ID Name in Box A of the KABM-SIF form
- In Section D, the level of confidentiality is indicated for correct pricing

- The form is certified correct and signed and dated

C. Sample Description Forms

Customers should choose which type of Sample Description Form is applicable to their lysate samples. The Non-Confidential Sample Description Form (NSDF-LY) is required to obtain the lower, non-confidential price. One form is required to be completed in full for every cell or tissue lysate submitted at this pricing level. If your samples are confidential, the the Confidential Sample Description Form (CSDF-LY) should be used.

For each lysate submitted, please ensure the following:

- Each sample tube is labelled and properly identified on the form in Section B, including the final concentration and volume
- A minimum of 200 µg of protein is provided for each sample submitted
- Please be as accurate as possible in completing the Non-Confidential Form. A Technical Service Representative may contact you for additional information regarding any sample details that are unclear
- The form is certified correct and signed and dated

D. Proteomics Services Agreement

A Proteomics Services Agreement is required to be signed before the first order can be processed. This Agreement is required to be signed and dated by an authorized representative, typically a Senior Officer, Senior Scientist, Principal Investigator, or Director of Research, before the first order can be processed, but does not have to be signed again for repeat orders. The Proteomics Service Agreement is typically valid for 15 years. If you require changes or modifications to be made to our standard service agreement, please email sales@kinexus.ca to request a Microsoft Word version of the document so your requested changes can be made directly into the agreement and emailed back to us for our final approval.

E. Courier Airway Bill

Airway bill for Federal Express or any courier that accepts dry ice shipments if the samples must be sent frozen.

Complete the airway bill and specify:

- Priority overnight delivery
- Bill transportation charges to your institute
- If chemical cleavage of the samples is not performed and samples must be sent frozen, use sufficient dry ice to last several days into a large Styrofoam shipping container
- Dry ice is a "*hazardous"* item, so ensure proper labels are attached to the outside of the box
- Do not specify Saturday delivery or hold at courier location
- Contact the courier to pick up the samples from you institute before the cut off time.
- For shipments coming from within Canada or the United States, it is preferable to ship any day from Monday to Wednesday. Do not ship on a Thursday or Friday.
- For international shipments coming from outside of North America, the best day to ship is on a Monday to ensure arrival in Canada for delivery later the same week
- Customers should e-mail the date of shipment and the courier airway bill number with number of samples to Kinexus at info@kinexus.ca to ensure we can track and monitor your package in transit
- For customers located outside of Canada, 3 copies of a commercial invoice are required to accompany your shipment (see below)

FOR U.S AND INTERNATIONAL CUSTOMER ONLY

F. Commercial Invoice (not required by Canadian clients)

Please complete one of the two attached commercial invoices (one for regular shipping and the other with dry ice) as applicable with the following information:

- Date of exportation
- Shipper name, address, and telephone number
- Country of export and country of origin
- Name of courier and the airway bill number
- Number, type and total weight of package(s)
- Total declared value of shipment (number of samples x $1.00 per sample) and please specify currency
- Date, name, signature, and title of authorized person
- Include three (3) copies of the commercial invoice on the outside of the package along with the airway bill

The regular Shipping Commercial Invoice should be used if the lysate samples are obtained from cells and tissues that have been subjected to chemical cleavage and/or homogenized in SDS-PAGE sample buffer (for immunoblotting validation studies). For lysate samples or cell/tissue pellets that must be shipped frozen, use the Shipping Commercial Invoice that corresponds to a dry ice shipment.

Please ensure 3 copies of a signed commercial invoice accompany your shipment which specifies your samples are “non-hazardous, non-infectious, and non-toxic and for research purposes only”. Since the samples are not for resale, the value of your shipment should be priced low, we recommend $1.00 per sample, to avoid paying additional duties and taxes on entry into Canada. It is also highly recommended that customers e-mail their courier airway bill number and the date of departure to info@kinexus.ca so we can track your shipment in transit and ensure it arrives in a timely manner. If we know your package tracking number, we can often pick up your package if it misses the cut off time for the courier delivery. We will send an e-mail confirmation once your shipment arrives safely at our facility.

The international air waybill is required for all international shipments. It is your customs declaration, which can possibly be used to clear your shipment through customs at the destination. If the description on your commercial invoice is too vague or missing information, customs authorities may select the shipment for further inspection. All customs paperwork, such as the commercial invoice, must have detailed commodity descriptions. A detailed description on the air waybill and other customs documentation will help speed up the clearance time and reduce your delivery time.

KINEXUS

Form: KAM-1325-SOF

KINEX™ ANTIBODY MICROARRAY SERVICES — SERVICE ORDER FORM

Subject to terms of the Kinexus Proteomics Services Agreement

KINEXUS ORDER NUMBER
For Kinexus internal use only.

CUSTOMER INFORMATION ☐ REPEAT CUSTOMER OR ☐ NEW CUSTOMER

☐ Dr. ☐ Mr. ☐ Ms. _____
Name of Authorized Representative or Principal Investigator — *Title/Position*

Company Name or Institute — *Department*

Street Address

City — *State or Province* — *Country* — *Zip or Postal Code*

Email Address — *(Area Code) Telephone Number* — *(Area Code) Facsimile Number*

Contact Person (if different from Authorized Representative) — *Email Address* — *(Area Code) Telephone Number*

KINEX™ KAM-1325 REPORTS

RESULTS SENT BY EMAIL TO: ☐ AUTHORIZED REPRESENTATIVE/INVESTIGATOR **AND/OR** ☐ CONTACT PERSON

BILLING INFORMATION

Kinex™ Antibody Microarray KAM-1325 Services offered for the detection with 1325 pan- and phosphosite-specific antibodies for cell signalling proteins in two (2) samples with two replicate measurements: KAM-1350 – Expression and specific phosphosite profiling; KAM-1325-pY – Phosphotyrosine profiling.

PRICE PER SAMPLE ON EACH MICROARRAY - *Refer to Section E of the Sample Identification Forms:* ***All prices in U.S. Funds***
NOTE: EACH MICROARRAY ORDERED INCLUDES THE ANALYSIS OF ONE (1) SAMPLE

Sample Analysis Options

KAM-1325-N Ab microarrays (2 non-confidential samples/array) @ US $1950 per microarray x # arrays $ _____
KAM-1325-C Ab microarrays (2 full confidential samples/array) @ US $2996 per microarray x # arrays + $ _____
KAM-1325-pY-N Ab microarrays (2 non-confidential samples/array) @ US $1996 per microarray x # arrays + $ _____
KAM-1325-pY-C Ab microarrays (2 full confidential samples/array) @ US $2996 per microarray x # arrays + $ _____

Total # of samples submitted: _____ Total # of Kinex™ antibody microarrays: _____ **Subtotal** = $ _____

Quotation or Reference Number: _____ Quotation Price $ _____

TOTAL COST FOR THIS ORDER = $ _____

FOR CANADIAN CUSTOMERS ONLY:
Add applicable GST to the above total (No. 893907329 RT0001): + **$** _____ = **$** _____
TOTAL AMOUNT PAYABLE IN U.S FUNDS

PAYMENT METHOD

☐ PURCHASE ORDER ACCEPTED FROM COMPANIES AND INSTITUTES WITH APPROVED CREDIT. P.O. NUMBER: _____

☐ VISA OR ☐ MASTERCARD

Print Cardholder Name — *Visa Number* — *Expires (M/Y)* — *Cardholder Signature*

BILLING INFORMATION ☐ SEND INVOICE TO CUSTOMER AT ABOVE ADDRESS OR ☐ SEND INVOICE TO ACCOUNTS PAYABLE CONTACT:

☐ Dr ☐ Mr ☐ Ms _____
Accounts Payable Contact Name — *Company Name or Institute*

Street Address — *City*

State or Province — *Country* — *Zip or Postal Code* — *(Area Code) Telephone Number*

AUTHORIZATION

CUSTOMER HAS READ THE KINEXUS PROTEOMICS SERVICES AGREEMENT AND AGREES TO BE BOUND BY THE TERMS AND CONDITIONS:

Print Name of Authorized Representative or Principal Investigator — *Authorized Signature* — *Date y/m/d)*

How did you originally hear about the KAM Services? ☐ ***Direct Mail*** ☐ ***Email*** ☐ ***Web Site*** ☐ ***Ad*** ☐ ***Referral*** ☐ ***Conference or Trade Show*** ☐ ***Other***

Form: KAM-1325-SIF

KINEX™ ANTIBODY MICROARRAY SERVICE IDENTIFICATION FORM

Subject to terms of the Kinexus Proteomics Services Agreement

KINEXUS ORDER NUMBER

NAME: _____ **COMPANY/INSTITUTE:** _____

(Authorized Representative or Principal Investigator)

STANDARD KINEX™ KAM-1325 SCREENING SERVICES REQUESTED: (WITH CLIENT LYSATES + KINEXUS ANTIBODY MICROARRAY)

Use this form to order one or more of the four Standard Kinex™ Antibody Microarray KAM-1325 Services currently offered by Kinexus. Please check the appropriate tick boxes. If you need assistance, please contact a technical service representative by calling toll free in North America 1-866-KINEXUS (866-546-3987) or by email at info@kinexus.ca. An electronic fillable MS-Word version of this form can be downloaded from the Kinexus website or supplied upon request.

☐ KAM-1325 EXPRESSION + PHOSPHORYLATION PROFILING SERVICE REQUESTED

☐ KAM-1325-pY PHOSPHOTYROSINE PROFILING SERVICE REQUESTED

Standard Antibody Microarrays (1150 pan- and phosphosite-specific antibodies) and Two (2) Lysate Samples per Microarray

200 µg protein for each cell or tissue lysate sample are required

KINEXUS ID NUMBER

(Bar Code Identification Number)

For Kinexus Internal Use Only.

A. CLIENT SCREEN ID NAME:

Customer ID:

Provide ID name of your choice for your reference and for use in Box B of the "Client-Supplied Non-confidential Sample Description" (NSDF-LY) and "Client-Supplied Confidential Sample Description" (CSDF-LY) forms.

B. KINEX™ SCREEN SELECTION:

Kinexus currently offers four (4) Standard Kinex™KAM-1325 Antibody Microarray screening services. Check with the Kinexus website at www.kinexus.ca for new releases.

☐ **KAM-1325-N** 1325 Pan- and phosphosite-specific Ab microarray for expression (2 non-confidential samples)

☐ **KAM-1325-C** 1500 Pan-specific Ab microarray for expression (2 confidential samples)

☐ **KAM-1325-pY-N** 1500 Pan-specific Ab microarray for tyrosine phosphorylation (2 non-confidential samples)

☐ **KAM-1325-pY-C** 1500 Pan-specific Ab microarray for tyrosine phosphorylation (2 confidential samples)

C. SAMPLE IDENTIFICATION:

For each client supplied sample, please complete a "Client-Supplied Non-confidential Sample Description Form" (NSDF-SDF-LY) or a "Client-Supplied Confidential Sample Description Form" (CSDF-LY). There should be one (1) completed Sample Description Form per Client Screen ID Name.

D. CHEMICAL CLEAVAGE SELECTION:

☐ Check box is the lysate proteins are to be subjected to chemical cleavage to reduce protein-protein potential interactions.

E. PRICING:

☐ KAM-1325-N 2 non confidential samples = $1950.

☐ KAM-1325-C 2 confidential samples = $2996.

☐ KAM-1325-pY-N 2 non-confidential samples = $1996.

☐ KAM-1325-pY-C 2 confidential samples = $2996.

Use this pricing information for completion and submission of Service Order Form KAM-1325-SOF.

_____ _____ _____

Name of person completing this form *Signature* *Date (y/m/d)*

Form: NSDF-LY

FOR LYSATES

CLIENT SUPPLIED NON-CONFIDENTIAL SAMPLE DESCRIPTION FORM

Subject to terms of the Kinexus Service Agreement

KINEXUS ORDER NUMBER

NAME: _____ **COMPANY/INSTITUTE:** _____

(Authorized Representative or Principal Investigator)

Non-Confidential Service Requested and Lysate Sample Details:

Please refer to the Customer Information Package for the particular Kinexus proteomics service that you are requesting for details on how to prepare and ship your lysates to Kinexus for testing. Clients are required to complete all Sections A-K to qualify for the Non-Confidential pricing level for the Kinexus' Proteomics Services if they provide their own lysates for analysis. If sample details are to remain Confidential, please complete instead the "Client-Supplied Confidential Sample Description Form" (CSDF-LY) in Sections A-C. If you need further assistance, please contact a technical service representative by calling toll free in North America 1-866-KINEXUS (866-546-3987) or by email at info@kinexus.ca. Please check the appropriate tick boxes.

A. CLIENT SCREEN ID NAME + KINEXUS SERVICES NAME:

CLIENT ID: _____ KINEXUS PROTEOMICS SERVICES NAME: _____

Use the Client ID Name that you entered in Box B on the Service Identification Form (SIF). The Kinexus Proteomics Services abbreviated name should be used from the SIF.

B. SAMPLE IDENTIFICATION:

Client Name for Sample: _____

Control: ❑ Yes ❑ No

Concentration (mg/ml): _____ Volume (µl): _____

C. SPECIES:

❑ Human *(Homo sapiens)* Sex: ❑ Male ❑ Female ❑ M/F pooled ❑ Unknown

❑ Rat *(Rattus norvegicus)* # Animals: ____ Age: _____ Weight: _____

❑ Mouse *(Mus musculus)*

❑ Other – *Provide scientific & common name:* _____

KINEXUS ID NUMBER (FOR INTERNAL USE ONLY)

(Bar Code Identification Number)

D. SAMPLE SOURCE:

Tissues: ❑ Yes ❑ No *If yes, proceed to Section E*

Cells: ❑ Yes ❑ No *If yes, proceed to Section F*

E. TISSUES:

A. Organ source of tissue: _____

B. Tissue name: _____

C. Disease condition if appropriate: _____

F. CELLS: Is your sample a primary culture? ❑ Yes ❑ No

Is your sample an established cell line? ❑ Yes ❑ No

A. Name of cell line: _____

B. Organ source of cells: _____

C. Tissue or cell type: _____

D. Disease condition if appropriate: _____

G. CELL STATE: ❑ N/A

❑ Subconfluent ❑ Quiescent

❑ Confluent ❑ Scenescent

❑ Proliferating ❑ Apoptosing

❑ Differentiated ❑ Stressed

H. FRACTIONATION:

❑ Detergent-solubilized total lysate

❑ Cytosolic (Soluble)

❑ Particulate (Detergent-solubilized)

❑ IP - *If yes, indicate antibody or ligand used:* _____

❑ Other purification: _____

I. PERTURBATION:

❑ Normal untreated *If yes, proceed to Section K*

❑ Normal treated *If yes, proceed to Section J*

❑ Diseased untreated *If yes, proceed to Section K*

❑ Diseased treated *If yes, proceed to Section J*

J. TREATMENTS: *Please indicated if you used combined [CMB] or sequential [SEQ] treatments and provide details on your treatment:*

1. Name of compound/stimuli: _____ Concentration: _____ Time: _____ ❑ CMB ❑ SEQ

2. Name of compound/stimuli: _____ Concentration: _____ Time: _____ ❑ CMB ❑ SEQ

3. Name of compound/stimuli: _____ Concentration: _____ Time: _____ ❑ CMB ❑ SEQ

Details of treatment: _____

K. ADDITIONAL SAMPLE INFORMATION: *Please include any additional information that differentiates your samples:*

Transgenic: ❑ Yes ❑ No Knockout: ❑ Yes ❑ No Wildtype: ❑ Yes ❑ No Transfected/Over-expressed: ❑ Yes ❑ No Mutant: ❑ Yes ❑ No

If you answered yes to any of the above, please specify details including if there was any deprivation (such as serum/growth factor/drug/site of mutation) prior to treatment:

_____

_____

I hereby certify that all the sample information provided in this order is correct and accurate to the best of my knowledge. To qualify for the non-confidential pricing level, I agree that all Sections A-K must be completed in full otherwise the confidential pricing level will be applied. I further acknowledge that I may be contacted by a Kinexus representative for additional information if any section is unclear.

_____ _____ _____

Name of person completing this form *Signature* *Date (y/m/d)*

KINEXUS

Form: CSDF-LY

FOR LYSATES

CLIENT SUPPLIED
CONFIDENTIAL SAMPLE DESCRIPTION FORM

Subject to terms of the Kinexus Service Agreement

KINEXUS ORDER NUMBER

NAME: _____ **COMPANY/INSTITUTE:** _____

(Authorized Representative or Principal Investigator)

Confidential Service Requested and Lysate Sample Details:

Please refer to the Customer Information Package for the particular Kinexus proteomics service that you are requesting for details on how to prepare and ship your lysates to Kinexus for testing. Clients are required to complete Sections A-C for the Confidential pricing level for Kinexus' Proteomics Services if they provide their own lysates for analysis. Note that a Confidential analysis is performed at a higher pricing level than a Non-Confidential analysis. Clients should instead complete all of Sections A-C on the "Client-Supplied Non-Confidential Sample Description Form" (NSDF-LY) to qualify for the non-confidential pricing. To obtain further assistance, please contact a technical service representative by calling toll free in North America 1-866-KINEXUS (866-546-3987) or by email at info@kinexus.ca. Please check the appropriate tick boxes.

A. CLIENT SCREEN ID NAME + KINEXUS SERVICES NAME:

CLIENT ID: _____ KINEXUS PROTEOMICS SERVICES NAME: _____

Use the Client ID Name that you entered in Box B on the Service Identification Form (SIF). The Kinexus Proteomics Services abbreviated name should be used from the SIF.

B. SAMPLE IDENTIFICATION:

Client Name for Sample: _____ Control: ❑ Yes ❑ No

Concentration (mg/ml): _____ Volume (µl): _____

C. SPECIES:

❑ Human *(Homo sapiens)* Sex: ❑ Male ❑ Female ❑ M/F pooled ❑ Unknown

❑ Rat *(Rattus norvegicus)* # Animals: ____ Age: _____ Weight: _____

❑ Mouse *(Mus musculus)*

❑ Other – *Provide scientific & common name:* _____

KINEXUS ID NUMBER (FOR INTERNAL USE ONLY)

(Bar Code Identification Number)

A. CLIENT SCREEN ID NAME + KINEXUS SERVICES NAME:

CLIENT ID: _____ KINEXUS PROTEOMICS SERVICES NAME: _____

Use the Client ID Name that you entered in Box B on the Service Identification Form (SIF). The Kinexus Proteomics Services abbreviated name should be used from the SIF.

B. SAMPLE IDENTIFICATION:

Client Name for Sample: _____ Control: ❑ Yes ❑ No

Concentration (mg/ml): _____ Volume (µl): _____

C. SPECIES:

❑ Human *(Homo sapiens)* Sex: ❑ Male ❑ Female ❑ M/F pooled ❑ Unknown

❑ Rat *(Rattus norvegicus)* # Animals: ____ Age: _____ Weight: _____

❑ Mouse *(Mus musculus)*

❑ Other – *Provide scientific & common name:* _____

KINEXUS ID NUMBER (FOR INTERNAL USE ONLY)

(Bar Code Identification Number)

A. CLIENT SCREEN ID NAME + KINEXUS SERVICES NAME:

CLIENT ID: _____ KINEXUS PROTEOMICS SERVICES NAME: _____

Use the Client ID Name that you entered in Box B on the Service Identification Form (SIF). The Kinexus Proteomics Services abbreviated name should be used from the SIF.

B. SAMPLE IDENTIFICATION:

Client Name for Sample: _____ Control: ❑ Yes ❑ No

Concentration (mg/ml): _____ Volume (µl): _____

C. SPECIES:

❑ Human *(Homo sapiens)* Sex: ❑ Male ❑ Female ❑ M/F pooled ❑ Unknown

❑ Rat *(Rattus norvegicus)* # Animals: ____ Age: _____ Weight: _____

❑ Mouse *(Mus musculus)*

❑ Other – *Provide scientific & common name:* _____

KINEXUS ID NUMBER (FOR INTERNAL USE ONLY)

(Bar Code Identification Number)

I hereby certify that all the sample information provided in this order is correct and accurate to the best of my knowledge. I further acknowledge that I may be contacted by a Kinexus representative for additional information if any section is unclear.

_____ _____ _____

Name of person completing this form *Signature* *Date (y/m/d)*

COMMERCIAL INVOICE

DATE OF EXPORTATION	EXPORT REFERENCES
SHIPPER/EXPORTER	**CONSIGNEE** Kinexus Bioinformatics Corporation Suite 1 8755 Ash Street Vancouver, B.C. Canada V6P 6T3 Telephone: (604) 323-2547 Facsimile: (604) 232-2548 Email: info@kinexus.ca
COUNTRY OF EXPORT	**TERMS OF SALE** Not for resale, sample for analysis
COUNTRY OF ORIGIN	**PURPOSE** Research and development
COUNTRY OF ULTIMATE DESTINATION Canada	**EXPORTING CARRIER**
INTERNATIONAL AIR WAYBILL NUMBER Courier Name: Number:	

NO. OF PKGS	TYPE OF PACKAGING	QUANTITY OF SAMPLES	COMPLETE AND ACCURATE COMMODITY DESCRIPTION	UNIT VALUE
	☐ FedEx Letter ☐ FedEx Pak ☐ Box ☐ Other	*Total number of 1.5 ml Eppendorf tubes:*	Non-hazardous, non-infectious degraded protein lysate for research and development diagnostic purposes. Samples are not for resale and there is no commercial value.	$1.00 *per sample*

TOTAL NO. OF PACKAGES	TOTAL WEIGHT OF PACKAGES	TOTAL DECLARED VALUE
		$

These commodities were exported from the Country indicated above in accordance with the Export Administration Regulations and are licensed for the ultimate designation shown. It is hereby certified that this commercial invoice shows the actual price of the goods described, that no other invoice has been or will be issued for these goods, and that all particulars are true and correct.

SIGNATURE AND STATUS OF AUTHORIZED PERSON

Print Name	*Title*
Authorized Signature	*Date (month/day/year)*

INCLUDE THREE (3) COPIES OF THIS INVOICE WITH YOUR SHIPMENT

COMMERCIAL INVOICE

DATE OF EXPORTATION	EXPORT REFERENCES
SHIPPER/EXPORTER	**CONSIGNEE** Kinexus Bioinformatics Corporation Suite 1 8755 Ash Street Vancouver, B.C. Canada V6P 6T3 Telephone: (604) 323-2547 Facsimile: (604) 232-2548 Email: info@kinexus.ca
COUNTRY OF EXPORT	**TERMS OF SALE** Not for resale, frozen sample for analysis
COUNTRY OF ORIGIN	**PURPOSE** Research and development
COUNTRY OF ULTIMATE DESTINATION Canada	**EXPORTING CARRIER**
INTERNATIONAL AIR WAYBILL NUMBER Courier Name: Number:	

NO. OF PKGS	TYPE OF PACKAGING	QUANTITY OF SAMPLES	COMPLETE AND ACCURATE COMMODITY DESCRIPTION	UNIT VALUE
	☐ FedEx Letter ☐ FedEx Pak ☐ Box ☐ Other	*Total number of 1.5 ml Eppendorf tubes:*	Non-hazardous, non-infectious protein lysate for research and development diagnostic purposes. Samples are not for resale and there is no commercial value. Samples are packaged on Dry Ice, Class 9, UN 1845, Group 3 (____ X ____ kgs).	$1.00 *per sample*

TOTAL NO. OF PACKAGES	TOTAL WEIGHT OF PACKAGES	TOTAL DECLARED VALUE
		$

These commodities were exported from the Country indicated above in accordance with the Export Administration Regulations and are licensed for the ultimate designation shown. It is hereby certified that this commercial invoice shows the actual price of the goods described, that no other invoice has been or will be issued for these goods, and that all particulars are true and correct.

SIGNATURE AND STATUS OF AUTHORIZED PERSON

_____ _____

Print Name *Title*

_____ _____

Authorized Signature *Date (month/day/year)*

INCLUDE THREE (3) COPIES OF THIS INVOICE WITH YOUR SHIPMENT

PROTEOMICS SERVICES AGREEMENT

SERVICE AGREEMENT NO.

This Proteomics Services Agreement (the "Agreement") is entered into effective as of the Effective Date by and between Kinexus Bioinformatics Corporation ("**Kinexus**"), a Canadian corporation with a principal place of business at Suite 1, 8755 Ash Street, Vancouver, British Columbia, Canada, V6P 6T3 **AND** the corporation or other entity ("**Customer**") having the following name and business or institution address: _____

_____

_____

R E C I T A L S

WHEREAS Kinexus is a bioinformatics company employing proprietary proteomics and bioinformatics services to create and interpret data to map protein signalling networks and compile databases with this knowledge to enable disease biomarker and therapeutics discovery.

WHEREAS the Customer desires to have Kinexus perform standard and/or customized proteomics services with materials and/or information provided by the Customer.

WHEREAS Kinexus is willing to provide these proteomics services under the terms and conditions set forth herein.

THEREFORE, in consideration of the premises and covenants and agreements contained herein, and other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, Kinexus and the Customer agree as follows:

1. DEFINITIONS

1.1 "Academic Collaborator" means a principal investigator, employed at a university or other not-for-profit academic research institution.

1.2 "Affiliate" means any corporation or other entity that directly or indirectly controls, is controlled by or is under common control with a party to this Agreement. A corporation or other entity shall be regarded as in control of another corporation or entity if it owns or directly or indirectly controls more than fifty percent (50%) of the outstanding voting stock or other ownership interest of the other corporation or entity.

1.3 "Corporate Partner" means any Third Party which enters into an agreement with the Customer or its Affiliates involving the grant to such Third Party of rights for the development or commercialization of a product that was discovered, identified, selected, characterized or determined to have therapeutic or diagnostic use through use of the Proteomics Analyses provided to the Customer pursuant to this Agreement.

1.4 "Confidential Information" means any information or data received by a party (the "Receiving Party") from the other party (the "Disclosing Party") in connection with the performance of this Agreement that, if

disclosed in writing, is marked or otherwise identified by the Disclosing Party as confidential or, if disclosed orally is identified in writing by the Disclosing Party as confidential within ten (10) days following the disclosure. Confidential Information shall not include any information or data that the Receiving Party can demonstrate:

(a) was generally available to the public before its disclosure to the Receiving Party or became generally available to the public after its disclosure to the Receiving Party, provided that such information or data did not become generally available to the public by means of an unauthorized act or omission of the Receiving Party;

(b) was already in the possession of the Receiving Party before its disclosure under this Agreement, as demonstrated by Receiving Party's written records, provided that such information or data was not obtained directly or indirectly from the Disclosing Party under an obligation of confidentiality;

(c) was disclosed to the Receiving Party, whether before or after its disclosure under this Agreement, by a Third Party, provided that such information or data was not obtained directly or indirectly from the Disclosing Party under an obligation of confidentiality; or

(d) was independently developed or discovered by employees or agents of the Receiving Party without any use of Confidential Information of the Disclosing Party as demonstrated by Receiving Party's written records.

All of the Proteomics Services technologies provided by Kinexus will be deemed to have been identified as proprietary and considered the Confidential Information of Kinexus.

1.5 "Contact" means the contact person of the Customer that is designated on the Service Order Forms, who is deemed to have the authority to deliver Samples, Service Order Forms, Service Information Forms, and Sample Description Forms to Kinexus, on behalf of the Customer, under this Agreement.

1.6 "Proteomics Analyses" means one or more of the custom and standard proteomics services offered by Kinexus that may permit the identification and/or quantification of proteins, their phosphorylation states, their interactions with proteins, peptides, and other compounds, and the regulation of their functional activities by these agents.

1.7 "Proteomics Products" means the products of the custom proteomics services offered by Kinexus to manufacture one or more proteins using recombinant DNA technology, and designer peptides by chemical synthesis.

1.8 "Sample" means a lysate or semi-purified fraction from cells and tissues, a protein, and/or a compound provided to Kinexus by the Customer, which the Customer has prepared and shipped in a manner that it can be properly used by Kinexus for the Proteomics Analyses. Samples for Proteomics Analyses may also be provided by Kinexus at the request of the Customer.

1.9 "Sample Description Form" means the Kinexus form to be completed by the Customer to provide information on the nature of each Sample submitted for the Proteomics Analyses. It is included in the Proteomics Services Customer Information Package that is incorporated into this Agreement by reference, and may be amended from time to time as updated on the Kinexus website.

1.10 Antibody" means the immunoglobulin reagent that permits detection of a target protein or phosphorylation site.

1.11 "Antibody Description Form" means the Kinexus form to be completed by the Customer to provide information on the nature of each Antibody submitted by the Customer for the Proteomics Analyses. It is included

in the Proteomics Services Customer Information Package with this Agreement, and may be amended from time to time as updated on the Kinexus website.

1.12 "Service Order Form" means the Kinexus form to be completed by the Customer to provide Kinexus with the Customer's contact and billing information for the Proteomics Analyses or Proteomics Products. This form indicates the level of confidentiality requested by the Customer. It is included in the Proteomics Services Customer Information Package with this Agreement, and may be amended from time to time as updated on the Kinexus website.

1.13 "Service Information Form" means the Kinexus form to be completed by the Customer to provide Kinexus with a specific listing of the Samples to be tested for the Proteomics Analysis or a specific description of the Proteomics Products that are requested. It is included in the Proteomics Services Customer Information Package with this Agreement, and may be amended from time to time as updated on the Kinexus website.

1.14 "Report" means the underlying raw data and the report provided to the Customer hereunder consisting of the Proteomic Analyses of Samples, including, but not limited to tables of the experimental results. For Proteomics Products, the Report may include raw data confirming the composition and purity of the Proteomics Products.

1.15 "Field of Use" means use by Kinexus and its Affiliates and Academic Collaborators of data from the Report for research and commercial purposes relating to the creation and interpretation of knowledge about the composition, architecture and operation of cell signalling networks, improving its Proteomics Services, and the compilation of databases that may become accessible to Third Parties on-line over the Internet.

1.16 "Third Party" means any entity other than Kinexus', Kinexus' Affiliates, the Customer and the Customer's Affiliates.

1.17 "Effective Date" means the date of the last signature on this Agreement.

2. REQUEST FOR AND DELIVERY OF PROTEOMICS SERVICES

2.1 Request for Proteomics Services. From time to time, over the Term of this Agreement (as defined in Section 6.1 herein), the Customer can engage Kinexus to provide its Proteomics Analyses or Proteomics Products. After submission of a quotation from Kinexus to the Customer, by delivery to Kinexus of a Service Order Form, a Service Information Form and a Sample Description Form with Samples as appropriate, the Customer hereby requests and authorizes Kinexus to perform those Proteomics Services stated in the Services Order Form and deliver the results of these services to the Customer, pursuant to the terms and conditions in this Agreement. In the case of Customer requested Proteomics Analyses, this would include the delivery of a Report. In the case of Customer requested Proteomics Products, this would include the delivery of the Proteomics Products and a Report.

2.2 Representation and Warranty. The Customer represents and warrants that: (a) it has all right and authority to provide the Sample to Kinexus for analysis under the terms and conditions of this Agreement, (b) it collected the Sample lawfully and with all necessary consents and approvals, and (c) that the collection, use and disclosure of the Sample to Kinexus pursuant to this Agreement will not violate the rights of any Third Party.

2.3 Delivery Conditions for Customer Sample. The Customer shall be responsible for making shipping arrangements to deliver Samples to Kinexus. The Customer shall also be responsible for complying with all applicable laws and regulations (including but not limited to customs requirements and relevant handling procedures and protocols) and obtaining any and all permits, forms or permissions that may be required by all regulatory authorities to ship and deliver the Sample~~,~~ to Kinexus and for Kinexus to accept delivery of the Sample.

2.4 Processing and Delivery of Report and Proteomics Products. Subject to the terms of this Agreement, Kinexus shall analyze Samples with the Customer-specified Proteomics Services or produce Customer-specified Proteomics Products, and deliver a Report to the Customer as requested on the Service Order Form and Service Information Form.

2.5 Quality of Samples for Proteomics Analyses. Kinexus shall not deliver a Report on any Sample that Kinexus, in its sole discretion, reasonably believes has been prepared and delivered in a manner that would compromise its ability to provide a reliable result. Under such a circumstance, the Sample will be destroyed by Kinexus after fourteen (14) days notification by e-mail to the Customer or at the request of the Customer prior to the scheduled destruction of the Sample, it will be returned to the Customer provided that the Customer agrees to reimburse Kinexus for the courier costs for its delivery.

3. PAYMENTS

3.1 Payments for Proteomics Services. For each Proteomics Analyses and Proteomics Product requested under this Agreement, the Customer shall pay to Kinexus a fee in accordance with the amount specified on the Service Order Form and the Service Identification Form for the requested service, which may be amended from time to time as updated on Kinexus' website. This amount will be the same amount that was specified on the formal quotation issued by Kinexus to the Customer. In the absence of a formal quotation, the pricing will be based on the pricing specified in the latest versions of the Customer Information Packages for Proteomics Services that are downloadable from the Kinexus website (www.kinexus.ca). The category of pricing depends on the level of requested confidentiality for analysis:

(a) Non-Confidential Proteomics Analyses. If the Samples are provided by the Customer, then all of the Sample information on the Client Supplied **Non-Confidential** Sample Description Form is completed and **is not** designated as Confidential Information on the Service Identification Form. If Antibodies are supplied by the Customer, then all of the Antibody information on the Client Supplied Antibody Description Form (see example in Appendix) must be completed and **is not** designated as Confidential Information on the Service Identification Form.

(b) Confidential Proteomics Analyses. If the Samples are provided by the Customer, then all of the Sample information on the Client Supplied **Confidential** Sample Description Form must be completed and **is** designated as Confidential Information on the Service Identification Form.

3.2 The Customer shall issue a purchase order or provide a charge account at the time the Customer sample arrives at Kinexus' offices at Suite 1, 8755 Ash Street, Vancouver, British Columbia, Canada, V6P 6T3. Kinexus will invoice Customer when the Proteomics Analyses or Proteomics Products are complete and delivered to Customer. Payment terms are net 30 days from date of invoice.

3.3 Interest on Late Payments. Any overdue payments by the Customer to Kinexus under this Agreement shall bear interest, to the extent permitted by applicable law at 18% per annum, calculated on the total number of days payment is delinquent; provided, however, that interest shall not accrue pursuant to this Section 3.3 on any amounts payable under this Agreement with respect to which payment is disputed in good faith; provided, further that interest shall accrue pursuant to this Section 3.3 once such dispute has been resolved if payment is not made promptly thereafter.

4. INTELLECTUAL PROPERTY RIGHTS

4.1 Ownership of Sample Information. The Customer owns all rights to the Sample information provided to Kinexus. For Non-Confidential Proteomics Analyses, the Customer grants Kinexus a non-exclusive, royalty-free fully paid up worldwide perpetual license to use, copy, publish, compile, display, communicate, modify, translate and otherwise exploit (and authorize Third Parties to do any of the foregoing) to use the information on the Client Supplied **Non-Confidential** Sample Description Form in the Field of Use, provided that the Customer's identity is not linked to, or otherwise disclosed with respect to, such data.

4.2 Ownership of Report. The Customer shall own the data in the Report. For Non-Confidential Proteomics Analyses, the Customer grants Kinexus a non-exclusive, royalty-free fully paid up worldwide perpetual license to use, copy, publish, compile, display, communicate, modify, translate and otherwise exploit (and authorize Third Parties to do any of the foregoing) data from the Report in the Field of Use.

4.3 Confidentiality of Sample Information. Kinexus will have no rights with respect to the Confidential Sample information until the Sample information is published or otherwise enters the public domain. Thereafter, Kinexus can use the results of the Proteomics Analyses of the Customer Samples for its internal research and development programs.

4.4 Ownership of Proteomics Products. The Customer owns the Proteomics Products that have been delivered to the Customer in the amounts specified in the Service Order Form and the Service Information Form. Kinexus owns any excess Proteomics Products and may dispose of these in its best interests.

4.5 Ownership of New Intellectual Property.

(a) The Customer shall own and have rights to all inventions, discoveries, improvements, know-how, technical information, data or other technology discovered, conceived, made, developed and/or reduced to practice through the use of the data in the Report and Proteomics Products solely by employees of the Customer or jointly with its Affiliates;

(b) Kinexus shall own and have rights to all inventions, discoveries, improvements, know-how, technical information, data or other technology discovered, conceived, made, developed and/or reduced to practice through the use of the data in the Report and Proteomics Products solely by employees of Kinexus or jointly with its Affiliates.

4.6 Non-Exclusive License to Preserve Kinexus Proteomics Services Freedom of Operation. In the event one or more claims of an issued patent arising from the use of a Report by the Customer, its Affiliates, Academic Collaborators or Corporate Partners would, absent a license from the Customer or its Affiliates, prevent Kinexus from using or permitting others to use the Kinexus Proteomics Services or any data therein, then the Customer and/or its Affiliates (as applicable) shall grant to Kinexus a non-exclusive, royalty-free fully-paid up perpetual license, including the right to grant sublicenses, under any such patent claim to use and permit others to use the Proteomics Services.

5. CONFIDENTIALITY

5.1 Confidentiality. Each Receiving Party shall treat the Confidential Information of the Disclosing Party as strictly confidential and (a) take reasonable precautions to protect such Confidential Information (including, without limitation, all precautions such as the Receiving Party employs with respect to its own confidential information), (b) not disclose or make available to any Third Party such Confidential Information without the express prior written consent of the Disclosing Party and (c) use such Confidential Information only for purposes specifically authorized under this Agreement. Each Receiving Party may disclose Confidential

Information of the Disclosing Party to its officers, directors, employees, consultants, Affiliates and agents, and to licensees or prospective licensees of its rights to any invention, on a need-to-know basis and on the condition that such employees, Affiliates, agents, licensees and prospective licensees are obligated to maintain the confidentiality of the Confidential Information in a manner no less restrictive than the terms and conditions of this Section 5. Each Receiving Party may disclose Confidential Information of the Disclosing Party pursuant to a demand issued by a court or governmental agency or as otherwise required by law, provided, however, that the Receiving Party notifies the Disclosing Party promptly upon receipt thereof, giving the Disclosing Party sufficient advance notice to permit it to seek a protective order or other similar order with respect to such Confidential Information, and provided, further, that the Receiving Party furnishes only that portion of the Confidential Information of the Disclosing Party that it is advised by counsel is legally required whether or not a protective order or other similar order is obtained by the Disclosing Party.

5.2 Publication. The Customer may publish and/or present the Report, abstracts or manuscripts generated utilizing the Report, and any data and/or results generated by the Customer utilizing the Report. The Customer is encouraged to disclose in scientific publications any Proteomics Analyses that were performed by Kinexus and any Proteomics Products were produced by Kinexus that meaningfully contributed to the described work. Please refer to "Kinexus Bioinformatics Corporation (Vancouver, Canada)." For all Samples submitted for analysis and identified as Non-Confidential by the Customer, Kinexus will not use, copy, publish, compile, display, communicate, modify, or translate the Sample Information or the data from the Report for a period of 180 days (6 months) following the return of the Report to the Customer. At any time, the Customer may opt to pay the difference in price between the Non-Confidential pricing level to the Confidential pricing level for each applicable Sample, to ensure the confidentiality status of such sample is changed.

5.3 Confidential Sample Information. All parties agree that the term of confidentiality pertaining to that Sample information will expire when the Sample information is published or otherwise enters public domain through no fault of Kinexus.

5.4 Use of Customer Name. Except as expressly provided in Section 9.5, no right or license is granted hereunder by Customer for Kinexus to use the Customer's name in relation to data from a Report to a Third Party.

6. TERM AND TERMINATION

6.1 Term. The term of this Agreement ("**Term**") shall commence on the Effective Date and shall remain in effect for fifteen (15) years or until the termination of this Agreement pursuant to the terms hereof.

6.2 Early Termination. Each party shall have the right to terminate this Agreement at any time prior to Kinexus' delivery of a Report or Proteomics Product to the Customer hereunder, upon ten (10) business days written notice to the other party, if such party reasonably determines that the production, or use of such Sample infringes intellectual property rights of any Third Party, and the Customer elects not to obtain a license under the necessary Third Party intellectual property rights at its sole expense. If this Agreement is terminated by either party pursuant to this Section 6.2, neither party shall have any obligation to the other with respect to payments under this Agreement regarding the Sample or Proteomics Product at issue.

Kinexus shall have the right to terminate any Service Order Form for any Proteomics Services upon ten (10) business days written notice to the Customer, upon the identification of a technical difficulty related to the Sample or Proteomics Product which would prevent it from delivering the Report or Proteomics Product using reasonable efforts. If Kinexus terminates a work order as a result of a technical difficulty related to a Customer Sample that is the fault of Kinexus, Kinexus shall provide for the reanalysis of the same number of problematic Customer Samples for the Proteomics Analyses at the original agreed upon price without any additional expenses incurred by the Customer, or Kinexus shall repay any prepayment fee paid by the Customer for such a Customer Sample and neither party shall have any further obligation to the other with respect to that Customer Sample.

If Kinexus terminates a Service Order Form for Proteomics Analyses as a result of a technical difficulty related to the Customer Sample (including insufficient material or other problems associated with the quality of the Sample) that is the fault of the Customer, then Kinexus shall provide for the reanalysis of the problematic Customer Samples at the original agreed upon price without any additional expenses incurred by the Customer, provided Kinexus completes the full Proteomics Analyses for all Samples. For any subsequent resubmission of Customer Samples for Proteomics Analyses due to technical difficulty that is again the fault of the Customer, Kinexus shall provide for the reanalysis of the problematic Customer Samples at an additional charge per sample at a price mutually agreed by the Customer and Kinexus. If the Customer elects not to resubmit Samples for Proteomics Analyses, then the Customer will pay Kinexus an amount equivalent to 50% of the quoted price for the work performed by Kinexus to this point.

6.3 Events of Default. An event of default (an "Event of Default") shall be deemed to occur upon a material breach of this Agreement by a party (including, without limitation, any breach of the provisions of Section 5) if the breaching party fails to remedy such breach within thirty (30) days after written notice thereof by the non-breaching party.

6.4 Effect of an Event of Default.

(a) Remedies Available to Kinexus. If an Event of Default occurs relating to a material breach by the Customer, then Kinexus shall have the right, at its option exercisable in its sole discretion, in addition to any other rights or remedies available to it at law or in equity, to immediately terminate this Agreement upon notice thereof to the Customer, in which case the Customer shall return to Kinexus, or, upon Kinexus' written instruction, destroy any Report, Proteomics Products, and all information, other materials or documentation provided or made available by Kinexus pursuant to this Agreement, and any copies thereof (including electronic copies).

(b) Remedies Available to the Customer. If an Event of Default occurs relating to a material breach by Kinexus, then the Customer shall have the right, at its option exercisable in its sole discretion, in addition to any other rights or remedies available to it at law or in equity and subject to the limitations set forth in Section 7, to terminate this Agreement upon notice thereof to Kinexus.

6.5 Effect of Expiration or Termination of Agreement. The expiration or termination of this Agreement shall not relieve the parties of any obligation accruing prior to such expiration or termination. Kinexus will not be required to continue custom proteomics analyses on a Sample after termination, and the Customer will be required to pay for work done prior to termination. The provisions of Sections 4, 5, 6, 7, 8, and 9 hereof shall survive any expiration or termination of this Agreement.

7. DISCLAIMER OF WARRANTIES AND LIMITATION OF LIABILITY

7.1 Disclaimer of Warranties. THE PROTEOMICS SERVICES ARE BEING SUPPLIED TO CUSTOMER WITH NO EXPRESS, IMPLIED, STATUTORY OR OTHER WARRANTIES, REPRESENTATIONS, CONDITIONS OR GUARANTEES, INCLUDING THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND DURABILITY. WITHOUT LIMITING THE FOREGOING, KINEXUS MAKES NO REPRESENTATION OR WARRANTY THAT THE USE OF THE REPORT, ANY PROTEOMICS PRODUCTS OR THE DATA THEREIN OR THE PERFORMANCE OF THIS AGREEMENT WILL NOT INFRINGE ANY INTELLECTUAL PROPERTY OR OTHER RIGHTS OF ANY THIRD PARTY.

7.2 Limitation of Liability. Kinexus shall not be liable for any use by the Customer, its Affiliates, Corporate Partners, or Academic Collaborators of the Report and any Proteomics Products or any loss, claim,

damage or liability, of whatever kind or nature, which may arise from or in connection with the use of the Report or the data therein, and any Proteomics Products. NOTWITHSTANDING ANYTHING ELSE IN THIS AGREEMENT OR OTHERWISE TO THE CONTRARY, NEITHER KINEXUS NOR CUSTOMER WILL BE LIABLE TO EACH OTHER WITH RESPECT TO ANY MATTER ARISING UNDER THIS AGREEMENT UNDER ANY CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHER LEGAL OR EQUITABLE THEORY FOR (I) ANY PUNITIVE, EXEMPLARY, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOST PROFITS OR (II) COST OF PROCUREMENT OF SUBSTITUTE GOODS, TECHNOLOGY OR SERVICES. WITHOUT IN ANY WAY LIMITING THE FOREGOING, KINEXUS SHALL NOT, IN ANY EVENT, HAVE ANY LIABILITY WHATSOEVER IN CONNECTION WITH THIS AGREEMENT IN EXCESS OF AN AMOUNT EQUAL TO THE FEES PAID TO KINEXUS BY CUSTOMER HEREUNDER IN RESPECT OF THE PROTEOMICS SERVICES AT ISSUE.

8. INDEMNIFICATION

Except to the extent prohibited by law, the Customer shall assume all liability for, and shall defend, indemnify and hold Kinexus, its Affiliates and their respective directors, officers, employees and agents harmless from, all claims, losses, damages or expenses (including reasonable attorneys' fees) arising directly or indirectly as a result of: (a) the use of the Report or the data therein and any Proteomics Products by the Customer or its Affiliates, Corporate Partners or Academic Collaborators, or (b) the breach, untruthfulness or inaccuracy of any of the Customer's representations and warranties in this Agreement.

9. MISCELLANEOUS

9.1 Entire Agreement. The Appendices to this Agreement, together with all terms and conditions contained within this Agreement constitute the entire understanding between the parties with respect to the subject matter hereof and, with respect to any conflicting terms from prior agreements between the parties, supersedes and cancels such conflicting sections from all previous registrations, agreements, commitments and writings in respect thereof. This Agreement may be amended, or any term hereof modified, only by a written instrument duly executed by both parties hereto.

9.2 Assignment and Waiver. This Agreement may not be assigned or otherwise transferred by either party without the written consent of the other party, such consent will not be unreasonably withheld. Notwithstanding the foregoing, Kinexus may, without such consent, assign its rights and obligations under this Agreement (a) to any Affiliate or (b) to a Third Party in connection with a merger, consolidation or sale of such portion of its assets that includes rights under this Agreement provided, however, that Kinexus' rights and obligations under this Agreement shall be assumed by its successor in interest in any such transaction. In the event of such a transaction with Third Party, notwithstanding the other provisions of this Agreement, the intellectual property rights of such Third Party shall not be subject to the licenses granted by Kinexus under this Agreement. Any purported assignment in violation of the provisions of this Section 9.2 shall be void. Any permitted assignee shall assume all obligations of its assignor under this Agreement. The waiver by either party hereto of any right hereunder or the failure to perform or of a breach by the other party shall not be deemed a waiver of any other right hereunder or of any other breach or failure by said other party whether of a similar nature or otherwise.

9.3 Force Majeure. Neither party shall be held liable or responsible to the other party nor be deemed to have defaulted under or breached this Agreement for failure or delay in fulfilling or performing any obligation under this Agreement when such failure or delay is caused by or results from causes beyond the reasonable control of the affected party, including but not limited to fire, floods, embargoes, war, acts of war (whether war is declared or not), insurrections, riots, civil commotions, strikes, lockouts or other labor or supply disturbances, acts of God or acts, omissions or delays in acting by any governmental authority or the other party; provided, however, that the party so affected shall use reasonable commercial efforts to avoid or remove such causes of nonperformance, and

shall continue performance hereunder with reasonable dispatch whenever such causes are removed. Either party shall provide the other party with prompt written notice of any delay or failure to perform that occurs by reason of force majeure. The parties shall mutually seek a resolution of the delay or the failure to perform as noted above.

9.4 Notices. Any consent, notice, or report required or permitted to be given or made under this Agreement by one of the notification parties hereto to the other shall be in writing, delivered personally, by email or by facsimile (and promptly confirmed by telephone, personal delivery or courier) or courier, postage prepaid (where applicable), addressed to such other party at its address indicated below, or to such other address as the addressee shall have last furnished in writing to the addressor and shall be effective upon receipt by the addressee.

If to Kinexus:

Kinexus Bioinformatics Corporation
Suite 1, 8755 Ash Street
Vancouver, British Columbia, Canada V6P 6T3
Attention: Dr. Steven Pelech
President & C.S.O.
Telephone: (604) 323-2547 extension 10
Facsimile: (604) 323-2548

If to the Customer:

To the Customer at the address designated at the front of this Agreement and to the attention of the duly authorized representative signing this Agreement.

9.5 Publicity. Except as required by law, the terms of this Agreement shall be treated as Confidential Information and shall not be disclosed to anyone (except for the parties' respective directors, officers, employees, consultants, agents and attorneys assisting in the review and negotiation of this Agreement and/or who have a need to know the terms of this Agreement) without the written consent of the other party, such consent which will not be unreasonably withheld. Notwithstanding the foregoing, (a) Kinexus may, without such consent, publicly announce the execution of this Agreement with the Customer and may reference the Customer as a Kinexus client.

9.6 No Partnership. It is expressly agreed that the relationship between Kinexus and the Customer shall not constitute a partnership, joint venture or agency. Neither Kinexus nor the Customer shall have the authority to make any statements, representations or commitments of any kind, or to take any action, which shall be binding on the other, without the prior consent of the other party to do so.

9.7 Applicable Law. This Agreement shall be governed by, construed, interpreted and enforced in accordance with, the laws of the province of British Columbia and the laws of Canada, without reference to conflict of laws principles.

9.8 Dispute Resolution.

(a) The parties hereby agree that they will attempt in good faith to resolve any controversy or claim arising out of or relating to this Agreement promptly by negotiations. If a controversy or claim should arise hereunder, the matter shall be referred to an individual designated by the Chief Executive Officer or President of Kinexus and an individual designated by the Chief Executive Officer (or the equivalent position) of the Customer (the "Representatives"). If the matter has not been resolved within twenty-one (21) days of the first meeting of the Representatives of the parties (which period may be extended by mutual agreement) concerning such matter, subject to rights to injunctive relief and specific performance, and unless otherwise specifically provided for herein, any controversy or claim arising out of or relating to this Agreement, or the breach thereof, will be settled as set forth in Section 9.8(b).

(b) All disputes arising in connection with this Agreement that are not resolved pursuant to Section 9.8(a) above shall be finally settled in Vancouver, British Columbia, by a single arbitrator appointed pursuant to the provisions of the *Commercial Arbitration Act* (British Columbia). Notwithstanding the above, either party has the right to bring an action in a court of competent jurisdiction against the other party for (i) any breach of such other party's duties of confidentiality pursuant to Section 5 of this Agreement; (ii) any infringement of its proprietary rights by the other party; and (iii) for interim protection such as, by way of example, an interim injunction. Judgment upon the arbitrator's award may be entered in any court of competent jurisdiction. The award of the arbitrator may include compensatory damages against either party, but under no circumstances will the arbitrator be authorized to, nor shall he/she, award punitive, consequential or incidental damages against either party. The parties agree not to institute any litigation or proceedings against each other in connection with this Agreement except as provided in this Section 9.8.

9.9 Severability. Each party hereby agrees that it does not intend to violate any public policy, statutory or common laws, rules, regulations, treaty or decision of any government agency or executive body thereof of any country or community or association of countries. Should one or more provisions of this Agreement be or become invalid, the parties hereto shall substitute, by mutual consent, valid provisions for such invalid provisions which valid provisions in their economic effect are sufficiently similar to the invalid provisions that it can be reasonably assumed that the parties would have entered into this Agreement with such valid provisions. In case such valid provisions cannot be agreed upon, the invalidity of one or several provisions of this Agreement shall not affect the validity of this Agreement as a whole, unless the invalid provisions are of such essential importance to this Agreement that it is to be reasonably assumed that the parties would not have entered into this Agreement without the invalid provisions.

9.10 Counterparts. This Agreement may be executed in counterparts, each of which when executed and delivered is an original, but both of which together shall constitute one and the same instrument.

9.11 Fax Delivery. This Agreement may be executed by the parties and transmitted by facsimile or electronically as a portable document format (pdf) file or similar electronic file and if so executed and transmitted this Agreement will be for all purposes as effective as if the parties had delivered an executed original Agreement.

IN WITNESS WHEREOF, the parties have caused their duly authorized officer to execute and deliver this Agreement as of the Effective Date.

_____ *Printed Name of Institute or Company*	**KINEXUS BIOINFORMATICS CORPORATION**
Per: _____ *Signature of Authorized Representative*	Per: _____ *Signature of Dr. Steven Pelech*
Name: _____ *Printed Name of Authorized Representative*	**Dr. Steven Pelech**
Title: _____ *Printed Title of Authorized Representative*	**President and Chief Scientific Officer**
Date signed: _____	Date signed: _____

Appendix 1. List of Antibodies and Their Targets on the KAM-1325 Antibody Microarray

Final Order on Array	Target Short Name	UniProt ID	Target P-Site	Ab Type	Kinexus Ab ID	Protein Kinases	PK or PP Type	Phosphatases	Transcription	Other Enzymes
1	**Orientation Marker**									
2	4E-BP1	Q13541	Pan-specific	MmAb	NN166-2					
3	4E-BP1 (PHAS1)	Q13541	T37+T46	RpAb	PN550					
4	A6 (Twinfilin-1)	Q12792	Y309	RpAb	PK501	X	PSTK			
5	A6r (Twinfin-2)	Q6IBS0	Y309	RpAb	PK502	X	PSTK			
6	AAK1	Q2M2I8	S637	RpAb	PK503	X	PSTK			
7	Abl (Abl1)	P00519	Pan-specific	RpAb	NK001-2	X	PYK			
8	Abl (Abl1)	P00519	Pan-specific	RpAb	NK001-6	X	PYK			
9	Abl (Abl1)	P00519	Y139	RpAb	PK504	X	PYK			
10	Abl (Abl1)	P00519	Y226	RpAb	PK505	X	PYK			
11	Abl (Abl1)	P00519	Y257	RpAb	PK506	X	PYK			
12	Abl (Abl1)	P00519	Y264	RpAb	PK507	X	PYK			
13	Abl (Abl1)	P00519	Y393+T394	RpAb	PK873	X	PYK			
14	Abl (Abl1)	P00519	Y413	MmAb	PK177	X	PYK			
15	Abl (Abl1)	P00519	Y469	RpAb	PK508	X	PYK			
16	Abl2 (Arg)	P42684	Pan-specific	RpAb	NK238-1	X	PYK			
17	Abl2 (Arg)	P42684	Y439	RpAb	PK509	X	PYK			
18	Abl2 (Arg)	P42684	Y439+T440	RpAb	PK510	X	PYK			
19	ACC1 (ACACA)	Q13085	Pan-specific	MmAb	NN390-1					X
20	ACC1 (ACACA)	Q13085	S29	RpAb	PN733					X
21	ACC1 (ACACA)	Q13085	S78+S80	MmAb	PN202					X
22	ACC1 (ACACA)	Q13085	S80	RpAb	PN002					X
23	ACC2 (ACACB)	O00763	T1342	RpAb	PN734					X
24	ACK1 (TNK2)	Q07912	Pan-specific	RpAb	NK002	X	PYK			
25	ACK1 (TNK2)	Q07912	Y284	RpAb	PK511	X	PYK			
26	ACK1 (TNK2)	Q07912	Y518	RpAb	PK512	X	PYK			
27	Not listed									
28	ACLY	P53396	S455	RpAb	PN735					X
29	ACLY	P53396	Y682	RpAb	PN686					X
30	ACO1 (IREB1)	P21399	S711	RpAb	PN736					X
31	ACO1 (IREB1)	P21399	S806	RpAb	PN737					X
32	ACP1	P24666	Y132+Y133	RpAb	PN687			X		
33	ACS1 (ACSL1)	P33121	Y567	RpAb	PN688					X
34	ACTB	P60709	Pan-specific	RpAb	NN218-1					
35	ACTB	P60709	Y53	RpAb	PN501					
36	ACTB	P60709	Y294	RpAb	PN500					
37	ACTN1	P12814	Y246	RpAb	PN502					
38	ACTR-I (ALK2+ALK4)	Q04771	Pan-specific	MmAb	NK357-1	X	PSTK			
39	Adducin a/g (ADD1/3)	Q9UEY8	S726/S693	RpAb	N003-PN004					
40	ADK	P55263	S86	RpAb	PN689					X
41	Akt1 (PKBa)	P31749	Pan-specific	RpAb	NK129-3	X	PSTK			
42	Akt1 (PKBa)	P31749	Pan-specific	RpAb	NK129-5	X	PSTK			
43	Akt1 (PKBa)	P31749	Pan-specific	MmAb	NK129	X	PSTK			
44	Akt1 (PKBa)	P31749	T308	RpAb	PK515	X	PSTK			
45	Akt1 (PKBa)	P31749	Y315	RpAb	PK516	X	PSTK			
46	Akt1 (PKBa)	P31749	Y326	RpAb	PK517	X	PSTK			
47	Akt1 (PKBa)	P31749	T450/T451/T447	MmAb	PK071-8	X	PSTK			
48	Akt1 (PKBa)	P31749	S473	RpAb	PK869	X	PSTK			
49	Akt1 (PKBa)	P31749	S473/S474/S472	MmAb	PK071-6	X	PSTK			
50	Akt1 (PKBa)	P31749	S473/S474/S472	MmAb	PK071-7	X	PSTK			
51	Akt2 (PKBb)	P31751	Pan-specific	RpAb	NK130-8	X	PSTK			
52	Akt2 (PKBb)	P31751	Pan-specific	RpAb	NK130-9	X	PSTK			
53	Akt3 (PKBg)	Q9Y243	Pan-specific	RpAb	NK131-3	X	PSTK			
54	ALK	Q9UM73	Pan-specific	RpAb	NK003-2	X	PYK			
55	ALK	Q9UM73	Pan-specific	RpAb	NK003-3	X	PYK			
56	ALK	Q9UM73	Y1092	RpAb	PK518	X	PYK			

Final Order on Array	Target Short Name	UniProt ID	Target P-Site	Ab Type	Kinexus Ab ID	Protein Kinases	PK or PP Type	Phosphatases	Transcription	Other Enzymes
57	ALK	Q9UM73	Y1096	RpAb	PK519	X	PYK			
58	ALK	Q9UM73	Y1507	RpAb	PK520	X	PYK			
59	ALOX5 (5-LO)	P09917	S272	RpAb	PN738					X
60	AML1 (RUNX1)	Q01196	T273	RpAb	PN568				X	
61	AML2 (RUNX3)	Q13761	T231	RpAb	PN569				X	
62	AMPKa1 (PRKAA1)	Q13131	Pan-specific	RpAb	NK259-1	X	PSTK			
63	AMPKa1 (PRKAA1)	Q13131	Pan-specific	RpAb	NK259-2	X	PSTK			
64	AMPKa1 (PRKAA1)	Q13131	T183+S184	RpAb	PK521	X	PSTK			
65	AMPKa2 (PRKAA2)	P54646	Pan-specific	RpAb	NK260-2	X	PSTK			
66	AMPKa2 (PRKAA2)	P54646	Pan-specific	RpAb	NK260-1	X	PSTK			
67	AMPKa2 (PRKAA2)	P54646	S377	RpAb	PK522	X	PSTK			
68	ANKRD3 (RIPK4, DIK)	P57078	S438	RpAb	PK523	X	PSTK			
69	ANXA1	P04083	Y207	RpAb	PN503					
70	ANXA2	P07355	Y238	RpAb	PN504					
71	APC	P25054	S2129	RpAb	PN739					
72	AR	P10275	S96	RpAb	PN570				X	
73	AR	P10275	S310	RpAb	PN571				X	
74	AR	P10275	S310	MmAb	PN203				X	
75	ARID1A	O14497	S363	RpAb	PN740					
76	AurKA (AIK, STK15)	O14965	T288	MmAb	PK174	X	PSTK			
77	Arrestin b (ARRB1)	P49407	Pan-specific	MmAb	NN121					
78	Arrestin b (ARRB1)	P49407	S412	RpAb	PN133					
79	ASK1 (MAP3K5)	Q99683	Pan-specific	MmAb	NK007-3	X	PSTK			
80	ASK1 (MAP3K5)	Q99683	Pan-specific	RpAb	NK007-2	X	PSTK			
81	ASK1 (MAP3K5)	Q99683	S83	MmAb	PK175	X	PSTK			
82	ASK1 (MAP3K5)	Q99683	T838	RpAb	PK525	X	PSTK			
83	ASK1 (MAP3K5)	Q99683	S966	RpAb	PK143	X	PSTK			
84	ASK1 (MAP3K5)	Q99683	S1033	RpAb	PK524	X	PSTK			
85	ASS1	P00966	T174+S180	RpAb	PN741					X
86	ATASE (PPAT)	Q06203	T356	RpAb	PN742					X
87	ATF2 (CRE-BP1)	P15336	Pan-specific	MmAb	NN160-2				X	
88	ATF2 (CRE-BP1)	P15336	T69+T71	RpAb	PN572				X	
89	ATF2 (CRE-BP1)	P15336	T71	MmAb	PN204				X	
90	ATF2 (CRE-BP1)	P15336	S112	RpAb	PN115				X	
91	ATM	Q13315	Pan-specific	RpAb	NK230-2	X	PSTK			
92	ATM	Q13315	Pan-specific	RpAb	NK230-1	X	PSTK			
93	ATM	Q13315	S1981	RpAb	PK526	X	PSTK			
94	ATM	Q13315	Y2969	RpAb	PK527	X	PSTK			
95	ATR	Q13535	Pan-specific	RpAb	NK237-1	X	PSTK			
96	ATR	Q13535	Pan-specific	RpAb	NK237-3	X	PSTK			
97	ATR	Q13535	S435+S436	RpAb	PK528	X	PSTK			
98	AurKA (AIK, STK15)	O14965	Pan-specific	RpAb	NK008-3	X	PSTK			
99	AurKA (AIK, STK15)	O14965	Pan-specific	RpAb	NK008-4	X	PSTK			
100	AurKA (AIK, STK15)	O14965	T287+T288	RpAb	PK529	X	PSTK			
101	AurKB (Aurora B, AIM-1)	Q96GD4	Pan-specific	RpAb	NK193-2	X	PSTK			
102	AurKB (Aurora B, AIM-1)	Q96GD4	Pan-specific	RpAb	NK193-3	X	PSTK			
103	AurKB (Aurora B, AIM-1)	Q96GD4	S227	RpAb	PK530	X	PSTK			
104	AurKB (Aurora B, AIM-1)	Q96GD4	T232	RpAb	PK531	X	PSTK			
105	AurKC (Aurora C, AIK3)	Q9UQB9	Pan-specific	RpAb	NK009-2	X	PSTK			
106	AurKC (Aurora C, AIK3)	Q9UQB9	Pan-specific	RpAb	NK009-3	X	PSTK			
107	AurKC (Aurora C, AIK3)	Q9UQB9	S193	RpAb	PK532	X	PSTK			
108	Axl (UFO)	P30530	Pan-specific	RpAb	NK010-2	X	PYK			
109	Axl (UFO)	P30530	Pan-specific	RpAb	NK010-3	X	PYK			
110	Axl (UFO)	P30530	Y702+Y703	RpAb	PK533	X	PYK			
111	B-Myb (MYBL2)	P10244	T487	RpAb	PN573				X	
112	B-Myb (MYBL2)	P10244	T487	MmAb	PN206				X	
113	B23 (NPM)	P06748	Pan-specific	MmAb	NN177-2					
114	B23 (NPM)	P06748	T234+T237	RpAb	PN009					

Final Order on Array	Target Short Name	UniProt ID	Target P-Site	Ab Type	Kinexus Ab ID	Protein Kinases	PK or PP Type	Phosphatases	Transcription	Other Enzymes
115	Bad	Q92934	S75	MmAb	PN207					
116	Bad	Q92934	S99	MmAb	PN208					
117	BARK1 (GRK2, ADRBK1)	P25098	Y356	RpAb	PK537	X	PSTK			
118	BARK1 (GRK2, ADRBK1)	P25098	S670	RpAb	PK536	X	PSTK			
119	BCKD (BCKDK)	O14874	Pan-specific	RpAb	NK257-1	X	PSTK			
120	BCKD (BCKDK)	O14874	Pan-specific	RpAb	NK257-2	X	PSTK			
121	BCLAF1	Q9NYF8	S512	RpAb	PN574				X	
122	Bcr	P11274	Pan-specific	MmAb	NK362-1	X	PSTK			
123	Bcr	P11274	Y177	RpAb	PK164	X	PSTK			
124	Bcr	P11274	Y177	RpAb	PK538	X	PSTK			
125	Bcr	P11274	Y591	RpAb	PK539	X	PSTK			
126	Bcr	P11274	Y644	RpAb	PK540	X	PSTK			
127	BLK	P51451	Y187	RpAb	PK541	X	PYK			
128	BLK	P51451	Y188	RpAb	PK542	X	PYK			
129	BLK	P51451	Y389	RpAb	PK543	X	PYK			
130	BLNK	Q8WV28	Y84	RpAb	PN013					
131	BMPR2 (BMPR-II)	Q13873	Pan-specific	MmAb	NK363-1	X	PSTK			
132	BMPR2 (BMPR-II)	Q13873	S375	RpAb	PK544	X	PSTK			
133	Bmx (Etk)	P51813	Pan-specific	MmAb	NK012	X	PYK			
134	Bmx (Etk)	P51813	Y40	RpAb	PK545	X	PYK			
135	BRCA1	P38398	Pan-specific	MmAb	NN395-1					
136	BRCA1	P38398	T509	RpAb	PN690					
137	BRCA1	P38398	S988	MmAb	PN212					
138	BRCA1	P38398	S1423	RpAb	PN116					
139	BRD2	P25440	Pan-specific	MmAb	NK013-2	X	PSTK			
140	BRD2	P25440	S37	RpAb	PK546	X	PSTK			
141	BRK	Q13882	Y342	RpAb	PK548	X	PYK			
142	BRK	Q13882	S446+Y447	RpAb	PK547	X	PYK			
143	BRSK1	Q8TDC3	Pan-specific	MmAb	NK364-1	X	PSTK			
144	BRSK1	Q8TDC3	T189	RpAb	PK549	X	PSTK			
145	Btk	Q06187	Pan-specific	RpAb	NK014	X	PYK			
146	Btk	Q06187	Y223+Y225	RpAb	PK550	X	PYK			
147	Btk	Q06187	Y551	RpAb	PK551	X	PYK			
148	BUB1B (Bub1R)	O60566	S670	RpAb	PK552	X	PSTK			
149	C-EBPa	P49715	T226+T230	RpAb	PN575				X	
150	C3G (RapGEF1)	Q13905	Y504	MmAb	PN216					
151	CAD	P27708	S1859	RpAb	PN691					X
152	Calcineurin A	P48454	Pan-specific	RpAb	NP049-1		PSP	X		
153	CALD1	Q05682	S789	RpAb	PN015					
154	CaMK1a (CAMK1)	Q14012	Pan-specific	GpAb	NK211	X	PSTK			
155	CaMK1a (CAMK1)	Q14012	T177	RpAb	PK553	X	PSTK			
156	CaMK1a (CAMK1)	Q14012	Y235	RpAb	PK874	X	PSTK			
157	CaMK1d	Q8IU85	Pan-specific	MmAb	NK016-3	X	PSTK			
158	CaMK1d	Q8IU85	Pan-specific	GpAb	NK016-2	X	PSTK			
159	CaMK1d	Q8IU85	T180	RpAb	PK554	X	PSTK			
160	CaMK2a	Q9UQM7	Pan-specific	MmAb	NK302-2	X	PSTK			
161	Not listed									
162	CaMK2a	Q9UQM7	T286	RpAb	PK555	X	PSTK			
163	CaMK2a	Q9UQM7	T286	MmAb	PK178	X	PSTK			
164	CaMK2b	Q13554	Pan-specific	RpAb	NK018-3	X	PSTK			
165	CaMK2d	Q13557	Pan-specific	RpAb	NK019-3	X	PSTK			
166	CaMK2g	Q13555	Pan-specific	RpAb	NK020-1	X	PSTK			
167	CaMK4 (CaMPK4)	Q16566	Pan-specific	RpAb	21-2 (NK02	X	PSTK			
168	CaMK4 (CaMPK4)	Q16566	Pan-specific	RpAb	SG-KAP-(	X	PSTK			
169	CaMK4 (CaMPK4)	Q16566	T200	RpAb	PK556	X	PSTK			
170	CaMKK1 (CaMKK)	Q8N5S9	Pan-specific	RpAb	NK022	X	PSTK			
171	CaMKK1 (CaMKK)	Q8N5S9	S74	RpAb	PK557	X	PSTK			
172	CaMKKb (CaMKK2)	Q96RR4	Pan-specific	MmAb	NK366-1	X	PSTK			

Final Order on Array	Target Short Name	UniProt ID	Target P-Site	Ab Type	Kinexus Ab ID	Protein Kinases	PK or PP Type	Phosphatases	Transcription	Other Enzymes
173	Cas-L	Q14511	Y166	RpAb	PN505					
174	CASK (/Lin2)	O14936	Pan-specific	MmAb	NK023-1	X	PSTK			
175	CTNNA1	P35221	S641	RpAb	PN162					
176	CTNNB1	P35222	Pan-specific	MmAb	NN021-2				X	
177	CTNNB1	P35222	Pan-specific	RpAb	NN021				X	
178	CTNNB1	P35222	S33	RpAb	PN166				X	
179	CTNNB1	P35222	S33+S37	MmAb	PN278				X	
180	CTNNB1	P35222	Y333	RpAb	PN167				X	
181	Caveolin 1	Q03135	Pan-specific	MmAb	NN147-2					
182	Caveolin 1	Q03135	Y14	RpAb	PN147					
183	Caveolin 1	Q03135	Y14	MmAb	PN217					
184	Caveolin 2	P51636	Pan-specific	MmAb	NN022-1					
185	Caveolin 2	P51636	S36	RpAb	PN018					
186	Cbl	P22681	Pan-specific	Ab on K	NN171-2					
187	Cbl	P22681	Y674	RpAb	PN743					
188	Cbl	P22681	Y700	RpAb	PN171					
189	Cbl	P22681	Y700	MmAb	PN218					
190	CBS	P35520	S227	RpAb	PN744					X
191	CD45 (PTPRC)	P08575	Pan-specific	MmAb	NP001		PYP	X		
192	CD45 (PTPRC)	P08575	Y1216	RpAb	PP527		PYP	X		
193	CDC2L5 (CHED, CDK13)	Q14004	Pan-specific	RpAb	NK024	X	PSTK		X	
194	CDC2L5 (CHED, CDK13)	Q14004	Pan-specific	RpAb	NK024-2	X	PSTK			
195	CDC5L	Q99459	T385	RpAb	PN576				X	
196	CDC7	O00311	T376	RpAb	PK558	X	PSTK			
197	CDK1 (CDC2)	P06493	Pan-specific	RpAb	NK025-6	X	PSTK			
198	CDK1 (CDC2)	P06493	Pan-specific	MmAb	NK025-1	X	PSTK			
199	CDK1 (CDC2)	P06493	Pan-specific	RpAb	NK204	X	PSTK			
200	CDK1 (CDC2)	P06493	T14	RpAb	PK559	X	PSTK			
201	CDK1 (CDC2)	P06493	T14+Y15	RpAb	PK560	X	PSTK			
202	CDK1 (CDC2)	P06493	Y15	RpAb	PK007-1	X	PSTK			
203	CDK1 (CDC2)	P06493	T161	RpAb	PK008-1	X	PSTK			
204	CDK1 (CDC2)	P06493	T161	RpAb	PK561	X	PSTK			
205	CDK2	P24941	Pan-specific	RpAb	NK026-6	X	PSTK			
206	CDK2	P24941	Pan-specific	MmAb	NK026-3	X	PSTK			
207	CDK2	P24941	T160	RpAb	PK568	X	PSTK			
208	CDK4	P11802	Pan-specific	RpAb	NK027-2	X	PSTK			
209	CDK4	P11802	T172	RpAb	PK569	X	PSTK			
210	CDK5	Q00535	Pan-specific	RpAb	NK028-4	X	PSTK			
211	CDK5	Q00535	Pan-specific	MmAb	NK028-5	X	PSTK			
212	CDK5	Q00535	Y15	RpAb	PK570	X	PSTK			
213	CDK5	Q00535	S159	MmAb	PK179	X	PSTK			
214	CDK6	Q00534	Pan-specific	RpAb	NK029-3	X	PSTK			
215	CDK6	Q00534	Pan-specific	MmAb	NK029-4	X	PSTK			
216	CDK6	Q00534	Y13	RpAb	PK571	X	PSTK			
217	CDK6	Q00534	Y24	RpAb	PK572	X	PSTK			
218	CDK7	P50613	Pan-specific	MmAb	NK030-2	X	PSTK			
219	CDK7	P50613	Pan-specific	RpAb	NK030-1	X	PSTK			
220	CDK7	P50613	T170	RpAb	PK573	X	PSTK			
221	CDK8	P49336	Pan-specific	GpAb	NK031-5	X	PSTK			
222	CDK8	P49336	Pan-specific	RpAb	NK031-4	X	PSTK			
223	CDK9	P50750	Pan-specific	RpAb	NK032	X	PSTK			
224	CDK9	P50750	T186	RpAb	PK575	X	PSTK			
225	CDK9	P50750	S347	RpAb	PK574	X	PSTK			
226	CDK10 (PISSLRE)	Q15131	Pan-specific	RpAb	NK033-2	X	PSTK			
227	CDK10 (PISSLRE)	Q15131	Pan-specific	RpAb	NK033-3	X	PSTK			
228	CDK10 (PISSLRE)	Q15131	T196	RpAb	PK564	X	PSTK			
229	CDK11A (Cdc2L2)	Q9UQ88	T583 (labeled as	RpAb	PK565	X	PSTK			
230	CDK12 (Cdc2L7)	Q9NYV4	S383+S385	RpAb	PK566	X	PSTK			

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231	CDK12 (Cdc2L7)	Q9NYV4	T893	RpAb	PK567	X	PSTK			
232	CDKL1	Q00532	Pan-specific	RpAb	NK199	X	PSTK			
233	CDKL2	Q92772	Pan-specific	RpAb	NK261-1	X	PSTK			
234	CDKL3	Q8IVW4	Pan-specific	RpAb	NK262-1	X	PSTK			
235	CDKL5 (STK9)	O76039	Y171	RpAb	PK576	X	PSTK			
236	Chk1 (CHEK1)	O14757	Pan-specific	RpAb	NK034-2	X	PSTK			
237	Chk1 (CHEK1)	O14757	Pan-specific	MmAb	NK034	X	PSTK			
238	Chk1 (CHEK1)	O14757	S280	RpAb	PK577	X	PSTK			
239	Chk1 (CHEK1)	O14757	S317	RpAb	PK578	X	PSTK			
240	Chk1 (CHEK1)	O14757	S345	RpAb	PK579	X	PSTK			
241	Chk2 (CHEK2)	O96017	Pan-specific	RpAb	NK035	X	PSTK			
242	Chk2 (CHEK2)	O96017	Pan-specific	MmAb	NK035-2	X	PSTK			
243	Chk2 (CHEK2)	O96017	T68	RpAb	PK581	X	PSTK			
244	Chk2 (CHEK2)	O96017	T383	RpAb	PK580	X	PSTK			
245	CK1 delta (CSNK1D)	P48730	Pan-specific	GpAb	NK036	X	PSTK			
246	CK1 epsilon (CSNK1E)	P49674	Pan-specific	MmAb	NK037-1	X	PSTK			
247	CK2a1 (CSNK2A1)	P68400	Pan-specific	MmAb	NK041-3	X	PSTK			
248	CK2a1 (CSNK2A1)	P68400	Pan-specific	RpAb	NK041-2	X	DSK			
249	CK2a1 (CSNK2A1)	P68400	Y255	RpAb	PK582	X	DSK			
250	CK2a1 (CSNK2A1)	P68400	T360+S362	RpAb	PK167	X	DSK			
251	CLK1	P49759	S337	RpAb	PK583	X	DSK			
252	CLK1	P49759	S337+T338	RpAb	PK584	X	DSK			
253	CLK1/4	759/Q9H	Pan-specific	MmAb	NK370-1	X	DSK			
254	CLK3	P49761	Pan-specific	MmAb	NK372-1	X	DSK			
255	CFL1	P23528	S3	RpAb	PN019					
256	CFL1	P23528	S3	MmAb	PN220					
257	Connexin 43 (GJA1)	P17302	S368	RpAb	PN148					
258	Connexin 43	P17302	Pan-specific	MmAb	NN398-1					
259	COT (MAP3K8, TPL2)	P41279	Pan-specific	RpAb	NK042-1	X	PSTK			
260	COT (MAP3K8, TPL2)	P41279	Pan-specific	RpAb	NK042-2	X	PSTK			
261	COT (MAP3K8, TPL2)	P41279	S334	RpAb	PK585	X	PSTK			
262	COX2	P35354	Y446	RpAb	PN695					X
263	COX2 (MTCO2)	P00403	Pan-specific	MmAb	NN027-2					X
264	Not listed									
265	CAD (CPS2)	P27708	T456	MmAb	PN221					X
266	CREB1	P16220	S129+S133	RpAb	PN577				X	
267	CREB1	P16220	S133	RpAb	PN553				X	
268	CrkL	P46109	Pan-specific	MmAb	NN182-2					
269	CrkL	P46109	Y251	RpAb	PN507					
270	CRYAB	P02511	S19	RpAb	PN025					
271	CRYAB	P02511	S45	RpAb	PN110					
272	CSF1R (Fms)	P07333	Pan-specific	RpAb	NK234-3	X	PYK			
273	CSF1R (Fms)	P07333	Pan-specific	RpAb	NK234-4	X	PYK			
274	CSF1R (Fms)	P07333	Y699	RpAb	PK587	X	PYK			
275	CSF1R (Fms)	P07333	S807+Y809	RpAb	PK586	X	PYK			
276	CSF1R (Fms)	P07333	Y809	RpAb	PK588	X	PYK			
277	Csk	P41240	Pan-specific	MmAb	NK044-3	X	DSK			
278	Csk	P41240	Pan-specific	MmAb	NK044	X	PYK			
279	Csk	P41240	Y184	RpAb	PK589	X	PYK			
280	CTNNB1	P35222	S33+S37+T41+	RpAb	PN578				X	
281	CTNNB1	P35222	Y489	RpAb	PN745				X	
282	CTNNB1	P35222	Y654	RpAb	PN579				X	
283	CUX1 (CUTL1)	P39880	S1270	RpAb	PN580				X	
284	CLNB1	P14635	Pan-specific	MmAb	NN029					
285	CLNB1	P14635	S147	RpAb	PN190					
286	CLNE	P24864	T395	RpAb	PN191					
287	DCK	P27707	S74	RpAb	PN696					X
288	DDR1	Q08345	Pan-specific	RpAb	NK263-1	X	PYK			

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289	DDR1	Q08345	Y796+Y797	RpAb	PK591	X	PYK			
290	DDR1	Q08345	Y797	RpAb	PK592	X	PYK			
291	DDR2 (Tyro10)	Q16832	Pan-specific	MmAb	NK183-3	X	PSTK			
292	DDR2 (Tyro10)	Q16832	Y736	RpAb	PK593	X	PYK			
293	DDR2 (Tyro10)	Q16832	Y740	RpAb	PK594	X	PYK			
294	DLK (ZPK)	Q12852	S269	RpAb	PK590	X	PSTK			
295	DMPK1 (DMPK)	Q09013	Pan-specific	RpAb	NK264-1	X	PSTK			
296	DMPK2 (MRCK-g)	Q6DT37	Pan-specific	RpAb	NK265-1	X	PSTK			
297	DNAPK (PRKDC)	P78527	Pan-specific	RpAb	NK048-4	X	PSTK			
298	DNAPK (PRKDC)	P78527	Pan-specific	RpAb	NK048-7	X	PSTK			
299	DNAPK (PRKDC)	P78527	Y883	RpAb	PK596	X	PSTK			
300	DNAPK (PRKDC)	P78527	T2609	RpAb	PK595	X	PSTK			
301	DNMT3A	Q9Y6K1	S105	RpAb	PN746					X
302	Dok3	Q7L591	Y398	RpAb	PN508					
303	DPYD	Q12882	S766+T768	RpAb	PN747					X
304	Dynamin I	Q05193	S795	MmAb	PN222					
305	DYRK1A	Q13627	Y321	RpAb	PK597	X	PSTK			
306	DYRK2	Q92630	Pan-specific	RpAb	NK266-1	X	PSTK			
307	DYRK2	Q92630	Y382	RpAb	PK598	X	PSTK			
308	DYRK3	O43781	Pan-specific	MmAb	NK374-1	X	PSTK			
309	DYRK4	Q9NR20	Pan-specific	MmAb	NK375-2	X	PSTK			
310	DYRK4	Q9NR20	Pan-specific	MmAb	NK375-1	X	PSTK			
311	EEF1A1	P68104	Y141	RpAb	PN509					
312	EEF2	P13639	T57	RpAb	PN555					
313	eEF2K	O00418	S366	MmAb	PK180	X	PSTK			
314	EGFR (ErbB1)	P00533	Pan-specific	RpAb	NK052-6	X	PYK			
315	EGFR (ErbB1)	P00533	Pan-specific	RpAb	NK052-4	X	PYK			
316	EGFR (ErbB1)	P00533	Y869	RpAb	PK602	X	PYK			
317	EGFR (ErbB1)	P00533	Y998	RpAb	PK603	X	PYK			
318	EGFR (ErbB1)	P00533	Y1069	RpAb	PK599	X	PYK			
319	EGFR (ErbB1)	P00533	Y1110	RpAb	PK600	X	PYK			
320	EGFR (ErbB1)	P00533	Y1172	RpAb	PK601	X	PYK			
321	EGFR (ErbB1)	P00533	Y1172	RpAb	PK010	X	PYK			
322	eIF2a	P05198	Pan-specific	RpAb	NN038-1					
323	eIF2a	P05198	S52	RpAb	PN028-1					
324	EIF2AK3 (PERK)	Q9NZJ5	T982	RpAb	PK604	X	PSTK			
325	eIF4B	P23588	Pan-specific	MmAb	NN407-1					
326	eIF4B	P23588	S422	RpAb	PN172					
327	eIF4E	P06730	Pan-specific	MmAb	NN039-3					
328	Not listed									
329	eIF4G (eIF4G1)	Q04637	Pan-specific	MmAb	NN408-1					
330	eIF4G (eIF4G1)	Q04637	S1106	RpAb	PN031					
331	eIF4G (eIF4G1)	Q04637	S1231	RpAb	PN193					
332	Elk-1	P19419	S324	RpAb	PN581				X	
333	Elk-1	P19419	S383	MmAb	PN223				X	
334	EML4	Q9HC35	Y226	RpAb	PN510					
335	ENO1	P06733	Y44	RpAb	PN511					X
336	ENO2	P09104	Y25	RpAb	PN512					X
337	EP300 (p300)	Q09472	S2279	RpAb	PN748				X	
338	EGFR (ErbB1)	P00533	Pan-specific	RpAb	NK052-5	X	PYK			
339	EphA1	P21709	Y781	RpAb	PK605	X	PYK			
340	EphA2	P29317	Y588	RpAb	PK606	X	PYK			
341	EphA2	P29317	Y772	RpAb	PK607	X	PYK			
342	EphA3	P29320	Y779	RpAb	PK608	X	PYK			
343	EphA4	P54764	Pan-specific	MmAb	NK376-1	X	PYK			
344	EphB1	P54762	Y594	RpAb	PK609	X	PYK			
345	EphB2	P29323	Pan-specific	RpAb	NK267-1	X	PYK			
346	EphB2	P29323	Pan-specific	RpAb	NK267-2	X	PYK			

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347	EphB2	P29323	Y780	RpAb	PK610	X	PYK			
348	EphB3	P54753	Y600	RpAb	PK611	X	PYK			
349	EphB4	P54760	Y596	RpAb	PK612	X	PYK			
350	ENFB2	P52799	Pan-specific	MmAb	NN410-1					
351	ENFB2	P52799	Y316	RpAb	PN173					
352	ERa (ESR1)	P03372	Pan-specific	MmAb	NN411-1				X	
353	ERa (ESR1)	P03372	S104	RpAb	PN198				X	
354	ERa (ESR1)	P03372	S167	RpAb	PN583				X	
355	ErbB2 (HER2, Neu)	P04626	Pan-specific	RpAb	NK054-4	X	PYK			
356	ErbB2 (HER2, Neu)	P04626	Pan-specific	RpAb	NK054-6	X	PYK			
357	ErbB2 (HER2, Neu)	P04626	Y735	RpAb	PK614	X	PYK			
358	ErbB2 (HER2, Neu)	P04626	Y877	RpAb	PK615	X	PYK			
359	ErbB2 (HER2, Neu)	P04626	Y1248	RpAb	PK613	X	PYK			
360	ERBB2IP (Erbin)	Q96RT1	Y1104	RpAb	PN513					
361	ErbB3 (HER3)	P21860	Pan-specific	RpAb	NK231-2	X	PYK			
362	ErbB3 (HER3)	P21860	Pan-specific	RpAb	NK231-3	X	PYK			
363	ErbB3 (HER3)	P21860	Y1289	RpAb	PK616	X	PYK			
364	ErbB3 (HER3)	P21860	Y1307	RpAb	PK617	X	PYK			
365	ErbB3 (HER3)	P21860	Y1328	RpAb	PK618	X	PYK			
366	ErbB4 (HER4)	Q15303	Pan-specific	RpAb	NK235-1	X	PYK			
367	ErbB4 (HER4)	Q15303	Pan-specific	RpAb	NK235-3	X	PYK			
368	Not listed									
369	ErbB4 (HER4)	Q15303	Y875	RpAb	PK620	X	PYK			
370	ERF	P50548	T526	RpAb	PN584				X	
371	ERK1 (MAPK3)	P27361	Pan-specific	RpAb	NK055-1	X	PSTK			
372	ERK1 (MAPK3)	P27361	Pan-specific	RpAb	NK055-3	X	PSTK			
373	ERK1 (MAPK3)	P27361	Pan-specific	RpAb	NK055-4	X	PSTK			
374	ERK1 (MAPK3)	P27361	T202+Y204	RpAb	PK621	X	PSTK			
375	ERK1 (MAPK3)	P27361	T202+Y204	MmAb	PK182	X	PSTK			
376	ERK1 (MAPK3)	P27361	Y204	RpAb	PK864	X	PSTK			
377	ERK1 (MAPK3)	P27361	Y204	MmAb	PK183	X	PSTK			
378	ERK1 (MAPK3)	P27361	Y204+T207	RpAb	PK866	X	PSTK			
379	ERK1 (MAPK3)	P27361	T207	RpAb	PK865	X	PSTK			
380	ERK1 (MAPK3)	P27361	S265	RpAb	PK878	X	PSTK			
381	ERK1 (MAPK3)	P27361	S283	RpAb	PK879	X	PSTK			
382	ERK2 (MAPK1)	P28482	Pan-specific	RpAb	NK056-3	X	PSTK			
383	ERK2 (MAPK1)	P28482	Pan-specific	RpAb	NK056-4	X	PSTK			
384	ERK2 (MAPK1)	P28482	Y263+S266	RpAb	PK880	X	PSTK			
385	ERK3 (MAPK6)	Q16659	Pan-specific	RpAb	NK057-2	X	PSTK			
386	ERK3 (MAPK6)	Q16659	S189	RpAb	PK623	X	PSTK			
387	ERK4 (MAPK4)	P31152	Pan-specific	RpAb	NK058	X	PSTK			
388	ERK4 (MAPK4)	P31152	S186	RpAb	PK624	X	PSTK			
389	ERK5 (MAPK7)	Q13164	Pan-specific	GpAb	NK206-3	X	PSTK			
390	ERK5 (MAPK7)	Q13164	Pan-specific	RpAb	NK206-5	X	PSTK			
391	ERK5 (MAPK7)	Q13164	T219+Y221	MmAb	PK184	X	PSTK			
392	ERK5 (MAPK7)	Q13164	Y221	RpAb	PK626	X	PSTK			
393	ESRRA (ERR1)	P11474	S19+S22	RpAb	PN585				X	
394	ESYT1	Q9BSJ8	Y822	RpAb	PN514					
395	Ets-1	P14921	S282	RpAb	PN586				X	
396	ETV6 (Tel)	P41212	S22	RpAb	PN587				X	
397	EZH2	Q15910	T487	RpAb	PN697					X
398	EZR	P15311	Y146	MmAb	PN224					
399	EZR	P15311	Y354	RpAb	PN175					
400	Not listed									
401	FAK (PTK2)	Q05397	Pan-specific	RpAb	NK060	X	PYK			
402	FAK (PTK2)	Q05397	Pan-specific	MmAb	NK060-2	X	PYK			
403	FAK (PTK2)	Q05397	Y397	MmAb	PK017-1	X	PYK			
404	FAK (PTK2)	Q05397	Y397	RpAb	PK627	X	PYK			

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405	FAK (PTK2)	Q05397	Y576+Y577	RpAb	PK151	X	PYK			
406	FAK (PTK2)	Q05397	Y576+Y577	RpAb	PK628	X	PYK			
407	FAK (PTK2)	Q05397	Y577	RpAb	PK629	X	PYK			
408	FAK (PTK2)	Q05397	S722	RpAb	PK020-3	X	PYK			
409	FAK (PTK2)	Q05397	S910	RpAb	PK024	X	PYK			
410	FASN (FAS)	P49327	Y45	RpAb	PN749					X
411	FASN (FAS)	P49327	S207	RpAb	PN698					X
412	FBPase (FBP1)	P09467	S88	RpAb	PN750					X
413	FBPase (FBP1)	P09467	Y265	RpAb	PN699					X
414	FBPase 2 (FBP2)	O00757	Y216	RpAb	PN700					X
415	FBPase 2 (FBP2)	O00757	Y259	RpAb	PN751					X
416	Fer (TYK3)	P16591	Y402	RpAb	PK630	X	PYK			
417	Fes	P07332	Pan-specific	RpAb	NK061	X	PYK			
418	Fes	P07332	Y713	RpAb	PK632	X	PYK			
419	Fes	P07332	Y713+S716	RpAb	PK633	X	PYK			
420	FGFR1	P11362	Pan-specific	RpAb	NK062-3	X	PYK			
421	FGFR1	P11362	Y653+Y654	RpAb	PK634	X	PYK			
422	FGFR2 (BEK)	P21802	Pan-specific	RpAb	NK063-4	X	PYK			
423	FGFR2 (BEK)	P21802	Pan-specific	RpAb	NK063-2	X	PYK			
424	FGFR2 (BEK)	P21802	Y656+Y657	RpAb	PK635	X	PYK			
425	FGFR3	P22607	Pan-specific	RpAb	NK236-2	X	PYK			
426	FGFR3	P22607	Pan-specific	RpAb	NK236-3	X	PYK			
427	FGFR3	P22607	Y647+Y648	RpAb	PK636	X	PYK			
428	FGFR3	P22607	Y647+Y648	RpAb	PK637	X	PYK			
429	FGFR4	P22455	Pan-specific	RpAb	NK239-3	X	PYK			
430	Fgr	P09769	Pan-specific	RpAb	NK268-1	X	PYK			
431	Fgr	P09769	Y208+Y209	RpAb	PK638	X	PYK			
432	Fgr	P09769	Y412	RpAb	PK639	X	PYK			
433	FOXO1A (FKHR)	Q12778	S256	RpAb	PN194				X	
434	FOXO1A (FKHR)	Q12778	S319	RpAb	PN195				X	
435	Flt3 (STK1)	P36888	Pan-specific	RpAb	NK240-1	X	PYK			
436	Flt3 (STK1)	P36888	Pan-specific	RpAb	NK240-2	X	PYK			
437	Flt3 (STK1)	P36888	Y842	RpAb	PK640	X	PYK			
438	Fos	P01100	Pan-specific	RpAb	NN044				X	
439	Fos	P01100	T232	RpAb	PN033				X	
440	Fos	P01100	T232	RpAb	PN588				X	
441	Fos	P01100	S362+S363	RpAb	PN589				X	
442	FOXK1	P85037	S441+S445	RpAb	PN590				X	
443	FOXK2	Q01167	S424+S428	RpAb	PN591				X	
444	FOXM1	Q08050	T611	RpAb	PN592				X	
445	FOXO1A (FKHR)	Q12778	S256	RpAb	PN593				X	
446	FOXO1A (FKHR)	Q12778	S319	RpAb	PN594				X	
447	FOXO1A (FKHR)	Q12778	S329	RpAb	PN595				X	
448	FOXO3 (FKHRL1)	O43524	T32	RpAb	PN596				X	
449	FOXO3 (FKHRL1)	O43524	S294	RpAb	PN597				X	
450	FRA1 (FOSL1)	P15407	S265	RpAb	PN599				X	
451	Frk	P42685	Pan-specific	RpAb	NK269-1	X	PYK			
452	Frk	P42685	Pan-specific	RpAb	NK269-2	X	PYK			
453	Frk	P42685	Y387	RpAb	PK641	X	PYK			
454	Frk	P42685	Y497	RpAb	PK642	X	PYK			
455	FRS2	Q8WU20	Pan-specific	MmAb	NN415-1					
456	FRS2	Q8WU20	Y349	RpAb	PN146					
457	Fused (STK36)	Q9NRP7	S159	RpAb	PK643	X	PYK			
458	Fyn	P06241	Pan-specific	MmAb	NK065	X	PYK			
459	Fyn	P06241	Pan-specific	RpAb	NK065-2	X	PYK			
460	Fyn	P06241	T12	MmAb	PK186	X	PYK			
461	Fyn	P06241	Y213+Y214	RpAb	PK644	X	PYK			
462	Fyn	P06241	Y420	RpAb	PK881	X	PYK			

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463	Fyn	P06241	Y531	RpAb	PK645	X	PYK			
464	G6PD	P11413	Y401	RpAb	PN515					X
465	G6PD	P11413	Y503+Y507	RpAb	PN701					X
466	Gab1	Q13480	Y406	RpAb	PN516					
467	Not listed									
468	GATA1	P15976	S142	RpAb	PN196				X	
469	GATA3	P23771	S369	RpAb	PN702				X	
470	GATA4	P43694	S262	MmAb	PN225				X	
471	GATAD2B	Q8WXI9	T120+S122	RpAb	PN600				X	
472	GCK (MAP4K2)	Q12851	Pan-specific	GpAb	NK066	X	PSTK			
473	GCK (MAP4K2)	Q12851	S170	RpAb	PK646	X	PSTK			
474	GK	P35557	S411	RpAb	PK893					X
475	GCLC	P48506	S5+S8	RpAb	PN752					
476	GCN2 (EIF2AK4)	Q9P2K8	T667	RpAb	PK877	X	PSTK			
477	GFAP	P14136	Pan-specific	MmAb	NN260-2					
478	GFAP	P14136	S8	MmAb	PN034					
479	GIT1	Q9Y2X7	Y545	RpAb	PN517					
480	GluR1	P42261	S849	RpAb	PN178					
481	GOLGA2 (GM130)	Q08379	S25	MmAb	PN226					
482	IL6ST (GP130)	P40189	S782	MmAb	PN227					
483	GR	P04150	S226	RpAb	PN601				X	
484	GRK1 (Rhodopsin kinase)	Q15835	Pan-specific	MmAb	NK382-1	X	PSTK			
485	BARK1 (GRK2, ADRBK1)	P25098	Pan-specific	MmAb	NK067-2	X	PSTK			
486	BARK1 (GRK2, ADRBK1)	P25098	Pan-specific	RpAb	NK067	X	PSTK			
487	BARK1 (GRK2, ADRBK1)	P25098	S670	RpAb	PK025	X	PSTK			
488	GRK5	P34947	Pan-specific	MmAb	-2 (should l	X	PSTK			
489	GRK7	Q8WTQ7	Pan-specific	MmAb	NK381-1	X	PSTK			
490	GSK3a	P49840	Pan-specific	MmAb	069-NK07(	X	PSTK			
491	GSK3a	P49840	Pan-specific	RpAb	NK069-3	X	PSTK			
492	GSK3a	P49840	T19+S21	RpAb	PK648	X	PSTK			
493	GSK3a	P49840	S21	MmAb	PK187	X	PSTK			
494	GSK3a	P49840	S278+Y279	RpAb	PK647	X	PSTK			
495	GSK3a	P49840	Y279	RpAb	PK649	X	PSTK			
496	GSK3a	P49840	Y284+Y285	RpAb	PK650	X	PSTK			
497	GSK3b	P49841	Pan-specific	RpAb	NK270-3	X	PSTK			
498	GSK3b	P49841	Pan-specific	RpAb	NK070	X	PSTK			
499	GSK3b	P49841	S9	MmAb	PK188	X	PSTK			
500	GSK3b	P49841	T275+T277	RpAb	PK883	X	PSTK			
501	GTF2F1	P35269	S385+T389	RpAb	PK651	X	PSTK		X	
502	GTF2I	P78347	S412	RpAb	PN602				X	
503	GUK1	Q16774	Y53	RpAb	PK652	X	PSTK			
504	GYS1	P13807	S641+S645	RpAb	PN703					X
505	GYS2	P54840	Y45	RpAb	PN704					X
506	HCA59	Q9NZ63	Y147	RpAb	PN518					
507	HCFC1	P51610	S1507	RpAb	PN604				X	
508	Hck	P08631	Pan-specific	RpAb	NK271-1	X	PYK			
509	HDAC4	P56524	Pan-specific	RpAb	NN169					
510	HDAC4/5/9	P56524	S246/259/220	RpAb	PN179					
511	HDAC5	Q9UQL6	S498	RpAb	PN188					
512	HePTP (PTPN7)	P35236	S44	RpAb	PP500		PYP	X		
513	HePTP (PTPN7)	P35236	T66	RpAb	PP501		PYP	X		
514	HePTP (PTPN7)	P35236	S143	RpAb	PP528		PYP	X		
515	HGK (ZC1)	O95819	Pan-specific	RpAb	NK300-1	X	PSTK			
516	HGK (ZC1)	O95819	T187	RpAb	PK653	X	PSTK			
517	HGS (Hrs)	O14964	Y216	RpAb	PN519					
518	HIPK1	Q86Z02	Y352	RpAb	PK654	X	PSTK			
519	HIPK2	Q9H2X6	Pan-specific	RpAb	NK272-1	X	PSTK			
520	H2AFX	P16104	S139	MmAb	PN036					

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521	H2B	P33778	S14	RpAb	PN037					
522	H3.1	P84243	T3	RmAb	PN101-2					
523	H3.1	P84243	S10	RpAb	PN038					
524	H3.1	P84243	S28	RpAb	PN039					
525	H3.1	P84243	S28	MmAb	PN228					
526	HMGA1	P17096	S36+T39	RpAb	PN605				X	
527	HMGA1	P17096	T53	RpAb	PN606				X	
528	HMGB1	P09429	S35+S39	RpAb	PN607				X	
529	HMGCR	P04035	S872	RpAb	PN705					X
530	HMGCS1	Q01581	S495	RpAb	PN754					X
531	HNF4A	P41235	S167	RpAb	PN608				X	
532	hnRNP-K	P61978	S302	MmAb	PN229					
533	Hpk1 (MAP4K1)	Q92918	Pan-specific	GpAb	NK072	X	PSTK			
534	HRAS	P01112	Pan-specific	RpAb	NN281-3					
535	HRAS	P01112	Y157	RpAb	PN755					
536	HRI (HCR; EIF2AK1)	Q9BQI3	Pan-specific	MmAb	NK383-1	X	PSTK			
537	Not listed									
538	HSF1	Q00613	Pan-specific	ratmA	NN268-2					
539	HSF1	Q00613	S303+S307	RpAb	PN609				X	
540	HSP27 (HSP28; HSPB1)	P04792	Pan-specific	RpAb	NN152-2					
541	HSP27 (HSP28; HSPB1)	P04792	S78	RpAb	PN041					
542	HSP27 (HSP28; HSPB1)	P04792	S82	MmAb	PN230					
543	HSP90a (HSP90AA1)	P07900	Pan-specific	MmAb	NN061					
544	HSP90AB1 (HSP90B)	P08238	Pan-specific	MmAb	NN061-18					
545	HSP90AB1 (HSP90B)	P08238	Y484	RpAb	PN520					
546	Huntingtin	P42858	Pan-specific	MmAb	NN422-1					
547	Huntingtin	P42858	S419	RpAb	PN103					
548	ICK	Q9UPZ9	Pan-specific	MmAb	NK073-2	X	PSTK			
549	ICK	Q9UPZ9	Y156+T157	RpAb	PK655	X	PSTK			
550	ICK	Q9UPZ9	Y159	RpAb	PK656	X	PSTK			
551	IDH1	O75874	T75+T77	RpAb	PN706					X
552	IDH1	O75874	Y391	RpAb	PN757					X
553	IGF1R	P08069	Pan-specific	MmAb	NK074-4	X	PYK			
554	IGF1R	P08069	Pan-specific	RpAb	NK074-2	X	PYK			
555	IGF1R	P08069	Y1161+T1163	RpAb	PK657	X	PYK			
556	IGF1R	P08069	Y1280	RpAb	PK152	X	PYK			
557	IGF1R	P08069	Y1346	RpAb	PK658	X	PYK			
558	IkBa	P25963	Pan-specific	RpAb	NN064					
559	IkBa	P25963	S32	MmAb	PN232					
560	IkBa	P25963	Y42	RpAb	PN164					
561	IkBe	O00221	S161	RpAb	PN168					
562	IKKa (IkBKA)	O15111	T23	RpAb	PK154	X	PSTK			
563	IKKa (IkBKA)	O15111	T179+S180	RpAb	PK659	X	PSTK			
564	IKKb (IkBKB)	O14920	Pan-specific	MmAb	NK076-7	X	PSTK			
565	IKKe (IkBKE)	Q14164	S172	RpAb	PK660	X	PSTK			
566	IKKg (NEMO)	Q9Y6K9	Pan-specific	MmAb	NN077-2					
567	IKKg (NEMO)	Q9Y6K9	S376	MmAb	PK189					
568	IKKg (NEMO)	Q9Y6K9	S377	RpAb	PN758					
569	IKZF1	Q13422	Y413	RpAb	PN707				X	
570	ILK1 (ILK)	Q13418	Pan-specific	MmAb	NK078-4	X	PSTK			
571	ILK1 (ILK)	Q13418	S343	RpAb	PK661	X	PSTK			
572	ILK1 (ILK)	Q13418	Y351	RpAb	PK662	X	PSTK			
573	InsR (IR)	P06213	Pan-specific	RpAb	NK079-2	X	PYK			
574	InsR (IR)	P06213	Pan-specific	MmAb	NK079-3	X	PYK			
575	InsR (IR)	P06213	Y1189	RpAb	PK663	X	PYK			
576	ITGA4 (CD49D)	P13612	Pan-specific	MmAb	NN424-1					
577	ITGB3	P05106	Y785	MmAb	PN231					
578	IRAK1	P51617	Pan-specific	RpAb	NK080-2	X	PSTK			

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579	IRAK1	P51617	T387	RpAb	PK664	X	PSTK			
580	IKKb (IkBKB)	O14920	Pan-specific	RpAb	NK076-5	X	PSTK			
581	IRAK4	Q9NWZ3	T345+S346	RpAb	PK665	X	PSTK			
582	IRF3	Q14653	T135	RpAb	PN610				X	
583	IRR (INSRR)	P14616	Pan-specific	RpAb	NK273-1	X	PYK			
584	IRS1	P35568	Pan-specific	MmAb	NN383-2					
585	IRS1	P35568	S312	RpAb	PN117					
586	IRS1	P35568	S639	RpAb	PN118					
587	ITK	Q08881	Pan-specific	RpAb	NK274-1	X	PYK			
588	ITK	Q08881	Y512	RpAb	PK666	X	PYK			
589	ITSN2	Q9NZM3	Y968	RpAb	PN521					
590	IWS1	Q96ST2	S720+T721+T7	RpAb	PN611				X	
591	JAK1	P23458	Pan-specific		NK084-2	X	PYK			
592	JAK1	P23458	Pan-specific	RpAb	NK084-5	X	PYK			
593	JAK1	P23458	Y1022	RpAb	PK126	X	PYK			
594	JAK1	P23458	Y1034+Y1035	RpAb	PK884	X	PYK			
595	JAK1	P23458	T1107	RpAb	PK895	X	PYK			
596	JAK2	O60674	Pan-specific	RpAb	NK085-3	X	PYK			
597	JAK2	O60674	Pan-specific	RpAb	NK085-4	X	PYK			
598	JAK2	O60674	Y570	RpAb	PK668	X	PYK			
599	JAK2	O60674	Y1007+Y1008	RpAb	PK034-1	X	PYK			
600	JAK2	O60674	Y1007+Y1008	RpAb	PK667	X	PYK			
601	JAK3	P52333	Pan-specific	MmAb	NK086	X	PYK			
602	JAK3	P52333	Pan-specific	RpAb	NK086-4	X	PYK			
603	JAK3	P52333	Y980+Y981	RpAb	PK669	X	PYK			
604	JNK1 (MAPK8)	P45983	Pan-specific	MmAb	NK189-5	X	PSTK			
605	JNK1 (MAPK8)	P45983	Pan-specific	RpAb	NK217-2	X	PSTK			
606	JNK1 (MAPK8)	P45983	T183+Y185	RpAb	PK035-2	X	PSTK			
607	JNK1 (MAPK8)	P45983	T183+Y185	MmAb	PK190	X	PSTK			
608	JNK1 (MAPK8)	P45983	Y185	RpAb	PK670	X	PSTK			
609	JNK2 (MAPK9)	P45984	Pan-specific	RpAb	NK189-2	X	PSTK			
610	JNK2 (MAPK9)	P45984	Pan-specific	RpAb	NK189-3	X	PSTK			
611	JNK3 (MAPK10)	P53779	Pan-specific	RpAb	NK197-2	X	PSTK			
612	Jun (c-Jun)	P05412	Pan-specific	MmAb	NN162				X	
613	Jun (c-Jun)	P05412	S63	MmAb	PN213				X	
614	Jun (c-Jun)	P05412	S63	RpAb	PN557				X	
615	Jun (c-Jun)	P05412	S73	RpAb	PN612				X	
616	Jun (c-Jun)	P05412	T91	RpAb	PN163				X	
617	Jun (c-Jun)	P05412	T91+T93	MmAb	PN214				X	
618	Jun (c-Jun)	P05412	Y170	RpAb	PN155				X	
619	Jun (c-Jun)	P05412	T239	RpAb	PN613				X	
620	Jun (c-Jun)	P05412	S243	RpAb	PN614				X	
621	KHS1 (MAP4K5; KHS)	Q9Y4K4	Pan-specific	GpAb	NK089	X	PSTK			
622	KHS1 (MAP4K5; KHS)	Q9Y4K4	Y31	RpAb	PK672	X	PSTK			
623	KHS1 (MAP4K5; KHS)	Q9Y4K4	S174	RpAb	PK671	X	PSTK			
624	Kit	P10721	Pan-specific	MmAb	NK241-4	X	PYK			
625	Kit	P10721	Pan-specific	RpAb	NK241-2	X	PYK			
626	Kit	P10721	Y703	RpAb	PK036	X	PYK			
627	Kit	P10721	Y721	RpAb	PK885	X	PYK			
628	Kit	P10721	Y730	RpAb	PK037	X	PYK			
629	Kit	P10721	S821+Y823	RpAb	PK674	X	PYK			
630	Kit	P10721	Y936	RpAb	PK673	X	PYK			
631	Ksr-1	Q8IVT5	Pan-specific	GpAb	NK090-2	X	PSTK			
632	Ksr1	Q8IVT5	Pan-specific	RpAb	NK090-1	X	PSTK			
633	Ksr1	Q8IVT5	S406	RpAb	PK675	X	PSTK			
634	Ksr2	Q6VAB6	S490	RpAb	PK676	X	PSTK			
635	Kv4.2 (KCND2)	Q9NZV8	T602	MmAb	PN233					
636	Kv4.2 (KCND2)	Q9NZV8	T607	MmAb	PN234					

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637	LATS1	O95835	Pan-specific	MmAb	NK091-3	X	PSTK			
638	LATS1	O95835	Pan-specific	RpAb	NK091-2	X	PSTK			
639	LATS1	O95835	S464	RpAb	PK677	X	PSTK			
640	LATS1	O95835	S909	RpAb	PK678	X	PSTK			
641	LATS2 (KPM)	Q9NRM7	Pan-specific	RpAb	NK092-1	X	PSTK			
642	LATS2 (KPM)	Q9NRM7	Pan-specific	RpAb	NK092-2	X	PSTK			
643	Lck	P06239	Pan-specific	MmAb	NK353-4	X	PYK			
644	Lck	P06239	Y192	RpAb	PK679	X	PYK			
645	Lck	P06239	Y263+Y264	RpAb	PK680	X	PYK			
646	Lck	P06239	Y394	MmAb	PK149	X	PYK			
647	Not listed									
648	LEDGF	O75475	S273+S275	RpAb	PN615				X	
649	LEF1	Q9UJU2	T155	RpAb	PN616				X	
650	LIMK1	P53667	Pan-specific	MmAb	NK093	X	PSTK			
651	LIMK1	P53667	T508	RpAb	PK681	X	PSTK			
652	LKB1 (STK11)	Q15831	Pan-specific	RpAb	NK227-3	X	PSTK			
653	LKB1 (STK11)	Q15831	Pan-specific	RpAb	NK227-4	X	PSTK			
654	LKB1 (STK11)	Q15831	S31	RpAb	PK682	X	PSTK			
655	LKB1 (STK11)	Q15831	S428	RpAb	PK683	X	PSTK			
656	LKB1 (STK11)	Q15831	S428	MmAb	PK191	X	PSTK			
657	LMR2 (LMTK2, KPI-2)	Q8IWU2	Pan-specific	MmAb	NK384-1	X	PYK			
658	LMR2 (LMTK2, KPI-2)	Q8IWU2	S1450	RpAb	PK684	X	PYK			
659	LOK	O94804	S191	RpAb	PK685	X	PSTK			
660	LOK	O94804	T952	RpAb	PK686	X	PSTK			
661	LRRK2 (PARK8)	Q5S007	Pan-specific	MmAb	NK303-1	X	PSTK			
662	LTK	P29376	Y672	RpAb	PK687	X	PYK			
663	Lyn	P07948	Pan-specific	MmAb	NK095	X	PYK			
664	Lyn	P07948	Pan-specific	RpAb	NK095-2	X	PYK			
665	Lyn	P07948	Y508	RpAb	PK688	X	PYK			
666	MAFG	O15525	S124	RpAb	PN617				X	
667	MAK	P20794	T157	RpAb	PK689	X	PSTK			
668	MAPKAPK2 (RPS6KC1)	P49137	Pan-specific	RpAb	NK097-2	X	PSTK			
669	MAPKAPK2 (RPS6KC1)	P49137	Pan-specific	GpAb	NK097	X	PSTK			
670	MAPKAPK2 (RPS6KC1)	P49137	T222	RpAb	PK690	X	PSTK			
671	MAPKAPK2 (RPS6KC1)	P49137	Y225+T226	RpAb	PK691	X	PSTK			
672	MAPKAPK2 (RPS6KC1)	P49137	T334	MmAb	PK192	X	PSTK			
673	MAPKAPK3	Q16644	Y76	RpAb	PK692	X	PSTK			
674	MAPKAPK5 (PRAK)	Q8IW41	T186	RpAb	PK693	X	PSTK			
675	MARK1	Q9P0L2	Pan-specific	RpAb	NK098-2	X	PSTK			
676	MARK1	Q9P0L2	T215	RpAb	PK695	X	PSTK			
677	MARK2	Q7KZI7	Pan-specific	RpAb	NK275-1	X	PSTK			
678	MARK2	Q7KZI7	Pan-specific	RpAb	NK275-2	X	PSTK			
679	MARK3	P27448	Pan-specific	RpAb	NK276-1	X	PSTK			
680	MARK3	P27448	Pan-specific	RpAb	NK276-2	X	PSTK			
681	MARK3	P27448	T507	RpAb	PK697	X	PSTK			
682	MARK4	Q96L34	Pan-specific	RpAb	NK277-1	X	PSTK			
683	MARK4	Q96L34	Pan-specific	RpAb	NK277-2	X	PSTK			
684	MAT1A	Q00266	T341	RpAb	PN759					X
685	MBP	P02686	T232	MmAb	PN235					
686	MBP	P02686	T232	RpAb	PN558					
687	MCM2	P49736	S40+S41	RpAb	PN618				X	
688	MCM2	P49736	Y137+S139	RpAb	PN620				X	
689	MDM2	Q00987	Pan-specific	MmAb	NN428-1					
690	MDM2	Q00987	S166	RpAb	PN169					
691	MEF2A	Q02078	Pan-specific	MmAb	NN429-1				X	
692	MEF2A	Q02078	T108	RpAb	PN622				X	
693	MEF2C	Q06413	S387	MmAb	PN236				X	
694	MEF2C	Q06413	S396	RpAb	PN623				X	

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695	MEF2D	Q14814	S121	RpAb	PN624				X	
696	MEF2D	Q14814	S180	RpAb	PN625				X	
697	MEK1 (MKK1, MAP2K1)	Q02750	Pan-specific	MmAb	NK099-10	X	DSK			
698	MEK1 (MKK1, MAP2K1)	Q02750	Pan-specific	RpAb	NK099-7	X	DSK			
699	MEK1 (MKK1, MAP2K1)	Q02750	Pan-specific	RpAb	NK099-3	X	DSK			
700	MEK1 (MKK1, MAP2K1)	Q02750	S218+S222	RpAb	K045-PN0(	X	DSK			
701	MEK1 (MKK1, MAP2K1)	Q02750	S222	RpAb	PK698	X	DSK			
702	MEK1 (MKK1, MAP2K1)	Q02750	S222	MmAb	PK193	X	DSK			
703	MEK1 (MKK1, MAP2K1)	Q02750	T286	RpAb	PK886	X	DSK			
704	MEK1 (MKK1, MAP2K1)	Q02750	T292	RpAb	PK046-1	X	DSK			
705	MEK1 (MKK1, MAP2K1)	Q02750	S298	MmAb	PK194	X	DSK			
706	MEK1 (MKK1, MAP2K1)	Q02750	T386	RpAb	PK048-1	X	DSK			
707	MEK2 (MKK2, MAP2K2)	P36507	Pan-specific	RpAb	NK100-5	X	DSK			
708	MEK2 (MKK2, MAP2K2)	P36507	Pan-specific	RpAb	NK100-4	X	DSK			
709	MEK2 (MKK2, MAP2K2)	P36507	T394	RpAb	PK049-3	X	DSK			
710	MEK2 (MKK2, MAP2K2)	P36507	T394	RpAb	PK049-2	X	DSK			
711	MEK5 (MAP2K5, MKK5)	Q13163	Pan-specific	GpAb	NK104	X	DSK			
712	MEK5 (MAP2K5, MKK5)	Q13163	Pan-specific	RpAb	NK104-2	X	DSK			
713	MEK5 (MAP2K5, MKK5)	Q13163	S311	RpAb	PK699	X	DSK			
714	MEKK1 (MAP3K1)	Q13233	Pan-specific	RpAb	NK107-4	X	PSTK			
715	MEKK1 (MAP3K1)	Q13233	Pan-specific	RpAb	NK107-3	X	PSTK			
716	MEKK2 (MAP3K2)	Q9Y2U5	Pan-specific	RpAb	NK108-3	X	PSTK			
717	MEKK2 (MAP3K2)	Q9Y2U5	Pan-specific	RpAb	NK108-4	X	PSTK			
718	MEKK2 (MAP3K2)	Q9Y2U5	S239	RpAb	PK700	X	PSTK			
719	MEKK6 (MAP3K6)	O95382	Pan-specific	RpAb	NK225-2	X	PSTK			
720	MELK	Q14680	Pan-specific	RpAb	NK229-2	X	PSTK			
721	MELK	Q14680	Pan-specific	RpAb	NK229-3	X	PSTK			
722	MELK	Q14680	Y438	RpAb	PK701	X	PSTK			
723	MERTK (MER)	Q12866	Y749	RpAb	PK702	X	PYK			
724	MERTK (MER)	Q12866	Y749+Y753	RpAb	PK703	X	PYK			
725	MERTK (MER)	Q12866	Y753	RpAb	PK704	X	PYK			
726	Met	P08581	Pan-specific	RpAb	NK110-2	X	PYK			
727	Met	P08581	Pan-specific	RpAb	NK110-3	X	PYK			
728	Met	P08581	Y1003	RpAb	PK708	X	PYK			
729	Met	P08581	Y1230+Y1234+Y	RpAb	PK055-1	X	PYK			
730	Met	P08581	Y1230	RpAb	PK709	X	PYK			
731	Met	P08581	Y1234	RpAb	PK710	X	PYK			
732	Met	P08581	Y1234+Y1235	RpAb	PK711	X	PYK			
733	Met	P08581	S1236	RpAb	PK705	X	PYK			
734	Met	P08581	T1241	RpAb	PK706	X	PYK			
735	Met	P08581	T1355+Y1356	RpAb	PK707	X	PYK			
736	MITF	O75030	S414	RpAb	PN626				X	
737	MKK3 (MAP2K3, MEK3)	P46734	Pan-specific	RpAb	NK101-3	X	DSK			
738	MKK3 (MAP2K3, MEK3)	P46734	Pan-specific	RpAb	NK101-4	X	DSK			
739	MKK3 (MAP2K3, MEK3)	P46734	Pan-specific	RpAb	NK101-5	X	DSK			
740	MKK3 (MAP2K3, MEK3)	P46734	S218	RpAb	PK051-4	X	DSK			
741	MKK3 (MAP2K3, MEK3)	P46734	S218	RpAb	PK713	X	DSK			
742	MKK3 (MAP2K3, MEK3)	P46734	Y230	RpAb	PK714	X	DSK			
743	MKK4 (MAP2K4, MEK4)	P45985	Pan-specific	RpAb	NK103-5	X	DSK			
744	MKK4 (MAP2K4, MEK4)	P45985	Pan-specific	RpAb	NK103-6	X	DSK			
745	MKK4 (MAP2K4, MEK4)	P45985	S80	RpAb	PK716	X	DSK			
746	MKK4 (MAP2K4, MEK4)	P45985	S257	RpAb	PK715	X	DSK			
747	MKK6 (MAP2K6, MEK6)	P52564	Pan-specific	RpAb	NK105-4	X	DSK			
748	MKK6 (MAP2K6, MEK6)	P52564	Pan-specific	RpAb	NK105-5	X	DSK			
749	MKK7 (MEK7, MAP2K7)	O14733	Pan-specific	RpAb	NK106-4	X	DSK			
750	MKK7 (MEK7, MAP2K7)	O14733	Pan-specific	RpAb	NK106-5	X	DSK			
751	MKK7 (MEK7, MAP2K7)	O14733	T275	RpAb	PK717	X	DSK			
752	MRLC2 (MLC)	P19105	S20	RpAb	PN051-1					

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753	MLK1 (MAP3K9)	P80192	Pan-specific	RpAb	NK278-1	X	PSTK			
754	MLK2 (MAP3K10)	Q02779	Pan-specific	RpAb	NK279-1	X	PSTK			
755	MLK3 (MAP3K11)	Q16584	Pan-specific	RpAb	NK208	X	PSTK			
756	MLK3 (MAP3K11)	Q16584	T277+S281	RpAb	PK870	X	PSTK			
757	MLK3 (MAP3K11)	Q16584	S281	RpAb	PK718	X	PSTK			
758	MLK4	Q5TCX8	Pan-specific	RpAb	NK280-1	X	PSTK			
759	MLTK (ZAK)	Q9NYL2	T161+T162	RpAb	PK719	X	PSTK			
760	Mnk1	Q9BUB5	Pan-specific	MmAb	NK387-1	X	PSTK			
761	Mnk2	Q9HBH9	Pan-specific	GpAb	NK111	X	PSTK			
762	MOK (RAGE)	Q9UQ07	Pan-specific	RpAb	NK281-2	X	PSTK			
763	MOK (RAGE)	Q9UQ07	Pan-specific	RpAb	NK281-1	X	PSTK			
764	MOK (RAGE)	Q9UQ07	T159+Y161	RpAb	PK720	X	PSTK			
765	MOK (RAGE)	Q9UQ07	Y167	RpAb	PK721	X	PSTK			
766	Mos	P00540	Pan-specific	RpAb	NK112	X	PSTK			
767	Mos	P00540	Y263	RpAb	PK722	X	PSTK			
768	MPL	P40238	Y591	RpAb	PN760					
769	MRCKa (PK428)	Q5VT25	Pan-specific	RpAb	NK282-1	X	PSTK			
770	MRCKb (CDC42BPB)	Q9Y5S2	Pan-specific	RpAb	NK283-1	X	PSTK			
771	MSH6	P52701	S14	RpAb	PN708					
772	MSK1 (RPS6KA5)	O75582	S212	RpAb	PK723	X	PSTK			
773	MSK2 (RPS6KA4)	O75676	T194+S196	RpAb	PK868	X	PSTK			
774	MSK2 (RPS6KA4)	O75676	T687	RpAb	PK725	X	PSTK			
775	MST1 (STK4, Krs2)	Q13043	Pan-specific	GpAb	NK113-3	X	PSTK			
776	MST1 (STK4, Krs2)	Q13043	Pan-specific	MmAb	NK113-2	X	PSTK			
777	MST1 (STK4, Krs2)	Q13043	T183	RpAb	PK871	X	PSTK			
778	MST1 (STK4, Krs2)	Q13043	T187	RpAb	PK726	X	PSTK			
779	mTOR (FRAP)	P42345	Pan-specific	RpAb	NK116-4	X	PSTK			
780	Not listed									
781	MST3 (STK24)	Q9Y6E0	T184	RpAb	PK727	X	PSTK			
782	MST3 (STK24)	Q9Y6E0	T190	RpAb	PK728	X	PSTK			
783	mTOR (FRAP)	P42345	Pan-specific	MmAb	NK116-6	X	PSTK			
784	mTOR (FRAP)	P42345	Pan-specific	RpAb	NK116-5	X	PSTK			
785	mTOR (FRAP)	P42345	Pan-specific	RpAb	NK116-3	X	PSTK			
786	mTOR (FRAP)	P42345	S2448	RpAb	PK729	X	PSTK			
787	mTOR (FRAP)	P42345	S2448	MmAb	PK196	X	PSTK			
788	mTOR (FRAP)	P42345	S2478+S2481	RpAb	PK730	X	PSTK			
789	MUSK	O15146	Y756	RpAb	PK872	X	PYK			
790	Myb	P10242	S532	RpAb	PN627				X	
791	Myc	P01106	Pan-specific	MmAb	NN430-1				X	
792	Myc	P01106	T58	RpAb	PN199				X	
793	Myc	P01106	T58+S62	RpAb	PN628				X	
794	Myc	P01106	T58+S62	MmAb	PN215				X	
795	Myc	P01106	S373	RpAb	PN186				X	
796	MyoD	P15172	Pan-specific	MmAb	NN431-1				X	
797	Not listed									
798	MYPT1 (MBS)	O14974	Pan-specific	MmAb	NP049-1					
799	MYPT1 (MBS)	O14974	S695	MmAb	PK197					
800	MYPT1 (MBS)	O14974	T696	RpAb	PN052					
801	MYPT1 (MBS)	O14974	S903	MmAb	PK198					
802	PLPB1 (MYT1)	Q01538	Pan-specific	MmAb	NN432-1				X	
803	MYT1	Q99640	S143	RpAb	PK887	X	PSTK			
804	NCOA3 (SRC-3)	Q9Y6Q9	S867	RpAb	PN629				X	
805	NDR1 (NDR, STK38)	Q15208	S281+T282	RpAb	PK731	X	PSTK			
806	Nek2	P51955	Pan-specific	GpAb	NK117-4	X	PSTK			
807	Nek2	P51955	Pan-specific	GpAb	NK117-3	X	PSTK			
808	Nek2	P51955	T170+S171	RpAb	PK733	X	PSTK			
809	Nek2	P51955	S171	RpAb	PK732	X	PSTK			
810	Nek3	P51956	Pan-specific	MmAb	NK393-1	X	PSTK			

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811	Nek6	Q9HC98	S206	RpAb	PK734	X	PSTK			
812	Nek7	Q8TDX7	Pan-specific	MmAb	NK119-2	X	PSTK			
813	Nek7	Q8TDX7	Pan-specific	RpAb	NK119	X	PSTK			
814	Nek7	Q8TDX7	T191+S195	RpAb	PK735	X	PSTK			
815	NES	P48681	T315	MmAb	PN237					
816	NF1	P21359	Y2577	RpAb	PN761					
817	NF2	P35240	S518	RpAb	PN709					
818	NFAT1	Q13469	S217+S221	RpAb	PN630				X	
819	NFAT3 (NFATc4)	Q14934	S213+S217	RpAb	PN631				X	
820	NFAT5	O94916	T135	RpAb	PN632				X	
821	NFAT4 (NFATc3)	Q12968	S169	MmAb	PN238				X	
822	NFAT4 (NFATc3)	Q12968	S240	MmAb	PN239				X	
823	NFAT3 (NFATc4)	Q14934	S168+S170	MmAb	PN240				X	
824	NFkB p50	P19838	S337	MmAb	PN242				X	
825	NFKB p65 (Rel A)	Q04206	Pan-specific	RpAb	NN071				X	
826	NFKB p65 (Rel A)	Q04206	S276	RpAb	PN053-1				X	
827	NFKB p65 (Rel A)	Q04206	S311	MmAb	PN243				X	
828	NFKB p65 (Rel A)	Q04206	S529	RpAb	PN156				X	
829	NFKB p65 (Rel A)	Q04206	S536	MmAb	PN245				X	
830	NFkB-p100	Q00653	S866	RpAb	PN633				X	
831	NFKB1 (NFkB-p105)	P19838	S903	RpAb	PN634				X	
832	NFKB1 (NFkB-p105)	P19838	S932	MmAb	PN241				X	
833	NLK (MAP3K14; NIK)	Q99558	Pan-specific	MmAb	NK207-2	X	PSTK			
834	NLK (MAP3K14; NIK)	Q99558	Pan-specific	GpAb	NK207	X	PSTK			
835	NLK (MAP3K14; NIK)	Q9UBE8	T298	RpAb	PK736	X	PSTK			
836	NMDAR1	Q05586	S896	RpAb	PN055-1					
837	NMDAR2A (GRIN2A)	Q12879	Pan-specific	MmAb	NN297-1					
838	NMDAR2A (GRIN2A)	Q12879	Y943	RpAb	PN710					
839	NMDAR2B (GRIN2B)	Q13224	Y1474	RpAb	PN054					
840	NOLC1	Q14978	T607+T610	RpAb	PN635				X	
841	NOS1	P29475	S746	RpAb	PN762					X
842	NOS2	P35228	S745	RpAb	PN711					X
843	NOS3	P29474	T495	MmAb	PN247					X
844	NOS3	P29474	T1175+S1177	RpAb	PN712					X
845	NuaK1 (ARK5)/Nuak2	O60285	Pan-specific	MmAb	NK361-1	X	PSTK			
846	NuaK1 (ARK5)/Nuak2	O60285	T211	RpAb	PK737	X	PSTK			
847	Nur77	P22736	S351	RpAb	PN636				X	
848	OSR1 (OXSR1)	O95747	T185	RpAb	PK738	X	PSTK			
849	Cip1 (WAF1; p21)	P38936	T145	MmAb	PN249					
850	Cip1 (WAF1; p21)	P38936	S146	MmAb	PN248					
851	p38a MAPK (MAPK14)	Q16539	Pan-specific	RpAb	NK120-7	X	PSTK			
852	p38a MAPK (MAPK14)	Q16539	Pan-specific	RpAb	NK120-10	X	PSTK			
853	p38a MAPK (MAPK14)	Q16539	T180+Y182	RpAb	PK739	X	PSTK			
854	p38a MAPK (MAPK14)	Q16539	Y182	MmAb	PN250	X	PSTK			
855	p38b MAPK (MAPK11)	Q15759	Pan-specific	RpAb	NK248-1	X	PSTK			
856	p38b MAPK (MAPK11)	Q15759	Pan-specific	RpAb	NK248-2	X	PSTK			
857	p38b MAPK (MAPK11)	Q15759	T180+Y182	RpAb	PK741	X	PSTK			
858	p38d MAPK (MAPK13)	O15264	Pan-specific	RpAb	NK121-2	X	PSTK			
859	p38d MAPK (MAPK13)	O15264	Pan-specific	RpAb	NK121-3	X	PSTK			
860	p38d MAPK (MAPK13)	O15264	T180+Y182	RpAb	PK742	X	PSTK			
861	p38d MAPK (MAPK13)	O15264	Y182	RpAb	PK743	X	PSTK			
862	p38d MAPK (MAPK13)	O15264	S261+T265	RpAb	PK888	X	PSTK			
863	p38g MAPK (MAPK12)	P53778	Pan-specific	RpAb	NK059-3	X	PSTK			
864	p38g MAPK (MAPK12)	P53778	Pan-specific	RpAb	NK059-4	X	PSTK			
865	p40-phox (NCF4)	Q15080	T154	MmAb	PN251					
866	p53 (TP53)	P04637	Pan-specific	MmAb	NN082-2				X	
867	p53 (TP53)	P04637	S6	RpAb	PN160				X	
868	p53 (TP53)	P04637	S6+S9	RpAb	PN637				X	

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869	p53 (TP53)	P04637	T18+S20	RpAb	PN638				X	
870	p53 (TP53)	P04637	S33	RpAb	PN158				X	
871	p53 (TP53)	P04637	S37	RpAb	PN159				X	
872	p53 (TP53)	P04637	S46	MmAb	PN254				X	
873	p53 (TP53)	P04637	T55	MmAb	PN256				X	
874	p53 (TP53)	P04637	T155	MmAb	PN255				X	
875	p53 (TP53)	P04637	S315	MmAb	PN253				X	
876	p53 (TP53)	P04637	S392	RpAb	PN640				X	
877	p53 (TP53)	P04637	S392	MmAb	PN252				X	
878	p70S6K (RPS6KB1)	P23443	Pan-specific	RpAb	NK223-4	X	PSTK			
879	p70S6K (RPS6KB1)	P23443	Pan-specific	RpAb	NK223-2	X	PSTK			
880	p70S6K (RPS6KB1)	P23443	T252	RpAb	PK145	X	PSTK			
881	p70S6K (RPS6KB1)	P23443	T252	RpAb	PK744	X	PSTK			
882	p70S6K (RPS6KB1)	P23443	S434	MmAb	PK199	X	PSTK			
883	p70S6K (RPS6KB1)	P23443	S434	RpAb	PK166	X	PSTK			
884	p70S6K (RPS6KB1)	P23443	T412	RpAb	PK745	X	PSTK			
885	p70S6K (RPS6KB1)	P23443	T421+S424	MmAb	PK200	X	PSTK			
886	p70S6K (RPS6KB1)	P23443	S447	RpAb	PK156	X	PSTK			
887	p70S6K (RPS6KB1)	P23443	T444+S447	RpAb	PK746	X	PSTK			
888	p70S6KB (RPS6KB2)	Q9UBS0	S423	RpAb	PK747	X	PSTK			
889	NBS1 (NBN; p95NBS1)	O60934	S343	RpAb	PN187				X	
890	PAH	P00439	S16	RpAb	PN713					X
891	PAK1 (PAKa)	Q13153	Pan-specific	RpAb	NK122	X	PSTK			
892	PAK1 (PAKa)	Q13153	Pan-specific	RpAb	NK122-2	X	PSTK			
893	PAK2 (PAKg)	Q13177	S141	RpAb	PK061	X	PSTK			
894	PAK1 (PAKa)	Q13153	S144	RpAb	PK748	X	PSTK			
895	PAK1 (PAKa)	Q13153	T212	RpAb	PK130	X	PSTK			
896	PAK1 (PAKa)	Q13153	T423	RpAb	PK749	X	PSTK			
897	PAK2 (PAKg)	Q13177	Pan-specific	GpAb	NK200-2	X	PSTK			
898	PAK2 (PAKg)	Q13177	Y130	RpAb	PK751	X	PSTK			
899	PAK2 (PAKg)	Q13177	S141	RpAb	PK750	X	PSTK			
900	PAK3	O75914	Pan-specific	GpAb	NK123	X	PSTK			
901	PAK4	O96013	S474	RpAb	PK752	X	PSTK			
902	PAK5 (PAK7)	Q9P286	Pan-specific	RpAb	NK190-2	X	PSTK			
903	PAK5 (PAK7)	Q9P286	Pan-specific	RpAb	NK190-3	X	PSTK			
904	PAK5 (PAK7)	Q9P286	S602	RpAb	PK753	X	PSTK			
905	PAK6	Q9NQU5	Pan-specific	RpAb	NK124-2	X	PSTK			
906	PXN	P49023	Pan-specific	MmAb	NN086					
907	PXN	P49023	Y31	RpAb	PN059					
908	PXN	P49023	Y118	MmAb	PN257					
909	PBK	Q96KB5	Pan-specific	RpAb	NK284-1	X	PSTK			
910	PBK	Q96KB5	Y74	RpAb	PK754	X	PSTK			
911	PBK	Q96KB5	Y272	RpAb	PK889	X	PSTK			
912	PBRM1	Q86U86	S948	RpAb	PN714				X	
913	PCTK1 (CDK16)	Q00536	Y176	RpAb	PK755	X	PSTK			
914	PCTK2 (CDK17)	Q00537	Pan-specific	RpAb	NK285-1	X	PSTK			
915	PCTK2 (CDK17)	Q00537	S180	RpAb	PK756	X	PSTK			
916	PCTK3 (CDK18)	Q07002	Pan-specific	RpAb	NK286-1	X	PSTK			
917	PCYT1A (CCTA)	P49585	Pan-specific	RpAb	NN-456-2					X
918	PCYT1A (CCTA)	P49585	Pan-specific	MmAb	NN-456-1					X
919	PCYT1A (CCTA)	P49585	S329+S331	RpAb	PN561					X
920	PCYT1A (CCTA)	P49585	T342+S343	RpAb	PN547					X
921	PCYT1A (CCTA)	P49585	Y359+S362	RpAb	PN548					X
922	PCYT1B (CCTB)	Q9Y5K3	S315+S319	RpAb	PN546					X
923	PDGFRa	P16234	Pan-specific	RpAb	NK242-1	X	PYK			
924	PDGFRa	P16234	Pan-specific	RpAb	NK242-2	X	PYK			
925	PDGFRa	P16234	Y754	RpAb	PK063	X	PYK			
926	PDGFRa	P16234	Y762	RpAb	PK758	X	PYK			

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927	PDGFRa	P16234	Y768	RpAb	PK759	X	PYK			
928	PDGFRa	P16234	S847+Y849	RpAb	PK757	X	PYK			
929	PDGFRb	P09619	Pan-specific	RpAb	NK243-1	X	PYK			
930	PDGFRb	P09619	Pan-specific	RpAb	NK243-3	X	PYK			
931	PDGFRb	P09619	Y716	MmAb	PK203	X	PYK			
932	PDGFRb	P09619	Y1009	MmAb	PK202	X	PYK			
933	PDK1 (PDPK1)	O15530	Pan-specific	RpAb	NK126-4	X	PSTK			
934	PDK1 (PDPK1)	O15530	S241	RpAb	PK760	X	PSTK			
935	PDK1 (PDHK1)	Q15118	Pan-specific	RpAb	NN179-1	X	PSTK			
936	PDK2 (PDHK2)	Q15119	Pan-specific	RpAb	NN180-2	X	PSTK			
937	PDK3 (PDHK3)	Q15120	Pan-specific	RpAb	NN181-2	X	PSTK			
938	PDK4 (PDHK4)	Q16654	Pan-specific	RpAb	NN178-2	X	PSTK			
939	PDLIM5 (LIM)	Q96HC4	Y251	RpAb	PN522					
940	PECAM-1	P16284	Y713	RpAb	PN523					
941	PED15 (PEA15)	Q15121	S116	RpAb	PN061					
942	PFKFB2 (PFK2)	O60825	S483	MmAb	PN258					X
943	PFKFB3	Q16875	S461	RpAb	PN715					X
944	PFKP	Q01813	S386	RpAb	PN716					X
945	PFN1	P07737	Y129	RpAb	PN524					
946	PFTAIRE1 (CDK14)	O94921	Pan-specific	RpAb	NK287-1	X	PSTK			
947	PFTAIRE2 (ALS2CR7)	Q96Q40	Pan-specific	RpAb	NK004-2	X	PSTK			
948	PFTAIRE2 (ALS2CR7)	Q96Q40	Pan-specific	RpAb	NK004-3	X	PSTK			
949	PGK1	P00558	Y196	RpAb	PN525					X
950	PIK3R1	P27986	Pan-specific	MmAb	NN089					
951	PIK3CA	P42336	Y317	RpAb	PK894					X
952	PIK3R1	P27986	Y467	RpAb	PN526					
953	PIK3R1	P27986	Y580	RpAb	PN527					
954	PIK3R2	O00459	Y464	RpAb	PN528					
955	Pim1	P11309	Pan-specific	RpAb	NK258-1	X	PSTK			
956	Pim2	Q9P1W9	Pan-specific	RpAb	NK288-1	X	PSTK			
957	Pim2	Q9P1W9	Pan-specific	RpAb	NK288-2	X	PSTK			
958	Pim2	Q9P1W9	T195	RpAb	PK761	X	PSTK			
959	Pim3	Q86V86	Pan-specific	RpAb	NK289-1	X	PSTK			
960	PIP5K	Q9Y2I7	S307	RpAb	PK762	X	PSTK			
961	PITSLRE (CDK11B)	P21127	Pan-specific	RpAb	NK213	X	PSTK			
962	PRKAR2A (PKA2RA)	P13861	S99	MmAb	PN259					
963	PKCa (PRKCA)	P17252	Pan-specific	RpAb	NK201	X	PSTK			
964	PKCa (PRKCA)	P17252	Pan-specific	MmAb	NK132	X	PSTK			
965	PKCa (PRKCA)	P17252	Y195	RpAb	PK764	X	PSTK			
966	PKCa (PRKCA)	P17252	T497	RpAb	PK763	X	PSTK			
967	PKCa (PRKCA)	P17252	S657	MmAb	PK210	X	PSTK			
968	PKCb (PRKCB1)	P05771	Pan-specific	MmAb	NK133-3	X	PSTK			
969	PKCb (PRKCB1)	P05771	T500	RpAb	PK766	X	PSTK			
970	PKCb (PRKCB1)	P05771	S661	RpAb	PK765	X	PSTK			
971	PKCb2 (PRKCB2)	P05771-2	Pan-specific	MmAb	NK134-3	X	PSTK			
972	Not listed									
973	PKCb2/d (PRKCB2/D)	P05771	S660	MmAb	PK204	X	PSTK			
974	PKCd (PRKCD)	Q05655	Pan-specific	RpAb	NK135	X	PSTK			
975	PKG1a (PRKG1A)	Q13976	T515+T517	RpAb	PK776	X	PSTK			
976	PKCd (PRKCD)	Q05655	Y313	MmAb	PK207	X	PSTK			
977	PKCd (PRKCD)	Q05655	Y313	RpAb	PK768	X	PSTK			
978	PKCd (PRKCD)	Q05655	Y334	RpAb	PK769	X	PSTK			
979	PKCd (PRKCD)	Q05655	T507	MmAb	PK206	X	PSTK			
980	PKCd (PRKCD)	Q05655	T507	RpAb	PK767	X	PSTK			
981	PKCd (PRKCD)	Q05655	S645	MmAb	PK205	X	PSTK			
982	PKCd (PRKCD)	Q05655	S645	RpAb	PK079-1	X	PSTK			
983	Not listed									
984	PKCe (PRKCE)	Q02156	S729	RpAb	PK081-1	X	PSTK			

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985	PKCg (PRKCG)	P05129	Pan-specific	RpAb	NK137	X	PSTK			
986	PKCg (PRKCG)	P05129	Pan-specific	MmAb	NK137-2	X	PSTK			
987	PKCg (PRKCG)	P05129	T514	RpAb	PK082-2	X	PSTK			
988	PKCg (PRKCG)	P05129	T655	RpAb	PK083	X	PSTK			
989	PKCh (PRKCeta)	P24723	T656	RpAb	PK085	X	PSTK			
990	PKCl (PRKCiota)	P41743	Pan-specific	GpAb	NK138-1	X	PSTK			
991	PKCl (PRKCiota)	P41743	T564	RpAb	PK087	X	PSTK			
992	Not listed									
993	PKCt (PRKCQ)	Q04759	T538	MmAb	PK209	X	PSTK			
994	PKCt (PRKCQ)	Q04759	Y545	RpAb	PK773	X	PSTK			
995	PKCt (PRKCQ)	Q04759	S676	RpAb	PK089-1	X	PSTK			
996	PKCt (PRKCQ)	Q04759	S695	RpAb	PK772	X	PSTK			
997	PKCz (PRKCZ)	Q05513	S262+Y263	RpAb	PK774	X	PSTK			
998	PKCz (PRKCZ)	Q05513	T410	MmAb	PK208	X	PSTK			
999	PKCz (PRKCZ)	Q05513	T410	RpAb	PK775	X	PSTK			
1000	PKD1 (PKCm, PRKD1)	Q15139	Pan-specific	RpAb	NK142	X	PSTK			
1001	PKD1 (PKCm, PRKD1)	Q15139	S205	RpAb	PK770	X	PSTK			
1002	PKD1 (PKCm, PRKD1)	Q15139	S738+S742	RpAb	PK771	X	PSTK			
1003	Not listed									
1004	PKD1 (PKCm, PRKD1)	Q15139	S910	RpAb	PK093-1	X	PSTK			
1005	PKD2 (PRKD2)	Q9BZL6	S197+S198	RpAb	PK784	X	PSTK			
1006	PKD3 (PRKCN)	O94806	Pan-specific	RpAb	NK139-2	X	PSTK			
1007	PKG1a (PRKG1A)	Q13976	Pan-specific	RpAb	NK202	X	PSTK			
1008	PKG1a (PRKG1A)	Q13976	T515+T517	RpAb	PK776	X	PSTK			
1009	PKG2 (PRKG2)	Q13237	Pan-specific	RpAb	NK290-1	X	PSTK			
1010	PKG2 (PRKG2)	Q13237	Pan-specific	RpAb	NK290-2	X	PSTK			
1011	PKM2	P14618	Pan-specific	MmAb	NN115-2					X
1012	PKM2	P14618	Y148	RpAb	PN717					X
1013	PKM2	P14618	S37	RpAb	PN718					X
1014	PKM2	P14618	Y390	RpAb	PN529					X
1015	PRK1 (PKN1)	Q16512	Pan-specific	GpAb	NK148	X	PSTK			
1016	PKN2 (PRK2)	Q16513	Pan-specific	RpAb	NK149-3	X	PSTK			
1017	PKR1 (PRKR; EIF2AK2)	P19525	Pan-specific	MmAb	NK144-1	X	PSTK			
1018	PKR1 (PRKR; EIF2AK2)	P19525	T446	RpAb	PK132	X	PSTK			
1019	PKR1 (PRKR; EIF2AK2)	P19525	T446	RpAb	PK777	X	PSTK			
1020	PLCB3	Q01970	S1105	RpAb	PN719					X
1021	PLCD1	P51178	S460	RpAb	PN720					X
1022	PLCE1	Q9P212	S1096+T1100	RpAb	PN721					X
1023	PLCG1	P19174	Pan-specific	MmAb	NN144-2					X
1024	PLCG1	P19174	Y771	RpAb	PN165					X
1025	PLCG1	P19174	Y783	RpAb	PN144					X
1026	PLCG1	P19174	Y783	RpAb	PN530					X
1027	PLCG1	P19174	Y977	RpAb	PN722					X
1028	PLCG2	P16885	Y753	RpAb	PN143					X
1029	PLCG2	P16885	Y753	RpAb	PN723					X
1030	PLCG2	P16885	Y759	RpAb	PN531					X
1031	Plk1 (PLK)	P53350	Pan-specific	RpAb	NK145-2	X	PSTK			
1032	Plk1 (PLK)	P53350	T210	RpAb	PK778	X	PSTK			
1033	Plk1 (PLK)	P53350	Y217	RpAb	PK779	X	PSTK			
1034	Plk3 (CNK)	Q9H4B4	Pan-specific	RpAb	NK147-2	X	PSTK			
1035	Plk4 (SAK; STK18)	O00444	Pan-specific	RpAb	NK291-1	X	PSTK			
1036	Plk4 (SAK; STK18)	O00444	T170	RpAb	PK780	X	PSTK			
1037	PML	P29590	S518	RpAb	PN641				X	
1038	POU2F1	P14859	S385	RpAb	PN643				X	
1039	PP1/Ca pan	P62136	Pan-specific	RpAb	NP009		PSTP	X		
1040	PP1/Cb (PPP1CB)	P62140	Pan-specific	MmAb	NP010-3		PSTP	X		
1041	PP1/Cb (PPP1CB)	P62140	T316	RpAb	PP502		PSTP	X		
1042	PP2A/Ca (PPP2CA)	P67775	Pan-specific	MmAb	P013-NP014-2		PSTP	X		

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1043	PP2A/Ca (PPP2CA)	P67775	Y307	RpAb	PP504		PSTP	X		
1044	PP2A/Ca (PPP2CA)	P67775	Y307	MmAb	PP007		PSTP	X		
1045	PP2Ca (PPPM1A)	P35813	Y362	RpAb	PP508		PSTP	X		
1046	PPARg-1	P37231	S112	RpAb	PN644				X	
1047	PPP1R11 (HCG V)	O60927	Y64	RpAb	PN532			X		
1048	PPP1R12B	O60237	T646	RpAb	PP503			X		
1049	PPP2CB	P62714	T304	RpAb	PP505		PSTP	X		
1050	PPP3CC	P48454	S463	RpAb	PP506		PSTP	X		
1051	PPP5C	P53041	Y119	RpAb	PP507		PSTP	X		
1052	AKT1S1 (PRAS40)	Q96B36	T246	RpAb	PN062					
1053	PRC1	O43663	T481	MmAb	PN260					
1054	PRK1 (PKN1)	Q16512	T774	RpAb	PK781	X	PSTK			
1055	PRKACA (PKA)	P17612	Pan-specific	MmAb	NK127-1	X	PSTK			
1056	PRKACA (PKA)	P17612	Pan-specific	MmAb	NK127-3	X	PSTK			
1057	PRKACA/B (PKACA/B)	P17612	T196+T198	RpAb	PK782	X	PSTK			
1058	PRKACB (PKA)	P22694	S339	RpAb	PK068	X	PSTK			
1059	PRKACB (PKA)	P22694	Y69	RpAb	PK783	X	PSTK			
1060	PRKX	P51817	Pan-specific	RpAb	NK292-1	X	PSTK			
1061	PRKX	P51817	T201+T203	RpAb	PK785	X	PSTK			
1062	PRKY	O43930	Pan-specific	RpAb	NK293-1	X	PSTK			
1063	PRMT5	O14744	T634	RpAb	PN549					
1064	PRP4K (PRP4, PRPF4B)	Q13523	Y849	RpAb	PK786	X	PSTK			
1065	PTEN	P60484	Pan-specific	MmAb	NP023		PIPP	X		
1066	PTEN	P60484	Pan-specific	RpAb	NP023-5		PIPP	X		
1067	PTEN	P60484	S380	MmAb	PP006-2		PIPP	X		
1068	PTEN	P60484	S380+T382+S38	RpAb	PP003		PIPP	X		
1069	PTEN	P60484	S380+T382+T38	RpAb	PP006-1		PIPP	X		
1070	PTPN1 (PTP1B)	P18031	Pan-specific	MmAb	NP024-2		PYP	X		
1071	PTPN1 (PTP1B)	P18031	S50	RpAb	PP509		PYP	X		
1072	PTPN1 (PTP1B)	P18031	Y66	RpAb	PP510		PYP	X		
1073	PTPN2	P17706	S304	RpAb	PP515		PYP	X		
1074	PTPN11 (PTP1D; SHP2)	Q06124	Pan-specific	MmAb	NP026-3		PYP	X		
1075	PTPN11 (PTP1D; SHP2)	Q06124	Y62	RpAb	PP512		PYP	X		
1076	PTPN11 (PTP1D; SHP2)	Q06124	Y546	MmAb	PP008		PYP	X		
1077	PTPN11 (PTP1D; SHP2)	Q06124	S580	RpAb	PP004		PYP	X		
1078	PTPN12 (PTP-PEST)	Q05209	S39	RpAb	PP513		PYP	X		
1079	PTPN14	Q15678	S486	RpAb	PP514		PYP	X		
1080	PTPN21	Q16825	S637	RpAb	PP516		PYP	X		
1081	PTPN22	Q9Y2R2	Y499	RpAb	PP517		PYP	X		
1082	PTPRA	P18433	Y798	RpAb	PP521		PYP	X		
1083	PTPRB	P23467	Y1981	RpAb	PP522		PYP	X		
1084	PTPRF	P10586	Y1621	RpAb	PP523		PYP	X		
1085	PTPRK (PTPκ)	Q15262	Y916	RpAb	PP524		PYP	X		
1086	PTPRM PTPμ)	P28827	Y929	RpAb	PP526		PYP	X		
1087	PTRF	Q6NZI2	Y308	RpAb	PN646				X	
1088	PU.1	P17947	S146	RpAb	PN647				X	
1089	PYK2 (PTK2B)	Q14289	Pan-specific	GpAb	NK154	X	PYK			
1090	PYK2 (PTK2B)	Q14289	Pan-specific	MmAb	NK154-3	X	PYK			
1091	PYK2 (PTK2B)	Q14289	Y402	RpAb	PK788	X	PYK			
1092	PYK2 (PTK2B)	Q14289	Y402	RpAb	PK787	X	PYK			
1093	PYK2 (PTK2B)	Q14289	Y579	RpAb	PK097-3	X	PYK			
1094	PYK2 (PTK2B)	Q14289	Y579+Y580	RpAb	PK789	X	PYK			
1095	Rac1	P63000	Pan-specific	MmAb	NN092-3					
1096	Rac1/cdc42	P63000	S71	RpAb	PN063					
1097	Raf-A (ARaf)	P10398	Pan-specific	RpAb	NK205-3	X	PSTK			
1098	Raf-A (ARaf)	P10398	Pan-specific	RpAb	NK205-4	X	PSTK			
1099	Raf-A (ARaf)	P10398	Y302	RpAb	PK500	X	PSTK			
1100	Raf-B (BRaf)	P15056	Pan-specific	RpAb	NK156-6	X	PSTK			

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1101	Raf-B (BRaf)	P15056	Pan-specific	RpAb	NK156-4	X	PSTK			
1102	Raf-B (BRaf)	P15056	S446+S447	RpAb	PK534	X	PSTK			
1103	Raf-B (BRaf)	P15056	S729	RpAb	PK535	X	PSTK			
1104	Raf1 (RafC)	P04049	Pan-specific	RpAb	NK155-7	X	PSTK			
1105	Raf1 (RafC)	P04049	Pan-specific	RpAb	NK155-8	X	PSTK			
1106	Raf1 (RafC)	P04049	S259	RpAb	PK790	X	PSTK			
1107	Raf1 (RafC)	P04049	S296	RpAb	PK791	X	PSTK			
1108	Raf1 (RafC)	P04049	S301+T303	RpAb	PK792	X	PSTK			
1109	Raf1 (RafC)	P04049	S621	MmAb	PK212	X	PSTK			
1110	RARA	P10276	S77	RpAb	PN648				X	
1111	Rb	P06400	Pan-specific	MmAb	NN093					
1112	Rb	P06400	S249+T252	MmAb	PN261					
1113	Rb	P06400	T356	MmAb	PN264					
1114	Rb	P06400	S608	MmAb	PN262					
1115	Rb	P06400	S612	RpAb	PN066					
1116	Rb	P06400	S780	RpAb	PN067					
1117	Rb	P06400	S795	MmAb	PN263					
1118	Rb	P06400	T821+T826	MmAb	PN265					
1119	Rb	P06400	T821	RpAb	PN070					
1120	Rb	P06400	T826	RpAb	PN071					
1121	RBM9 iso6	O43251	T7	RpAb	PN649				X	
1122	RDBP	P18615	S89+T91	RpAb	PN650				X	
1123	RelB	Q01201	Pan-specific	RpAb	NN170				X	
1124	RelB	Q01201	S573	RpAb	PN151				X	
1125	Ret (GDNF receptor)	P07949	Pan-specific	RpAb	NK244-2	X	PYK			
1126	Ret (GDNF receptor)	P07949	Y905	RpAb	PK793	X	PYK			
1127	Ret (GDNF receptor)	P07949	Pan-specific	MmAb	NK244-4	X	PYK			
1128	RIPK2 (RICK; RIP2)	O43353	Pan-specific	MmAb	NK157-3	X	PSTK			
1129	RIOK1	Q9BRS2	Y466	RpAb	PK794	X	PSTK			
1130	RIOK2	Q9BVS4	S332+S335+S33	RpAb	PK890	X	PSTK			
1131	RIPK2 (RICK; RIP2)	O43353	Pan-specific	MmAb	NK157	X	PSTK			
1132	RIPK1 (RIP; RIPK)	Q13546	Pan-specific	MmAb	NK158-2	X	PSTK			
1133	RIPK1 (RIP; RIPK)	Q13546	Y384	RpAb	PK795	X	PSTK			
1134	RIPK2 (RICK; RIP2)	O43353	S176	RpAb	PK796	X	PSTK			
1135	RIPK2 (RICK; RIP2)	O43353	Y381	RpAb	PK797	X	PSTK			
1136	PEBP1 (RKIP)	P30086	S153	MmAb	PN267					
1137	ROCK1 (ROKb)	Q13464	Pan-specific	MmAb	NK160	X	PSTK			
1138	ROCK1 (ROKb)	Q13464	Y913	RpAb	PK798	X	PSTK			
1139	ROCK2 (ROKa)	O75116	Pan-specific	MmAb	NK159-1	X	PSTK			
1140	ROCK2 (ROKa)	O75116	Pan-specific	RpAb	NK159-2	X	PSTK			
1141	ROCK2 (ROKa)	O75116	Y722	RpAb	PK799	X	PSTK			
1142	Ron (RONa)	Q04912	Pan-specific	RpAb	NK161-2	X	PYK			
1143	Ron (RONa)	Q04912	Y1238	RpAb	PK800	X	PYK			
1144	Ron (RONa)	Q04912	Y1238 + Y1239	RpAb	PK801	X	PYK			
1145	ROR2 (RON2)	Q01974	Y645+Y646	RpAb	PK802	X	PYK			
1146	RORA	P35398	S35	RpAb	PN651				X	
1147	Ros	P08922	Pan-specific	RpAb	NK163-3	X	PYK			
1148	Ros	P08922	Pan-specific	RpAb	NK163-4	X	PYK			
1149	Ros	P08922	Y2114+Y2115	RpAb	PK803	X	PYK			
1150	RPS6	P62753	S235+S236	RpAb	PN685					
1151	RPS6	P62753	S235+S236+S24	RpAb	PN559					
1152	RPS6	P62753	S236	MmAb	PN268					
1153	RSK1 (RPS6KA1)	Q15418	Pan-specific	RpAb	NK164-3	X	PSTK			
1154	RSK1 (RPS6KA1)	Q15418	Y220+S221	RpAb	PK807	X	PSTK			
1155	RSK1 (RPS6KA1)	Q15418	S221	RpAb	PK804	X	PSTK			
1156	RSK1 (RPS6KA1)	Q15418	S221	RpAb	PK099	X	PSTK			
1157	RSK1 (RPS6KA1)	Q15418	T359	RpAb	PK158	X	PSTK			
1158	RSK1 (RPS6KA1)	Q15418	S363	RpAb	PK157	X	PSTK			

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1159	RSK1 (RPS6KA1)	Q15418	S363	RpAb	PK100	X	PSTK			
1160	RSK1 (RPS6KA1)	Q15418	S380	MmAb	PK213	X	PSTK			
1161	RSK1 (RPS6KA1)	Q15418	S380	RpAb	PK805	X	PSTK			
1162	RSK1 (RPS6KA1)	Q15418	T573	RpAb	PK806	X	PSTK			
1163	RSK2 (RPS6KA3)	P51812	Pan-specific	RpAb	NK165-2	X	PSTK			
1164	RSK2 (RPS6KA3)	P51812	Pan-specific	RpAb	NK165-3	X	PSTK			
1165	RSK2 (RPS6KA3)	P51812	T577	MmAb	PK214	X	PSTK			
1166	RSK3 (RPS6KA2)	Q15349	Y217+S218	RpAb	PK808	X	PSTK			
1167	RXRa	P19793	S260	RpAb	PN652				X	
1168	SATB1	Q01826	S38	RpAb	PN653				X	
1169	SCYL1	Q96KG9	S754	RpAb	PK809	X	PSTK			
1170	SGK1	O00141	Pan-specific	RpAb	NK294-1	X	PSTK			
1171	Sgk223 (PRAG1)	Q86YV5	Y413	RpAb	PK810	X	PSTK			
1172	SgK269 (PEAK1)	Q9H792	Y635	RpAb	PK811	X	PSTK			
1173	SgK288 (ANKK1)	Q8NFD2	Pan-specific	RpAb	NK295-1	X	PSTK			
1174	SH2BP1	Q6PD62	T925	RpAb	PN654				X	
1175	Shc1 (Shc)	P29353	Y349	RpAb	PN161					
1176	Shc1 (Shc)	P29353	Y349+Y350	RpAb	PN074					
1177	SHIP1 (INPP5D)	Q92835	Pan-specific	RpAb	NP044-3		PIPP	X		
1178	SHIP1 (INPP5D)	Q92835	Y187	RpAb	PN560		PIPP	X		
1179	SHIP2 (INPPL1)	O15357	Pan-specific	RpAb	NP045-2		PIPP	X		
1180	SHIP2 (INPPL1)	O15357	Y886	RpAb	PN534		PIPP	X		
1181	SIK (SNF1LK)	P57059	Pan-specific	RpAb	NK251-2	X	PSTK			
1182	SIK (SNF1LK)	P57059	Pan-specific	RpAb	NK251-3	X	PSTK			
1183	SIK (SNF1LK)	P57059	T182	RpAb	PK812	X	PSTK			
1184	SIK2 (QIK)	Q9H0K1	Pan-specific	RpAb	NK249-2	X	PSTK			
1185	SIK2 (QIK)	Q9H0K1	Pan-specific	RpAb	NK249-3	X	PSTK			
1186	SIK2 (QIK)	Q9H0K1	S358	RpAb	PK813	X	PSTK			
1187	SIK3 (QSK)	Q9Y2K2	Pan-specific	RpAb	NK250-2	X	PSTK			
1188	SIK3 (QSK)	Q9Y2K2	Pan-specific	RpAb	NK250-3	X	PSTK			
1189	SIK3 (QSK)	Q9Y2K2	T163	RpAb	PK814	X	PSTK			
1190	SIK3 (QSK)	Q9Y2K2	T411	RpAb	PK815	X	PSTK			
1191	SIN3A	Q96ST3	S832	RpAb	PN655				X	
1192	SIT	Q9Y3P8	Y90	RpAb	PN535					
1193	SIT	Q9Y3P8	Y95	RpAb	PN536					
1194	SLK	Q9H2G2	S189	RpAb	PK816	X	PSTK			
1195	Smad1	Q15797	Pan-specific	MmAb	NN445-1				X	
1196	Smad2	Q15796	T220	RpAb	PN185				X	
1197	Smad2/3	Q15796	Pan-specific	MmAb	NN096-2				X	
1198	Smad3	P84022	T8	RpAb	PN658				X	
1199	SMARCB1	Q12824	T134	RpAb	PN727				X	
1200	SMC1A	Q14683	S957	MmAb	PN270					
1201	SMG1	Q96Q15	Pan-specific	RpAb	NK233-2	X	PSTK			
1202	SMG1	Q96Q15	Pan-specific	RpAb	NK233-1	X	PSTK			
1203	SMG1	Q96Q15	T3550	RpAb	PK817	X	PSTK			
1204	SNCA (a-Synuclein)	P37840	S129	RpAb	PN197					
1205	SND1	Q7KZF4	Y908	RpAb	PN661				X	
1206	snRNP 70	P08621	Y126	RpAb	PN537					
1207	SOCS7	O14512	Y561	RpAb	PN728					
1208	SPT5	O00267	T791	RpAb	PN663				X	
1209	Src	P12931	Pan-specific	RpAb	NK172-3	X	PYK			
1210	Src	P12931	Pan-specific	MmAb	NK172-4	X	PYK			
1211	Src	P12931	Y419	RpAb	PK107	X	PYK			
1212	Src	P12931	Y419	RpAb	PK818	X	PYK			
1213	Src	P12931	Y530	RpAb	PK108	X	PYK			
1214	Src	P12931	Y530	MmAb	PK215	X	PYK			
1215	SRF	P11831	S224	RpAb	PN664				X	
1216	SRPK1	Q96SB4	S222	RpAb	PK819	X	PSTK			

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1217	SRPK1	Q96SB4	S587	RpAb	PK891	X	PSTK			
1218	SRPK2	P78362	Pan-specific	RpAb	NK296-1	X	PSTK			
1219	SRPK2	P78362	Y319	RpAb	PK820	X	PSTK			
1220	SSRP1	Q08945	Y441+S444	RpAb	PN665				X	
1221	STAG2	Q8N3U4	Y433	RpAb	PN729				X	
1222	STAM2	O75886	Y374	RpAb	PN538				X	
1223	STAT1	P42224	Pan-specific	MmAb	NN139-2				X	
1224	STAT1	P42224	Y701	RpAb	PN666				X	
1225	STAT1	P42224	S727	RpAb	PN667				X	
1226	STAT2	P52630	Y690	RpAb	PN668				X	
1227	STAT3	P40763	Y705	MmAb	PN273				X	
1228	STAT3	P40763	Y705+T708	RpAb	PN539				X	
1229	STAT3	P40763	S727	MmAb	PN272				X	
1230	STAT3	P40763	S727	RpAb	PN669				X	
1231	STAT4	Q14765	Pan-specific	RpAb	NN117				X	
1232	STAT4	Q14765	Y693	RpAb	PN670				X	
1233	STAT4	Q14765	S721	MmAb	PN274				X	
1234	STAT5	P42229	Y694	RpAb	PN083-1				X	
1235	STAT5A	P42229	Y694	RpAb	PN671				X	
1236	STAT5A	P42229	S780	RpAb	PN672				X	
1237	STAT6	P42226	Pan-specific	MmAb	NN107-2				X	
1238	STAT6	P42226	Y641	RpAb	PN673				X	
1239	Syk	P43405	Pan-specific	MmAb	NK174	X	PYK			
1240	Syk	P43405	Y323	RpAb	PK821	X	PYK			
1241	Syk	P43405	Y352	RpAb	PK822	X	PYK			
1242	Syk	P43405	Y525+Y526	RpAb	PK823	X	PYK			
1243	TAK1 (MAP3K7)	O43318	Pan-specific	MmAb	NK175-5	X	PSTK			
1244	TAK1 (MAP3K7)	O43318	Pan-specific	RpAb	NK175-3	X	PSTK			
1245	TAK1 (MAP3K7)	O43318	T184+T187	RpAb	PK825	X	PSTK			
1246	TAK1 (MAP3K7)	O43318	S439	RpAb	PK824	X	PSTK			
1247	TAO1 (TAOK1)	Q7L7X3	S181	RpAb	PK826	X	PSTK			
1248	TAO1 (TAOK1)	Q7L7X3	Y309	RpAb	PK827	X	PSTK			
1249	TAOK3 (JIK, TAO3)	Q9H2K8	Pan-specific	RpAb	NK087-2	X	PSTK			
1250	TAOK3 (JIK, TAO3)	Q9H2K8	Pan-specific	MmAb	NK087-3	X	PSTK			
1251	TARDBP	Q13148	S409+S410	RpAb	PN674				X	
1252	Tau	P10636	S396	MmAb	PN275					
1253	Tau	P10636	S516	RpAb	PN085					
1254	Tau	P10636	T522	RpAb	PN121					
1255	Tau	P10636	S713	RpAb	PN090					
1256	Tau	P10636	S721	RpAb	PN092					
1257	Tau	P10636	S739	RpAb	PN107					
1258	TBC1D7	Q9P0N9	Y14	RpAb	PN540					
1259	TBK1	Q9UHD2	S172	RpAb	PK828	X	PSTK			
1260	TEC	P42680	Y519	RpAb	PK829	X	PYK			
1261	TERF1	P54274	T371	RpAb	PN675				X	
1262	TGM2	P21980	Y369	RpAb	PN541					X
1263	TH (TY3H)	P07101	Pan-specific	MmAb	NN449-1					X
1264	TH (TY3H)	P07101	S19	RpAb	PN731					X
1265	TH (TY3H)	P07101	S71	RpAb	PN730					X
1266	THRAP3	Q9Y2W1	S253	RpAb	PN676				X	
1267	TIE2 (TEK)	Q02763	Y897	RpAb	PK830	X	PYK			
1268	TIE2 (TEK)	Q02763	Y992	RpAb	PK831	X	PYK			
1269	TLN1	Q9Y490	Y70	RpAb	PN542					
1270	TNK1	Q13470	Y277	RpAb	PK832	X	PYK			
1271	TORC2	Q53ET0	S433	RpAb	PN677				X	
1272	TP53BP1	Q12888	T1056	RpAb	PN678				X	
1273	TRIM28 (TIF1B)	Q13263	Y458	RpAb	PK834	X	PSTK		X	
1274	TRIM28 (TIF1B)	Q13263	S473	RpAb	PK833	X	PSTK		X	

Final Order on Array	Target Short Name	UniProt ID	Target P-Site	Ab Type	Kinexus Ab ID	Protein Kinases	PK or PP Type	Phosphatases	Transcription	Other Enzymes
1275	TRIM28 (TIF1B)	Q13263	Y517	RpAb	PK835	X	PSTK		X	
1276	TRIM33 (TIF1G)	Q9UPN9	S1119	RpAb	PK836	X	PSTK		X	
1277	TrkA (NGFR; NTRK1)	P04629	Y680+Y681	RpAb	PK837	X	PYK			
1278	TrkB (NTRK2)	Q16620	Pan-specific	MmAb	NK179-2	X	PYK			
1279	TrkB (NTRK2)	Q16620	Y516	RpAb	PK838	X	PYK			
1280	TrkB (NTRK2)	Q16620	Y702	RpAb	PK839	X	PYK			
1281	TrkC (NTRK3)	Q16288	Y709+Y710	RpAb	PK840	X	PYK			
1282	TRRAP	Q9Y4A5	Pan-specific	RpAb	NK232-3	X	PSTK			
1283	TRRAP	Q9Y4A5	Pan-specific	RpAb	NK232-1	X	PSTK			
1284	TSSK3	Q96PN8	T168	RpAb	PK841	X	PSTK			
1285	TTK (MPS1)	P33981	Pan-specific	RpAb	NK180	X	DSK			
1286	TTK (MPS1)	P33981	T676	RpAb	PK842	X	DSK			
1287	TTK (MPS1)	P33981	Y833+Y836	RpAb	PK843	X	DSK			
1288	TXK	P42681	Y420	RpAb	PK844	X	DSK			
1289	TYK2	P29597	Pan-specific	RpAb	NK181-3	X	PYK			
1290	TYK2	P29597	Pan-specific	RpAb	NK181-5	X	PYK			
1291	TYK2	P29597	Y292	RpAb	PK846	X	PYK			
1292	TYK2	P29597	Y1054+Y1055	RpAb	PK845	X	PYK			
1293	DDR2 (Tyro10)	Q16832	Pan-specific	RpAb	NK183-1	X	PYK			
1294	Tyro3	Q06418	Y681	RpAb	PK847	X	PYK			
1295	Tyro3	Q06418	Y685+Y686	RpAb	PK848	X	PYK			
1296	UBF	P17480	T201	RpAb	PN680				X	
1297	UBF	P17480	S484	RpAb	PN679				X	
1298	ULK1	O75385	Pan-specific	RpAb	NK298-2	X	PSTK			
1299	ULK1	O75385	Pan-specific	RpAb	NK298-1	X	PSTK			
1300	ULK2	Q8IYT8	Pan-specific	RpAb	NK354-1	X	PSTK			
1301	ULK3	Q6PHR2	Pan-specific	RpAb	NK355-1	X	PSTK			
1302	VACAMKL	Q8NCB2	Y245	RpAb	PK892	X	PSTK			
1303	VASP	P50552	S157	MmAb	PN276					
1304	Vav	P15498	Y174	MmAb	PN277					
1305	Vav	P15498	Y826	RpAb	PN543					
1306	VEGFR1 (Flt1)	P17948	Pan-specific	RpAb	NK226-2	X	PYK			
1307	VEGFR1 (Flt1)	P17948	Y1048	RpAb	PK850	X	PYK			
1308	VEGFR1 (Flt1)	P17948	Y1053	RpAb	PK851	X	PYK			
1309	VEGFR2 (KDR)	P35968	Pan-specific	RpAb	NK245-2	X	PYK			
1310	VEGFR2 (KDR)	P35968	Pan-specific	RpAb	NK245-3	X	PYK			
1311	VEGFR2 (KDR)	P35968	Y1054	RpAb	PK852	X	PYK			
1312	VEGFR2 (KDR)	P35968	Y1059	RpAb	PK161	X	PYK			
1313	VEGFR2 (KDR)	P35968	Y1214	RpAb	PK133	X	PYK			
1314	VEGFR3 (Flt4)	P35916	Pan-specific	RpAb	NK064-2	X	PYK			
1315	VEGFR3 (Flt4)	P35916	Pan-specific	RpAb	NK064-3	X	PYK			
1316	VEGFR3 (Flt4)	P35916	Y1068	RpAb	PK853	X	PYK			
1317	VIM	P08670	Pan-specific	MmAb	NN185-2					
1318	VIM	P08670	S34	MmAb	PN094					
1319	VIM	P08670	Y117	RpAb	PN544					
1320	WASP	P42768	Y291	RpAb	PN545					
1321	Wee1	P30291	Pan-specific	RpAb	NK185	X	DSK			
1322	Wee1	P30291	S642	RpAb	PK854	X	DSK			
1323	WNK1	Q9H4A3	Pan-specific	RpAb	NK252-1	X	PSTK			
1324	WNK1	Q9H4A3	Pan-specific	RpAb	NK252-3	X	PSTK			
1325	WNK1	Q9H4A3	T60	RpAb	PK856	X	PSTK			
1326	WNK1	Q9H4A3	S382	RpAb	PK855	X	PSTK			
1327	WNK1	Q9H4A3	T2245	RpAb	PK857	X	PSTK			
1328	WNK2	Q9Y3S1	Pan-specific	RpAb	NK253-1	X	PSTK			
1329	WNK2	Q9Y3S1	Pan-specific	RpAb	NK253-2	X	PSTK			
1330	WNK3 (PRKWNK3)	Q9BYP7	Pan-specific	RpAb	NK254-1	X	PSTK			
1331	WNK3 (PRKWNK3)	Q9BYP7	Pan-specific	RpAb	NK254-3	X	PSTK			
1332	WNK4 (PRKWNK4)	Q96J92	Pan-specific	RpAb	NK255-1	X	PSTK			

Final Order on Array	Target Short Name	UniProt ID	Target P-Site	Ab Type	Kinexus Ab ID	Protein Kinases	PK or PP Type	Phosphatases	Transcription	Other Enzymes
1333	WNK4 (PRKWNK4)	Q96J92	Pan-specific	RpAb	NK255-3	X	PSTK			
1334	WT1	P19544	S365	RpAb	PN732				X	
1335	YAP1	P46937	S109	RpAb	PN681				X	
1336	YAP1	P46937	T119	RpAb	PN682				X	
1337	YAP1	P46937	S127	RpAb	PN683				X	
1338	Yes	P07947	Pan-specific	MmAb	NK186	X	PYK			
1339	Yes	P07947	Y222+Y223	RpAb	PK858	X	PYK			
1340	YSK1 (STK25, SOK1)	O00506	Pan-specific	GpAb	NK214	X	PSTK			
1341	YSK1 (STK25, SOK1)	O00506	T174	RpAb	PK859	X	PSTK			
1342	YSK4 (MAP3K19)	Q56UN5	Pan-specific	RpAb	NK256-2	X	PSTK			
1343	YSK4 (MAP3K19)	Q56UN5	Pan-specific	RpAb	NK256-3	X	PSTK			
1344	ZAP70	P43403	Pan-specific	RpAb	NK187-2	X	PYK			
1345	ZAP70	P43403	Pan-specific	MmAb	NK187	X	PYK			
1346	ZAP70	P43403	Y248	RpAb	PK860	X	PYK			
1347	ZAP70	P43403	Y292	RpAb	PK861	X	PYK			
1348	ZAP70	P43403	Y319	RpAb	PK862	X	PYK			
1349	ZAP70	P43403	Y492+Y493	RpAb	PK863	X	PYK			
1350	ZC2 (TNIK)	Q9UKE5	Pan-specific	RpAb	NK301-1	X	PSTK			
1351	ZIPK (DAPK3)	O43293	Pan-specific	RpAb	NK188-1	X	PSTK			
1352	**Orientation Marker**									

Appendix 2. Lead Antibodies in EGF-treated A431 Cells Identified with the KAM-1325-pY Microarray

The table below provides a selection of the leads antibodies that showed increased signals in over-night serum starved human A431 cervical epidermoid carcinoma cells that were subsequently treated with and without 100 ng/ml of epidermal growth factor (EGF) for 5 minutes prior to harvesting in lysate buffer that contained 1% Triton X-100 and a battery of phosphatase inhibitors (including 5 mM sodium orthovandate). Approximately 100 µg of lysate protein were applied per field on a KAM-1325 slide, and after a 1 hour incubation, the slide was washed and probed with dye-labeled PYK anti-phosphotyrosine antibody (Kinexus Cat. No. PG-0001). Values are the averages of duplicate measurements, and the percent error in these measurements from the averages are shown. %CFC is the percentage change with EGF treatment from the untreated control values. Notably, these findings reproduce expected changes in the phosphorylation of EGF receptor family and MAP kinase family members as revealed by Western blotting.

Target Name	P-Site	Kinexus Antibody Codes	Antibody Source	Type	Kinase or Phosphatase Type	Average Serum-Starved Net Signal	% Error	Average EGF-treated Net Signal	% Error	EGF-induced %CFC
ACK1 (TNK2)	Pan-specific	NK002	External	RpAb	PYK	359	10	548	33	53
ACK1 (TNK2)	Y284	PK511	Kinexus	RpAb	PYK	8931	19	27034	20	203
ACK1 (TNK2)	Y518	PK512	Kinexus	RpAb	PYK	3142	3	4585	3	46
BLK	Y188	PK542	Kinexus	RpAb	PYK	3160	23	8828	27	179
BLK	Y389	PK543	Kinexus	RpAb	PYK	4129	7	18130	27	339
CDK1/CDK2	T14+Y15	PK560	Kinexus	RpAb	PSTK	8859	11	42850	11	384
CDK2	Pan-specific	NK026-6	External	RpAb	PSTK	483	14	740	45	53
CDK2	T160	PK568	Kinexus	RpAb	PSTK	2233	6	3591	31	61
CDK5	Y15	PK570	Kinexus	RpAb	PSTK	3268	3	6451	28	97
CDK6	Pan-specific	NK029-4	External	MmAb	PSTK	140	7	235	22	68
CDK6	Y13	PK571	Kinexus	RpAb	PSTK	6317	7	20570	4	226
CDK6	Y24	PK572	Kinexus	RpAb	PSTK	3169	1	5672	28	79
CDK7	T170	PK573	Kinexus	RpAb	PSTK	4178	5	10685	13	156
COX2	Pan-specific	NN027-2	External	MmAb		241	13	408	46	69
COX2	Y446	PN695	Kinexus	RpAb		399	5	777	1	95
CTNNB1	Pan-specific	NN021-2	External	MmAb		256	16	399	21	56
CTNNB1	Pan-specific	NN021	External	RpAb		238	11	488	49	105
CTNNB1	S33	PN166	External	RpAb		290	1	747	64	157
CTNNB1	Y333	PN167	External	RpAb		267	14	502	64	88
CTNNB1	Y654	PN579	Kinexus	RpAb		2174	6	3238	11	49
EGFR (ErbB1)	Pan-specific	NK052-4	Kinexus	RpAb	PYK	10561	2	54142	2	413
EGFR (ErbB1)	Y869	PK602	Kinexus	RpAb	PYK	5787	3	13756	11	138
EGFR (ErbB1)	Y998	PK603	Kinexus	RpAb	PYK	6392	3	14495	5	127
EGFR (ErbB1)	Y1172	PK010	External	RpAb	PYK	136	36	233	1	71
EGFR (ErbB1)	Y1172	PK601	Kinexus	RpAb	PYK	5173	7	18471	1	257
ENO1	Y44	PN511	Kinexus	RpAb		7612	3	12528	2	65
ENO2	Y25	PN512	Kinexus	RpAb		5604	3	11789	3	110

Target Name	P-Site	Kinexus Antibody Codes	Antibody Source	Type	Kinase or Phosphatase Type	Average Serum-Starved Net Signal	% Error	Average EGF-treated Net Signal	% Error	EGF-induced %CFC
ErbB2 (HER2, Neu)	Pan-specific	NK054-4	Kinexus	RpAb	PYK	3071	1	4767	35	55
ErbB2 (HER2, Neu)	Pan-specific	NK054-6	Kinexus	RpAb	PYK	1843	5	3086	44	67
ErbB2 (HER2, Neu)	Y735	PK614	Kinexus	RpAb	PYK	3377	2	6567	40	94
ErbB2 (HER2, Neu)	Y877	PK615	Kinexus	RpAb	PYK	1946	2	2756	15	42
ErbB2 (HER2, Neu)	Y1248	PK613	Kinexus	RpAb	PYK	6813	4	18214	35	167
ERBB2IP (Erbin)	Y1104	PN513	Kinexus	RpAb		8011	2	21201	46	165
ErbB3 (HER3)	Pan-specific	NK231-3	Kinexus	RpAb	PYK	1777	5	2989	32	68
ErbB3 (HER3)	Y1289	PK616	Kinexus	RpAb	PYK	3708	3	13187	21	256
ErbB3 (HER3)	Y1307	PK617	Kinexus	RpAb	PYK	2714	3	4438	19	64
ErbB3 (HER3)	Y1328	PK618	Kinexus	RpAb	PYK	3886	4	8347	57	115
ERK1 (MAPK3)	Pan-specific	NK055-1	Kinexus	RpAb	PSTK	2098	6	2776	21	32
ERK1 (MAPK3)	Pan-specific	NK055-3	Kinexus	RpAb	PSTK	1854	6	2740	22	48
ERK1 (MAPK3)	T202+Y204	PK182	External	MmAb	PSTK	401	13	628	32	57
ERK1 (MAPK3)	T202+Y204	PK621	Kinexus	RpAb	PSTK	3068	4	11148	42	263
ERK1 (MAPK3)	Y204	PK183	External	MmAb	PSTK	149	15	256	33	72
ERK1 (MAPK3)	Y204	PK864	Kinexus	RpAb	PSTK	4505	5	9883	31	119
ERK1 (MAPK3)	Y204+T207	PK866	Kinexus	RpAb	PSTK	3828	4	4990	2	30
ERK1 (MAPK3)	S283	PK879	Kinexus	RpAb	PSTK	2073	3	2958	28	43
ERK2 (MAPK1)	Y263+S266	PK880	Kinexus	RpAb	PSTK	2763	3	5555	6	101
ERK3 (MAPK6)	Pan-specific	NK057-2	External	RpAb	PSTK	609	13	935	27	54
ERK3 (MAPK6)	S189	PK623	Kinexus	RpAb	PSTK	1997	5	3516	33	76
ERK5 (MAPK7)	Pan-specific	NK206-3	External	GpAb	PSTK	150	40	686	40	357
ERK5 (MAPK7)	T219+Y221	PK184	External	MmAb	PSTK	234	11	501	11	114
ERK5 (MAPK7)	Y221	PK626	Kinexus	RpAb	PSTK	4398	4	29019	17	560
ESYT1	Y822	PN514	Kinexus	RpAb		8144	2	27152	6	233
FAK (PTK2)	Y397	PK627	Kinexus	RpAb	PYK	9653	2	50927	1	428
FAK (PTK2)	Y576+Y577	PK628	Kinexus	RpAb	PYK	8596	0	15540	24	81
FBPase (FBP1)	Y265	PN699	Kinexus	RpAb		7671	0	19437	11	153
FBPase 2 (FBP2)	Y216	PN700	Kinexus	RpAb		2424	3	12906	6	433
FGFR2 (BEK)	Pan-specific	NK063-2	Kinexus	RpAb	PYK	2424	3	3196	14	32
FGFR2 (BEK)	Pan-specific	NK063-4	Kinexus	RpAb	PYK	1916	7	2625	11	37
FGFR2 (BEK)	Y656+Y657	PK635	Kinexus	RpAb	PYK	3756	2	8910	10	137
FGFR3	Pan-specific	NK236-2	Kinexus	RpAb	PYK	1803	4	2486	16	38
FGFR3	Y647+Y648	PK637	Kinexus	RpAb	PYK	3389	0	5074	3	50
FGFR3	Y647+Y648	PK636	Kinexus	RpAb	PYK	5121	4	9423	16	84
Fgr	Y208+Y209	PK638	Kinexus	RpAb	PYK	4449	3	16536	3	272
Fgr	Y412	PK639	Kinexus	RpAb	PYK	2536	3	7666	7	202
G6PD	Y401	PN515	Kinexus	RpAb		2184	5	3927	10	80

Target Name	P-Site	Kinexus Antibody Codes	Antibody Source	Type	Kinase or Phosphatase Type	Average Serum-Starved Net Signal	% Error	Average EGF-treated Net Signal	% Error	EGF-induced %CFC
G6PD	Y503+Y507	PN701	Kinexus	RpAb		6697	6	29997	1	348
GIT1	Y545	PN517	Kinexus	RpAb		6426	5	14806	7	130
GUK1	Y53	PK652	Kinexus	RpAb	PSTK	5848	4	15847	5	171
HCA59	Y147	PN518	Kinexus	RpAb		11538	2	26455	1	129
HMGA1	S36+T39	PN605	Kinexus	RpAb		1826	8	2917	1	60
HMGA1	T53	PN606	Kinexus	RpAb		2592	4	3803	9	47
HMGB1	S35+S39	PN607	Kinexus	RpAb		3254	8	5016	13	54
HMGCS1	S495	PN754	Kinexus	RpAb		5784	0	8965	19	55
HRAS	Pan-specific	NN281-3	Kinexus	RpAb		1688	7	2372	14	41
HRAS	Y157	PN755	Kinexus	RpAb		4122	10	9705	21	135
ICK	Pan-specific	NK073-2	External	MmAb	PSTK	355	17	503	1	42
ICK	Y156+T157	PK655	Kinexus	RpAb	PSTK	2476	1	4285	10	73
ICK	Y159	PK656	Kinexus	RpAb	PSTK	1571	4	2527	6	61
IDH1	T75+T77	PN706	Kinexus	RpAb		2196	1	3616	12	65
IDH1	Y391	PN757	Kinexus	RpAb		4662	7	29210	6	527
IGF1R	Pan-specific	NK074-2	Kinexus	RpAb	PYK	347	10	741	2	114
IGF1R	Pan-specific	NK074-4	External	MmAb	PYK	214	27	756	50	253
IGF1R	Y1280	PK152	External	RpAb	PYK	317	20	616	22	94
IGF1R	Y1346	PK658	Kinexus	RpAb	PYK	1396	3	3334	21	139
IkBa	Pan-specific	NN064	External	RpAb		225	19	438	22	95
IkBa	S32	PN232	External	MmAb		216	8	417	13	93
IkBa	Y42	PN164	External	RpAb		90	29	191	14	113
IkBe	S161	PN168	External	RpAb		77	0	107	24	39
IKKb (IkBKB)	Pan-specific	NK076-5	Kinexus	RpAb	PSTK	1445	3	2158	6	49
IKKb (IkBKB)	Pan-specific	NK076-7	External	MmAb	PSTK	131	18	316	27	142
IKKe (IkBKE)	S172	PK660	Kinexus	RpAb	PSTK	1484	0	1954	10	32
IKKg (NEMO)	Pan-specific	NN077-2	External	MmAb		153	11	233	10	52
IKKg (NEMO)	S377	PN758	Kinexus	RpAb		2210	1	3224	10	46
InsR (IR)	Pan-specific	NK079-2	Kinexus	RpAb	PYK	393	0	901	26	129
InsR (IR)	Y1189	PK663	Kinexus	RpAb	PYK	2832	8	4406	14	56
IRAK1	Pan-specific	NK080-2	External	RpAb	PSTK	453	15	671	22	48
IRAK1	T387	PK664	Kinexus	RpAb	PSTK	3563	1	5735	1	61
IRAK4	T345+S346	PK665	Kinexus	RpAb	PSTK	2977	8	4137	8	39
IRR (INSRR)	Pan-specific	NK273-1	Kinexus	RpAb	PYK	895	30	1272	7	42
ITK	Y512	PK666	Kinexus	RpAb	PYK	4742	4	9040	0	91
ITSN2	Y968	PN521	Kinexus	RpAb		4251	7	19574	23	360
JAK1	Pan-specific	NK084-5	Kinexus	RpAb	PYK	3361	5	4752	5	41
JAK1	Pan-specific	NK084-2	External		PYK	312	3	483	14	55

Target Name	P-Site	Kinexus Antibody Codes	Antibody Source	Type	Kinase or Phosphatase Type	Average Serum-Starved Net Signal	% Error	Average EGF-treated Net Signal	% Error	EGF-induced %CFC
JAK1	Y1034+Y1035	PK884	Kinexus	RpAb	PYK	7253	5	42395	6	485
JAK1	T1107	PK895	Kinexus	RpAb	PYK	1644	0	2494	4	52
JAK2	Pan-specific	NK085-3	Kinexus	RpAb	PYK	1800	3	2664	16	48
JAK2	Pan-specific	NK085-4	Kinexus	RpAb	PYK	1417	11	2283	14	61
JAK2	Y570	PK668	Kinexus	RpAb	PYK	2885	4	5736	18	99
JAK2	Y1007+Y1008	PK034-1	External	RpAb	PYK	382	28	587	0	54
JAK2	Y1007+Y1008	PK667	Kinexus	RpAb	PYK	1789	9	3372	4	88
JAK3	Pan-specific	NK086	External	MmAb	PYK	115	15	190	1	64
JAK3	Y980+Y981	PK669	Kinexus	RpAb	PYK	1942	3	2840	4	46
JNK1 (MAPK8)	Pan-specific	NK217-2	Kinexus	RpAb	PSTK	1196	7	1968	10	65
JNK1 (MAPK8)	Pan-specific	NK189-5	External	MmAb	PSTK	360	20	633	31	76
JNK1 (MAPK8)	T183+Y185	PK190	External	MmAb	PSTK	131	6	209	38	60
JNK1 (MAPK8)	Y185	PK670	Kinexus	RpAb	PSTK	1913	5	3263	3	71
JNK2 (MAPK9)	Pan-specific	NK189-3	Kinexus	RpAb	PSTK	1419	5	1973	4	39
JNK2 (MAPK9)	Pan-specific	NK189-2	Kinexus	RpAb	PSTK	3568	1	5106	7	43
JNK3 (MAPK10)	Pan-specific	NK197-2	Kinexus	RpAb	PSTK	2506	7	3693	17	47
Jun (c-Jun)	Pan-specific	NN162	External	MmAb		87	13	158	4	81
Jun (c-Jun)	S243	PN614	Kinexus	RpAb		3838	5	7150	3	86
Jun (c-Jun)	S63	PN557	Kinexus	RpAb		3324	1	4321	16	30
Jun (c-Jun)	S63	PN213	External	MmAb		192	3	270	10	41
Jun (c-Jun)	S73	PN612	Kinexus	RpAb		2191	0	3128	10	43
Jun (c-Jun)	T91	PN163	External	RpAb		202	17	311	1	54
Jun (c-Jun)	T91+T93	PN214	External	MmAb		346	13	581	25	68
Jun (c-Jun)	Y170	PN155	External	RpAb		210	11	656	7	212
Jun (c-Jun)	T239	PN613	Kinexus	RpAb		1171	1	1708	3	46
KHS1 (MAP4K5)	Pan-specific	NK089	External	GpAb	PSTK	133	4	188	7	42
KHS1 (MAP4K5)	S174	PK671	Kinexus	RpAb	PSTK	2496	0	3675	16	47
KHS1 (MAP4K5)	Y31	PK672	Kinexus	RpAb	PSTK	3577	6	18672	4	422
Kit	Pan-specific	NK241-4	External	MmAb	PYK	164	10	254	4	55
Kit	S821+Y823	PK674	Kinexus	RpAb	PYK	4272	2	12119	2	184
Kit	Y703	PK036	External	RpAb	PYK	2699	8	7479	13	177
Kit	Y721	PK885	Kinexus	RpAb	PYK	5061	8	26023	11	414
Kit	Y730	PK037	External	RpAb	PYK	738	1	1301	5	76
Kit	Y936	PK673	Kinexus	RpAb	PYK	8913	3	39835	5	347
Ksr1	Pan-specific	NK090-1	Kinexus	RpAb	PSTK	258	2	455	22	76
Ksr1	S406	PK675	Kinexus	RpAb	PSTK	2132	0	3181	2	49
Ksr2	S490	PK676	Kinexus	RpAb	PSTK	2306	4	3315	11	44
LATS1	Pan-specific	NK091-2	Kinexus	RpAb	PSTK	709	16	956	19	35

Target Name	P-Site	Kinexus Antibody Codes	Antibody Source	Type	Kinase or Phosphatase Type	Average Serum-Starved Net Signal	% Error	Average EGF-treated Net Signal	% Error	EGF-induced %CFC
LATS1	Pan-specific	NK091-3	External	MmAb	PSTK	207	7	325	4	57
LATS1	S464	PK677	Kinexus	RpAb	PSTK	1207	4	1619	2	34
LATS1	S909	PK678	Kinexus	RpAb	PSTK	2550	5	3705	16	45
Lck	Pan-specific	NK353-4	External	MmAb	PYK	195	11	262	10	35
Lck	Y192	PK679	Kinexus	RpAb	PYK	2193	2	4233	4	93
Lck	Y263+Y264	PK680	Kinexus	RpAb	PYK	3676	8	11064	1	201
Lck	Y394	PK149	External	MmAb	PYK	158	14	240	4	52
LOK	S191	PK685	Kinexus	RpAb	PSTK	4212	2	14191	2	237
LTK	Y672	PK687	Kinexus	RpAb	PYK	4193	5	7616	11	82
MERTK (MER)	Y749	PK702	Kinexus	RpAb	PYK	2210	1	10908	5	394
MERTK (MER)	Y749+Y753	PK703	Kinexus	RpAb	PYK	6536	6	22474	2	244
MERTK (MER)	Y753	PK704	Kinexus	RpAb	PYK	2854	15	7577	3	166
Met	Y1003	PK708	Kinexus	RpAb	PYK	3034	8	12255	1	304
Met	Y1230	PK709	Kinexus	RpAb	PYK	5518	3	13448	8	144
Met	Y1234	PK710	Kinexus	RpAb	PYK	6293	4	9779	18	55
Met	Y1234+Y1235	PK711	Kinexus	RpAb	PYK	7428	0	21575	8	190
PBK	Y74	PK754	Kinexus	RpAb	PSTK	2261	1	9315	5	312
PBK	Y272	PK889	Kinexus	RpAb	PSTK	7197	4	27056	3	276
PCTK1 (CDK16)	Y176	PK755	Kinexus	RpAb	PSTK	6805	2	22799	27	235
PECAM-1	Y713	PN523	Kinexus	RpAb		7162	3	19088	13	167
PGK1	Y196	PN525	Kinexus	RpAb		3511	5	13246	6	277
PIK3R1	Y467	PN526	Kinexus	RpAb		7170	6	19076	2	166
PIK3R1	Y580	PN527	Kinexus	RpAb		4582	1	8308	1	81
PIK3R2	Y464	PN528	Kinexus	RpAb		2432	16	4902	8	102
PKCt (PRKCQ)	Y545	PK773	Kinexus	RpAb	PSTK	4128	4	13694	9	232
PLCG1	Pan-specific	NN144-2	External	MmAb		567	18	769	0	36
PLCG1	Y771	PN165	External	RpAb		256	18	400	17	57
PLCG1	Y783	PN144	External	RpAb		115	25	304	11	165
PLCG1	Y783	PN530	Kinexus	RpAb		4894	9	20485	5	319
PLCG1	Y977	PN722	Kinexus	RpAb		5067	4	6676	19	32
PLCG2	Y753	PN723	Kinexus	RpAb		3465	1	8074	32	133
PLCG2	Y753	PN143	External	RpAb		335	8	1276	26	281
PLCG2	Y759	PN531	Kinexus	RpAb		4180	2	6482	16	55
Plk1 (PLK)	T210	PK778	Kinexus	RpAb	PSTK	1589	7	2856	35	80
Plk1 (PLK)	Y217	PK779	Kinexus	RpAb	PSTK	4273	12	16135	1	278
Plk4 (SAK; STK18)	T170	PK780	Kinexus	RpAb	PSTK	3216	11	8826	2	174
PP2A/Ca (PPP2CA)	Y307	PP504	Kinexus	RpAb	PSTP	2411	6	4813	5	100
PP2Ca (PPM1A)	Y362	PP508	Kinexus	RpAb	PSTP	3829	10	16063	0	319

Target Name	P-Site	Kinexus Antibody Codes	Antibody Source	Type	Kinase or Phosphatase Type	Average Serum-Starved Net Signal	% Error	Average EGF-treated Net Signal	% Error	EGF-induced %CFC
PPP5C	Y119	PP507	Kinexus	RpAb	PSTP	6662	4	24229	7	264
PTPN11 (SHP2)	Pan-specific	NP026-3	External	MmAb	PYP	304	1	456	15	50
PTPN11 (SHP2)	Y62	PP512	Kinexus	RpAb	PYP	6783	2	23367	5	244
PTPN11 (SHP2)	T542	PP008	External	MmAb	PYP	243	20	406	6	67
PTPRA	Y798	PP521	Kinexus	RpAb	PYP	2568	4	4656	5	81
PTPRB	Y1981	PP522	Kinexus	RpAb	PYP	4015	8	13054	2	225
PTPRK	Y916	PP524	Kinexus	RpAb	PYP	1665	5	9041	1	443
PTPRM	Y929	PP526	Kinexus	RpAb	PYP	3131	3	16719	5	434
PTRF	Y308	PN646	Kinexus	RpAb		6021	5	29191	2	385
PYK2 (PTK2B)	Y402	PK788	Kinexus	RpAb	PYK	4691	1	7939	10	69
PYK2 (PTK2B)	Y402	PK787	Kinexus	RpAb	PYK	3671	4	6641	14	81
PYK2 (PTK2B)	Y579+Y580	PK789	Kinexus	RpAb	PYK	6627	6	18387	2	177
RIPK1 (RIP; RIPK)	Pan-specific	NK158-2	External	MmAb	PSTK	750	2	1024	25	37
RIPK1 (RIP; RIPK)	Y384	PK795	Kinexus	RpAb	PSTK	3211	7	6890	21	115
Ron (RONa)	Pan-specific	NK161-2	Kinexus	RpAb	PYK	3696	1	7082	4	92
Ron (RONa)	Y1238	PK800	Kinexus	RpAb	PYK	5380	1	25684	6	377
Ron (RONa)	Y1238+Y1239	PK801	Kinexus	RpAb	PYK	3192	9	9874	26	209
Ros	Y2114+Y2115	PK803	Kinexus	RpAb	PYK	8187	4	34551	7	322
RSK1 (RPS6KA1)	T573	PK806	Kinexus	RpAb	PSTK	7999	5	22001	10	175
RSK1 (RPS6KA1)	Y220+S221	PK807	Kinexus	RpAb	PSTK	4867	1	21638	7	345
RSK3 (RPS6KA2)	Y217+S218	PK808	Kinexus	RpAb	PSTK	4559	2	9621	5	111
SgK269 (PEAK1)	Y635	PK811	Kinexus	RpAb	PSTK	5459	10	11582	5	112
SHIP2 (INPPL1)	Y886	PN534	Kinexus	RpAb		9919	18	28076	12	183
SIT	Y90	PN535	Kinexus	RpAb		2974	10	4033	8	36
SIT	Y95	PN536	Kinexus	RpAb		3623	2	14419	3	298
snRNP 70	Y126	PN537	Kinexus	RpAb		1849	13	2955	7	60
SOCS7	Y561	PN728	Kinexus	RpAb		4406	5	7432	3	69
Src	Pan-specific	NK172-4	External	MmAb	PYK	153	8	260	0	71
Src	Pan-specific	NK172-3	External	RpAb	PYK	242	13	447	41	85
Src	Y419	PK107	External	RpAb	PYK	147	38	457	5	210
STAT1	Y701	PN666	Kinexus	RpAb		9327	0	37380	3	301
STAT2	Y690	PN668	Kinexus	RpAb		145	26	276	5	90
STAT3	Y705+T708	PN539	Kinexus	RpAb		1549	6	3127	3	102
STAT4	S721	PN274	External	MmAb		354	7	779	0	120
STAT6	Y641	PN673	Kinexus	RpAb		3881	7	15544	2	301
Syk	Y323	PK821	Kinexus	RpAb	PYK	1064	18	1630	5	53
Syk	Y352	PK822	Kinexus	RpAb	PYK	615	1	858	1	39
Syk	Y525+Y526	PK823	Kinexus	RpAb	PYK	425	31	673	14	58

Target Name	P-Site	Kinexus Antibody Codes	Antibody Source	Type	Kinase or Phosphatase Type	Average Serum-Starved Net Signal	% Error	Average EGF-treated Net Signal	% Error	EGF-induced %CFC
TEC	Y519	PK829	Kinexus	RpAb	PYK	2374	1	4271	0	80
TGM2	Y369	PN541	Kinexus	RpAb		7205	9	22534	0	213
TIE2 (TEK)	Y897	PK830	Kinexus	RpAb	PYK	2722	4	9004	5	231
TIE2 (TEK)	Y992	PK831	Kinexus	RpAb	PYK	231	2	415	21	80
TLN1	Y70	PN542	Kinexus	RpAb		3691	1	6451	3	75
TNK1	Y277	PK832	Kinexus	RpAb	PSTK	1205	0	14220	3	1080
TrkA (NGFR)	Y680+Y681	PK837	Kinexus	RpAb	PYK	4722	2	14771	4	213
TrkB (NTRK2)	Y516	PK838	Kinexus	RpAb	PYK	2433	6	3632	5	49
TrkB (NTRK2)	Y702	PK839	Kinexus	RpAb	PYK	263	4	384	3	46
Yes	Pan-specific	NK186	External	MmAb	PYK	204	42	336	15	64
Yes	Y222+Y223	PK858	Kinexus	RpAb	PYK	3073	9	6875	2	124
YSK1 (STK25)	T174	PK859	Kinexus	RpAb	PSTK	2159	2	5282	7	145
ZAP70	Y248	PK860	Kinexus	RpAb	PYK	234	2	341	16	46
ZAP70	Y292	PK861	Kinexus	RpAb	PYK	1173	18	2831	17	141
ZAP70	Y319	PK862	Kinexus	RpAb	PYK	3173	32	5123	19	61
ZAP70	Y492+Y493	PK863	Kinexus	RpAb	PYK	3205	13	5104	22	59