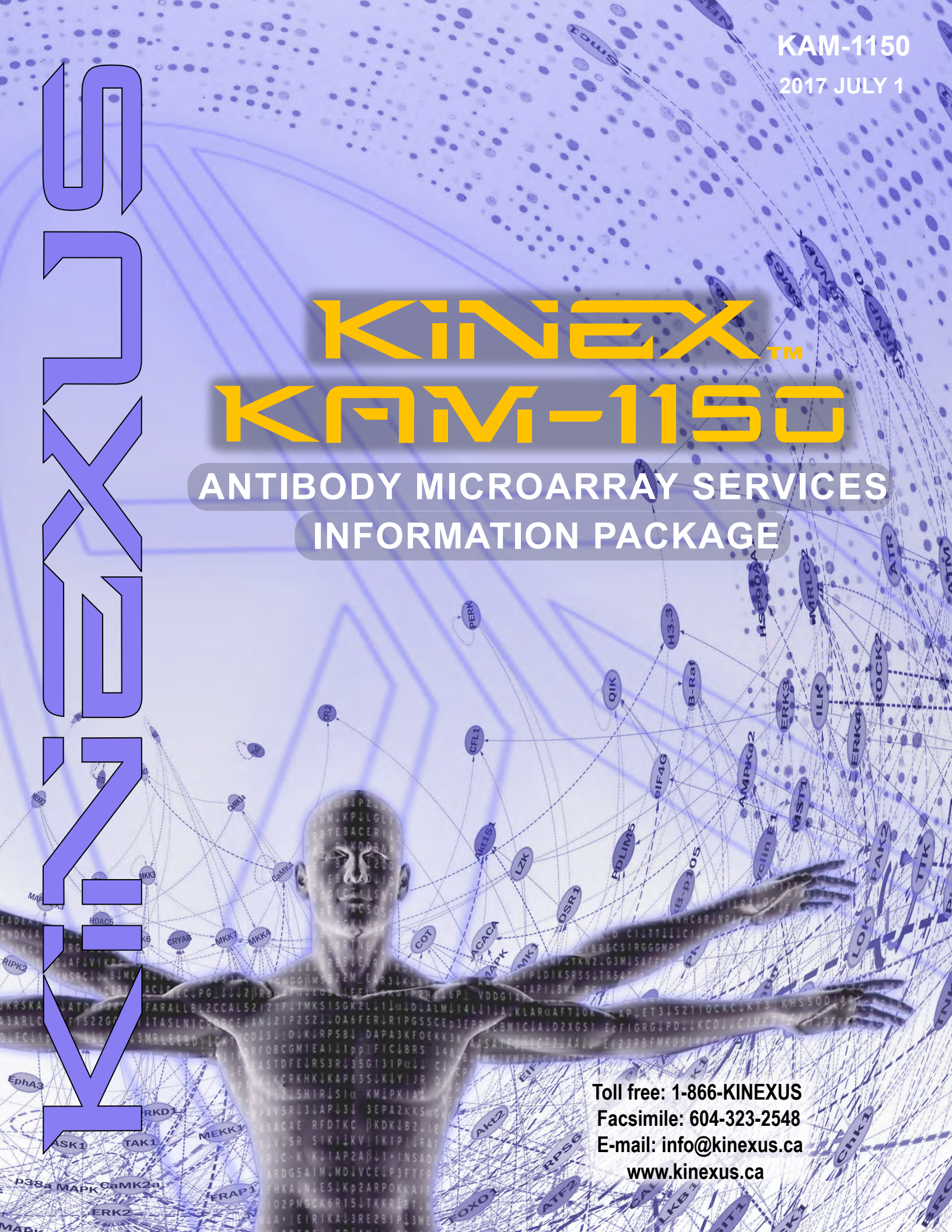
KAM-1150

2017 JULY 1

KINEXUS

KiNEX™ KAM-1150

ANTIBODY MICROARRAY SERVICES INFORMATION PACKAGE



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Overview of Kinex™ KAM-1150 Antibody Microarrays

1. INTRODUCTION

Our Kinex™ KAM Services allow our clients to have their cell and tissue lysates from their experimental model systems investigated for discovery of biomarker leads with our high content antibody microarrays. These 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 cell extracts, fresh or frozen tissues and biofluids such as serum and cerebral spinal fluid. The results can provide novel and useful insights into differences in protein expression, phosphorylation 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, wide coverage of cell signalling proteins and pathways, extensive follow-up services for validation, and supporting bioinformatics analyses for comparison purposes. In this information package, we explain how the various KAM-1150 antibody microarray formats work and how best to use them the most effectively to advance your research programs. With the KAM-1150 microarray, we have developed a range of alternative detection techniques to track protein expressions, covalent modifications, protein-protein and protein-drug interactions. Presently, we offer services with this microarray that permit detections of changes in protein expression levels (KAM-1150E) and protein-tyrosine phosphorylation (KAM-1150PY). Clients should contact us regarding alternative detection formats for other types of covalent modification and protein- and drug-interactions. The KAM-1150 microarray truly provides multi-dimensional analyses.

2. HIGHLY VALIDATED ANTIBODIES

Kinexus offers two different Kinex™ KAM antibody microarray services that use complementary antibody microarrays. The KAM-900P antibody microarray features 613 phosphosite-specific antibodies (for phosphorylation) and 265 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-900P and KAM-1100 chips permit screening of cell and tissue lysates with over 1700 non-redundant antibodies. These microarrays are the culmination of continuous on-going efforts to steadily improve the power and accuracy of our antibody microarrays over the last 8 years. Kinexus has already performed over 3000 antibody microarray analyses for our clients.

The antibodies deployed on the KAM-900P 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 15% of these antibodies that performed well in Western blotting applications have been incorporated into our Kinex™ Antibody Microarrays. In addition, Kinexus has produced its own panel of highly characterized cell signalling antibodies, many of which are incorporated into the KAM-900P and KAM-1150 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. When our clients utilize the KAM-1150 and KAM-900P antibody microarrays, upon request, we are pleased to disclose their commercial sources and in many cases, these antibodies are available directly from Kinexus at very affordable prices. Immunoblots images with the antibodies sold by Kinexus are available for easy viewing on our website at www.kinexusproducts.ca. A complete listing of all the antibodies printed on the KAM-1150 chip in MS-Excel format is downloadable from the Kinexus website and included at the end of this information package. In particular, at least 700 unique signalling proteins and their targets are tracked with these antibodies. 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 chicken, bovine, porcine, canine, rabbit, frog, sea star and many other diverse model systems. The classes of targeted proteins and phosphosites on the KAM-1150 antibody microarrays are listed in Table 1 below.

Table 1. Families of protein targets for the KAM-1150 antibody microarray slides. These statistics may be slightly altered in future print runs of these microarray chips.

Total Number of Pan-specific Antibodies	**1150**	**100%**
Total number of protein kinase antibodies:	581	50.5%
Total number of protein phosphatase antibodies:	87	7.6%
Total number of transcription factor antibodies:	37	3.2%
Total number of stress protein antibodies:	49	4.2%
Total number of adapter protein antibodies:	13	1.1%
Total Number of Non-redundant Target Proteins	**703**	**100%**
Total number of protein kinase targets	304	43.2%
Total number of protein phosphatase targets	45	6.4%
Total number of transcription factor targets	23	3.3%
Total number of stress protein targets	20	2.8%
Total number of adapter protein targets	10	1.4%

3. QUALITY CONTROL PROCEDURES

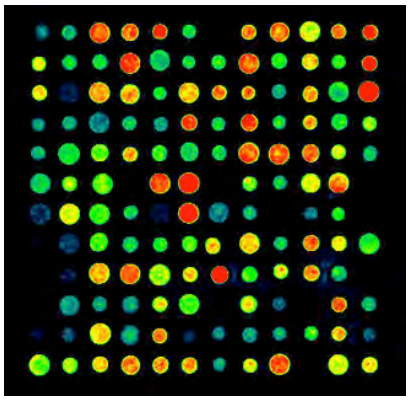
The antibodies on the KAM-1150 microarray are deposited on epoxy coated glass slides with a non-contact inkjet micro arrayer. A deposition volume of 400 pL with 0.1 to 0.5 mg/ml antibody solution are printed in each spot. These microarrays are subjected to stringent quality control measures designed to ensure optimum antibody activity, printing consistency, and consistent intra-slide and inter-slide variability. The printing of individual antibodies on our microarrays are validated by probing with dye-labeled anti-rabbit, anti-mouse, anti-rat and anti-goat secondary antibodies. Each microarray also has loading and antibody controls to ensure the amount of deposited protein is consistent on all fields. Each KAM-1150 antibody microarray provides for semi-quantitative analyses of the expression and phosphorylation status of cell signalling proteins in a single cell or tissue lysate. The quantitative analysis of the strength of the fluorescence signals for each captured target protein is based on at least triplicate measurements. We also employ a normalization step to take into account any minor differences in protein loading on to our microarrays.

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, and the percent standard deviation for error measurement, which can be used to determine which target proteins to follow up. In internal studies with our KAM-1150 series antibody microarrays, we determined that the spread between triplicate measurements with the same antibody in triplicate printed spots on the same slide corresponded to a median standard deviation of 9% (calculated from six separate sets of triplicate antibody spots for each of 1150 antibodies tested). The frequency of flagged antibody spots dues to dust or misprinting was less than 3%. The dynamic range between the highest and lowest fluorescent dye-signals of captured lysate proteins from these KAM-1150 chips was over 2,000-fold.

We strongly believe that our KAM-900P and KAM-1150 series antibody microarrays are the best commercial high content antibody arrays that are available in the market place today for tracking protein expression and phosphorylation. The performance of our Kinex™ KAM chips exceeded the other leading antibody microarrays from at least three other companies 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.

Figure 1. Close up scanned images of replicate fields (A+C, B+D) corresponding to 1 of 8 different grids that were printed on a Kinex™ KAM-1150 antibody microarray chip and incubated with lysates from overnight serum-starved A431 cells that were treated without (A,C) and with 100 nM epidermal growth factor (B,D). The captured lyste proteins on the microarray were then probed with a dye-labelled anti-phosphotyrosine antibody (PYKu, Cat. No. PG001U) prior to scanning. Decreasing signal intensity corresponds with a red to orange to yellow to green to blue transition. EGF treatment can be seen to increase the tyrosine phosphorylation states of several A431 cell proteins.

A



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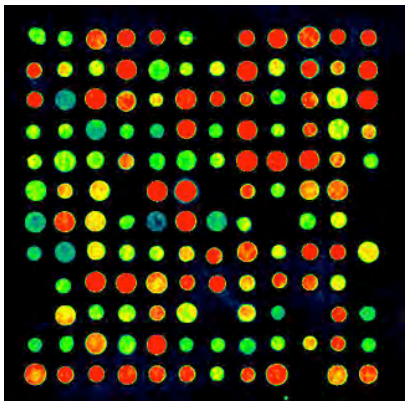

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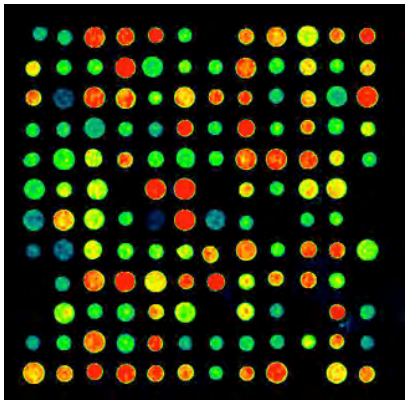
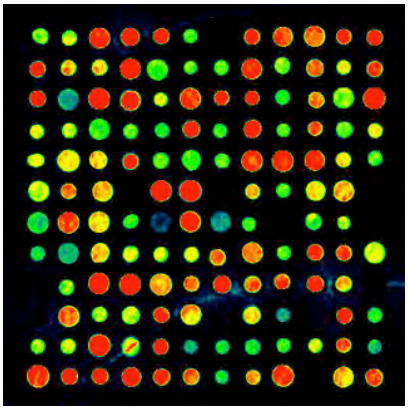


D



4. PRINCIPLES OF BINDING AND DETECTION

There are several different methodologies that can be used with Kinex™ KAM-1150 antibody microarrays for expression profiling, and these are outlined in Figure 2. **Method 1** involves the direct labelling of lysate proteins with a fluorescent dye and then incubation of the tagged proteins with the microarray for their immunocapture. Unbound lysate proteins are washed away and the microarray slide is scanned for the fluorescent signals associated with each antibody spot. One disadvantage of this approach is that proteins often reside in complexes, and the dye signal associated with an antibody spot may arise from different proteins. 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 G25 spin-column and the presence of ethanolamine 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 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.

Methods 2 and **3**, both involve 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). The CCC treatment dissociates protein complexes, and abolishes the activities of kinases, phosphatases, proteases and other enzymes, resulting in more stable peptide samples and preservation of protein phosphorylation. With **Method 2**, CCC treatment is performed at the time of homogenization of cells and tissues, whereas with **Method 3**, CCC is carried out at a later date, but also prior to labelling of the lysate proteins with a fluorescent dye.

With **Method 4**, CCC occurs at the time of homogenization, but the lysate proteins are subsequently biotinylated rather than directly dye labeled. We find that this produced less background signals that observed with the direct-dye labelling approach. After capture of the biotinylated proteins on the microarray, the array is then probed with a dye-labeled anti-biotin antibody. **Method 4** provides the lowest background signals and greatest dynamic range for detection of lysate proteins on the KAM-1150 slide, and it is our recommended procedure for the best results with this microarray for tracking changes in protein expression with higher accuracy.

The Kinex™ KAM-1150 chip can also be used in a sandwich antibody microarray approach to monitor various covalent modifications or protein-interactions of captured 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 PYKu (Cat. No. PG001U) to reveal changes in total phosphorylation on tyrosine residues (Figure 2). Figure 3 illustrates the expected configuration of capture and reporter antibodies binding to different epitopes on the same target protein. In principal, most generic antibodies for different types of covalent modifications should be compatible with this detection system.

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. Figure 4 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 effect of cysteine chemical cleavage conditions to disrupt protein-protein interactions, we strongly recommend not using protein fragmentation conditions for exploring possible protein complexes.

Figure 2. Possible methodologies used with the Kinex™ KAM-1150 antibody microarray to examine target protein expression.

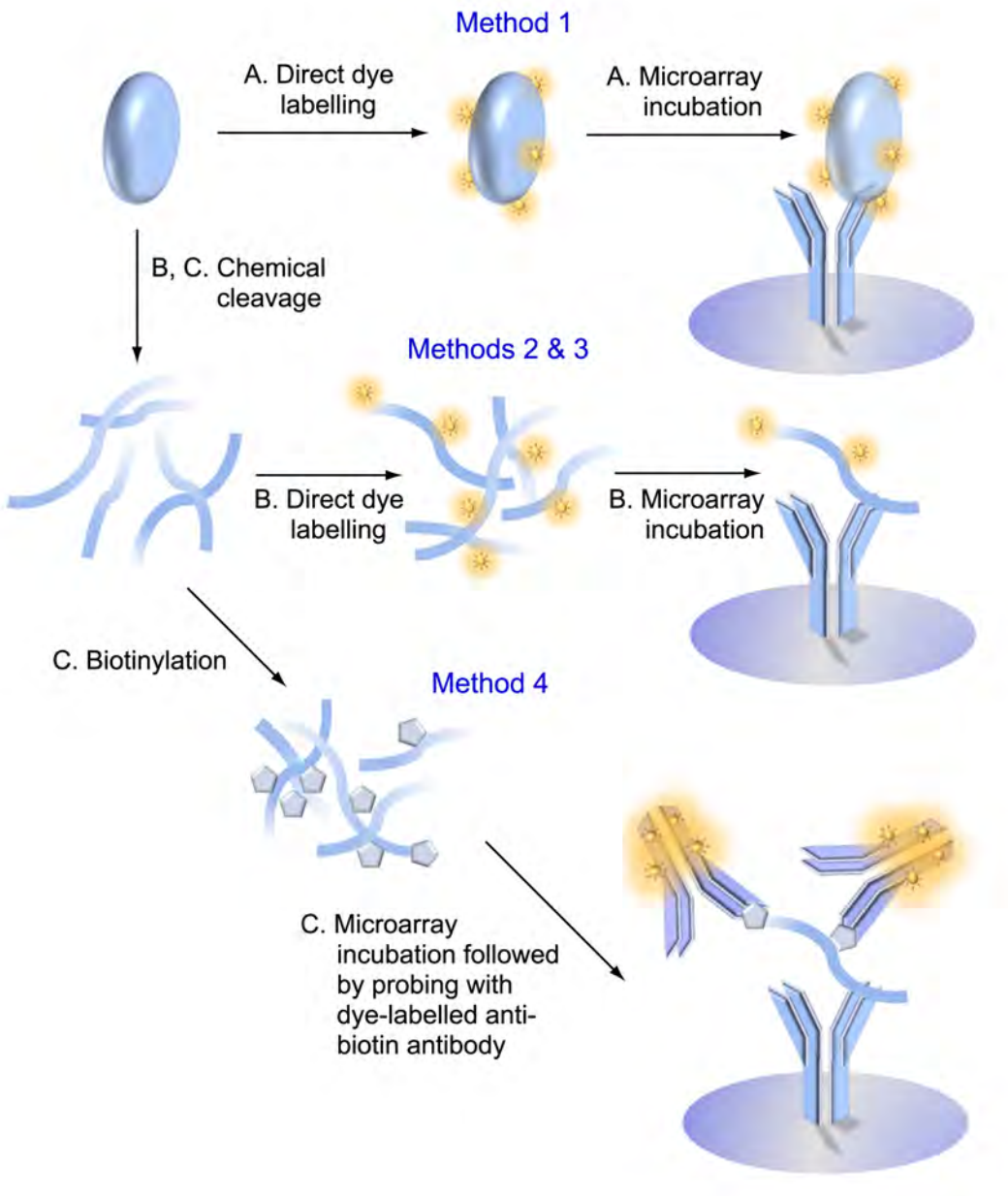


Figure 3. Sandwich antibody microarray (SAM) configuration for monitoring protein covalent modifications with the Kinex™ KAM-1150 antibody microarray. In this example, an anti-phosphotyrosine reporter antibody is used to detect the tyrosine phosphorylation of immune-captured proteins. Detection of a fluorescent signal denotes phosphorylation of the target protein on tyrosine.

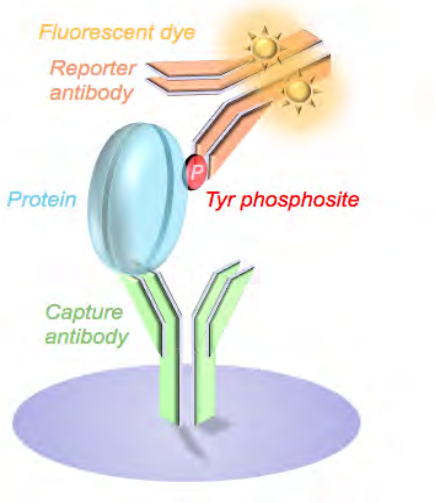
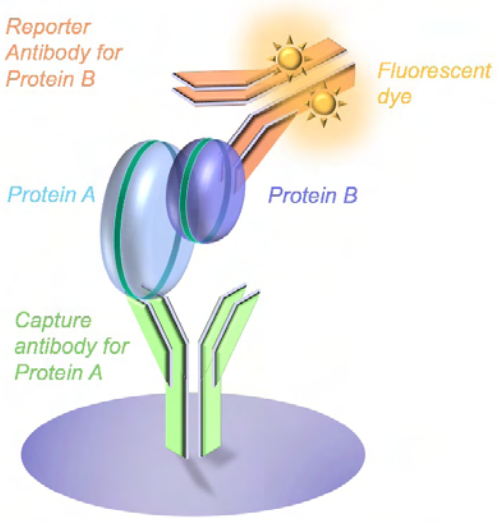


Figure 4. Sandwich antibody microarray (SAM) configuration for monitoring protein-protein interactions with the Kinex™ KAM-1150 antibody microarray. Detection of a fluorescent signal denotes the successful interaction of a protein of interest (Protein B) to one of the proteins (Protein A) captured on the antibody microarray.



5. PROPRIETARY DYE COMBINATIONS

One key advantage of our antibody microarrays is that lysate samples from control and treated cells are labeled with the same dyes 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 labeled 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. 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 labeled with different

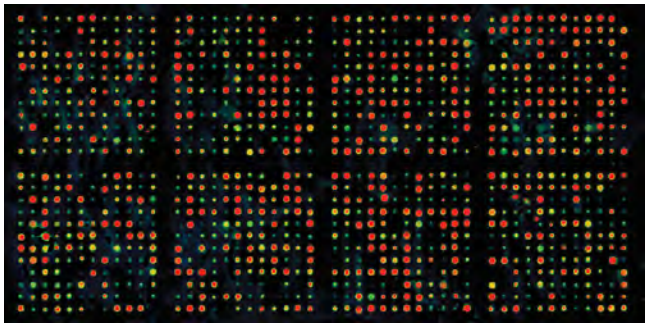
dyes are mixed prior to electrophoresis. Colour changes seen with spots evident on a DIGE 2D gel may not be related to differences in protein expression but rather dye binding to individual protein species. Clients should also be aware that cell signalling proteins are typically present at concentrations that are 100- to 1,000-fold lower than structural proteins and metabolic pathway enzymes. Consequently, 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 Screens are superior and complementary methods to undertake broad studies of proteins for signalling network analyses. We use the dye combinations both with direct dye labelling of the lysate proteins as with **Methods 1, 2** and **3**, or for dye labelling of the anti-biotin antibody used in **Method 4** in Figure 2, or for any other reporter antibody (Figures 3 and 4).

6. FALSE POSITIVES & FALSE NEGATIVES

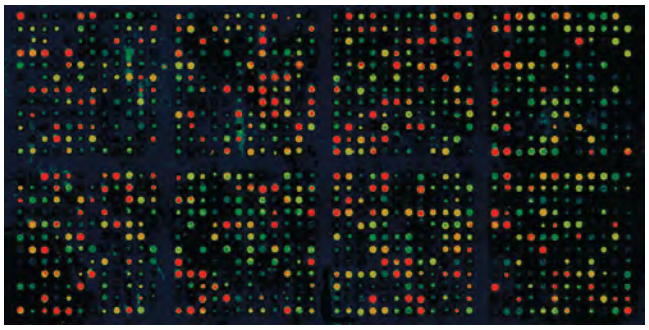
Since non-denatured proteins are commonly analyzed by **Method 1**, as illustrated in Figure 2, there is increased opportunity for false positives and false negatives due to antibody cross-reactivity and blocked epitopes in protein complexes. Many proteins reside in complexes with other proteins and antibodies, and as it is normally necessary to use non-denaturing conditions with antibody microarrays, many apparent changes in protein expressions or phosphorylations may arise from alterations in protein-protein interactions. It is also feasible that some epitopes may be blocked by internal interactions amongst amino acid residue side chains even within the same chemically cleaved fragment, for example, a phosphorylated residue with an arginine or lysine residue. 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 by immunoblotting, because no detectable immunoreactive proteins were evident in these studies as the antibody microarray appeared to be at least 10-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. To help reduce the number of false positives that are typically generated on a protein microarray, we have developed a chemical digestion step in which native proteins are cleaved into larger fragments by chemical cleavage at cysteine residues (CCC) with TCEP and NTBC. 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 target protein fragments that is much less reflective of the initial size of these proteins, which can vary by more than 20-fold. This chemical digestion step is an option to reduce the number of false positives for those clients that are less interested in tracking protein-protein interactions changes in experimental model systems. We recommend that the protein-labelling step is carried with fluorescent dye or biotin after the CCC step, which is ideally performed at the time of homogenization. However, many users may wish to also observe changes in protein-protein interactions in lysate samples from specimens from humans and animals, and in this case, the CCC step should be omitted. We have determined that following the CCC step, the fragmented peptides in lysates are very stable at ambient temperature for well over 2 weeks, and yield similar results to lysates that are immediately subjected to antibody microarray analyses. Figure 5 shows how the intensity of fluorescently tagged proteins captured on the KAM-1150 are affected by the CCC step, and the use of biotin-labelling of lysate proteins instead of direct dye-labelling.

Figure 5. Scanned images of Kinex™ KAM-1150 antibody microarrays following incubation with dye-labeled (Panel A) or biotin-labelled (Panels B and C) lysate proteins from overnight serum-starved A431 human cervical carcinoma cells homogenized without (Panels A and B) and with cysteine chemical cleavage (Panels C and D). For comparison, the same lysate protein sample that was not subjected to direct dye or biotin labelling was captured on the KAM-1150 antibody microarray and subsequently probed with dye-labelled PYKu anti-phosphotyrosine antibody (Cat. No. PG001U) (Panel D).

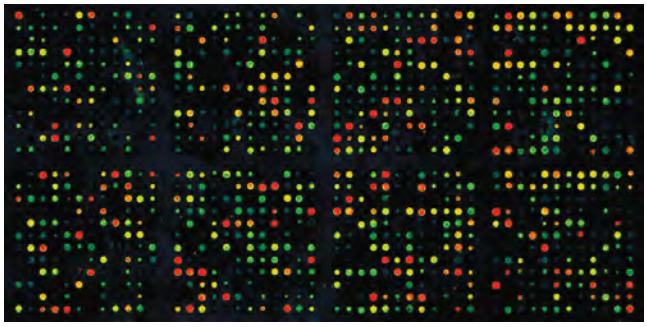
A No chemical cleavage – Direct dye labelling



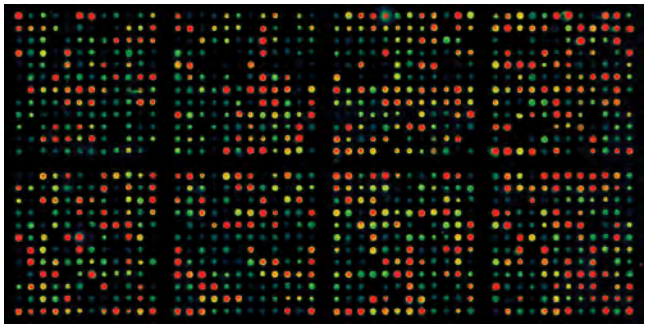
B No chemical cleavage – Biotin labelling



C Chemical cleavage – Biotin labelling



D Chemical cleavage – Anti-phosphotyrosine antibody detection



7. KAM-1150 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, and we use our proprietary software to average the intensities recorded for each triplicate of antibody spots to calculate the differences between the control and treated lysate samples. This includes calculations of percent changes from control (%CFC). This permits the identification of the most promising biomarkers for further validation by immunoblotting. The Report is in PDF and MS-Excel formats.

To provide a sense of the typical performance of individual antibodies on the Kinex™ KAM-1150 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-1150 chips can be ordered directly from Kinexus for follow up to experimentally validate key leads from the antibody microarray analyses.

Kinections Pathway Maps provide direct linkage of subsets of the KAM microarray results with over 200 local signalling network maps for many of the proteins and phosphosites tracked on the KAM microarrays. These Kinections Maps may be freely downloaded in MS PowerPoint format from the www.kinasenet.ca and the www.phosphonet.ca websites. With MS PowerPoint, these pathways 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.

8. 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 ~1150 pan-specific antibodies and full confidentiality, our regular price for the Kinex™ KAM-1150P Antibody Microarray Services starts at US $1,498 per slide for each cell or tissue lysate sample submitted and analyzed in quadruplicate. At this pricing level, only the species needs to be disclosed. To receive a further 34% discount off of these prices, 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 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. 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 .

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 11,000 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 most 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 6 shows an example of a portion of a qualitative KiNetscape map. Custom qualitative KiNetscape maps are priced at US$225 each, whereas quantitative maps cost US$275 each. Figure 7 shows the the same portion of the map in Figure 6 in the quantitative KiNetscape map format. A range of colour schemes are available with this graphics service. Clients should directly contact Kinexus for details if they wish to utilize this service.

Figure 6. 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.

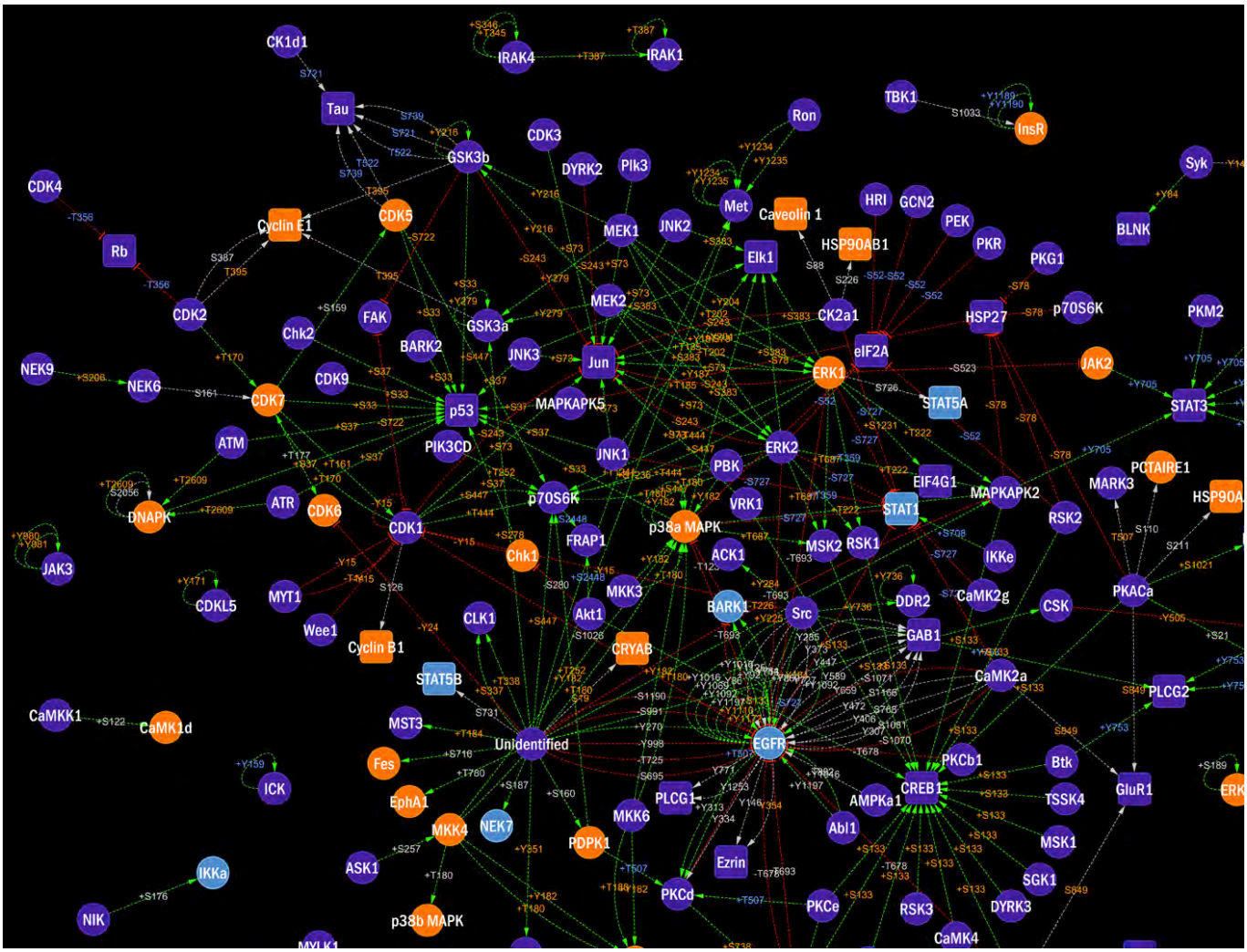
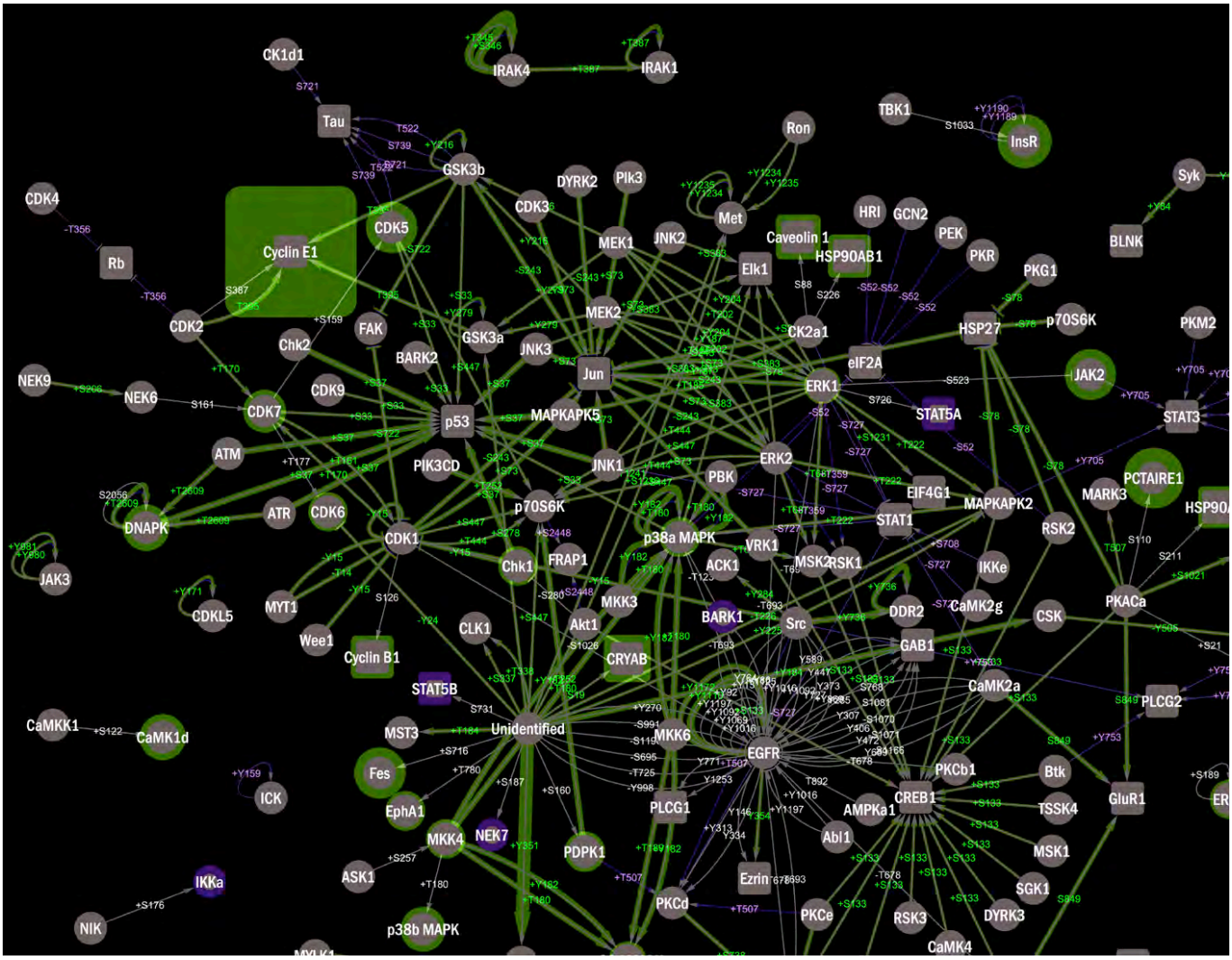


Figure 7. KiNetscape quantitative representation of the key EGF-induced changes in protein expression or phosphorylation from a Kinex™ KAM-900P antibody microarray analyses of the lysates from serum-starved A431 cells that were treated without or with 100 ng/ml EGF for 5 minutes. Lysates were prepared 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). The data from untreated cells and EGF-treated cells are used to generate separate maps that were colored separately and then overlaid. With this representation style, the sizes of the icons (nodes) and the thicknesses of the lines (edges) are proportioned to the EGF-induced changes. The size of the node is increased or decreased by the percentage of the EGF-induced change from the untreated condition provided that it is at least 45% altered. In the case of the edges, the thickness of the lines is related to square of the change induced by EGF, again provided that it was at least 45% altered. With the colour scheme selected in this map, increases in phosphorylation are shown with green lines and arrows and green text for the phosphosites, and reduced phosphorylation are shown with purple lines and purple text, and any phosphorylation changes that do not meet the 45% threshold appear with grey lines and grey text. Proteins that showed increased expression changes greater than 45% have green exterior halos, but have purple interior halos if there was decreased expression greater than 45%. Protein expression changes less than 45% are not identified and these protein icons are colored only grey. The appearance of a positive or negative sign in front of the phosphorylation site text indicates if the site is known to be stimulatory or inhibitory, respectively.



9. FOLLOW-UP SERVICES

We highly recommend that all interesting leads generated with the Kinex™ KAM Antibody Microarray should be validated by Western blotting before proceeding to other follow-up work. Such validation is essential with any commercial or custom produced antibody microarray. To assist in this regard, Kinexus offers two 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-1150 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 multiple 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 databases, which contain the results from thousands of previous Kinetworks™ Immunoblots or 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;
- KiNET™ Immunoblotting (KiNET-IB) DataBase (www.kinet.ca) – clients can compare the results from their validation immunoblotting data with hundreds of other experiments from hundreds of other model systems.
- 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.

Sample Preparation

10. QUANTITY OF LYSATE

The amount of protein recommended for the Kinex™ KAM-1150 Antibody Microarray services is 200 μg per sample at an approximate concentration of 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.

11. 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. 2.5 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)

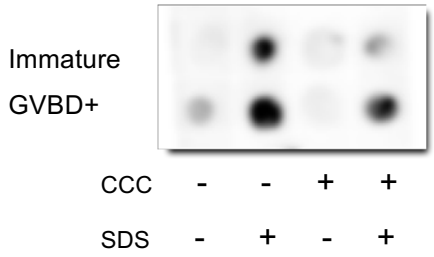
Protease Inhibitors and Dithiothreitol

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 8 below shows the stimulation of ERK1 phosphorylation during meiotic maturation of sea star oocytes on a dot blot.

Figure 8. 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. 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 chemical cleavage at the time of homogenization. This is especially critical for detection of protein-tyrosine phosphorylation with the KAM-1150PY 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 3-4 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.

12. 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.

13. PROTEIN LYSATE PREPARATION WITH AND WITHOUT CHEMICAL CLEAVAGE

The optimum amount of protein recommended for the Kinex™ KAM-1150 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-900P 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-1150 chip.
10. 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. Chemically cleaved lysates are stable at ambient temperature for at least 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-900P 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-900P 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-1150 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-1150 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-1150 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-1150PY 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-1150 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 .

14. 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-1150 analysis. If Kinetworks™ multi-immunoblotting is desired for validation of the KAM-1150 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

15. 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 labeled 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 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 at least 2 weeks at room temperature and special refrigeration or freezing is not necessary during shipping.

16. 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.

17. 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

18. 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-1150-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-1150-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 labeled 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 customers)

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.

Form: KAM-1150-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-1150 REPORTS

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

BILLING INFORMATION

Kinex™ Antibody Microarray KAM-1150 Services offered for the detection with up to 1150 pan-specific antibodies for cell signalling proteins in one (1) sample in triplicate measurements: KAM-1150E – Expression profiling; KAM-1550PY – 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-1150E-N Ab microarrays (1 non-confidential sample) @ US $988 per microarray x # samples $ _____
KAM-1150E-C Ab microarrays (1 full confidential sample) @ US $1498 per microarray x # samples + $ _____
KAM-1150PY-N Ab microarrays (1 non-confidential sample) @ US $988 per microarray x # samples + $ _____
KAM-1150PY-C Ab microarrays (1 full confidential sample) @ US $1498 per microarray x # samples + $ _____

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-1150-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-1150 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-1150 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-1150E EXPRESSION PROFILING SERVICE REQUESTED

☐ KAM-1150PY PHOSPHOTYROSINE PROFILING SERVICE REQUESTED

Standard Antibody Microarrays (1150 pan-specific antibodies) and One (1) Sample 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-1150 Antibody Microarray screening services. Check with the Kinexus website at www.kinexus.ca for new releases.

☐ **KAM-1150E-N** 1500 Pan-specific Ab microarray for expression (1 non-confidential sample)

☐ **KAM-1150E-C** 1500 Pan-specific Ab microarray for expression (1 confidential sample)

☐ **KAM-1150PY-N** 1500 Pan-specific Ab microarray for tyrosine phosphorylation (1 non-confidential sample)

☐ **KAM-1150PY-C** 1500 Pan-specific Ab microarray for tyrosine phosphorylation (1 confidential sample)

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-1150E-N 1 non-confidential sample = $988.

☐ KAM-1150E-C 1 confidential sample = $1498.

☐ KAM-1150PY-N 1 non-confidential sample = $988.

☐ KAM-1150PY-C 1 confidential sample = $1498.

Use this pricing information for completion and submission of Service Order Form KAM-1150-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)*

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

24. LISTING OF ANTIBODIES AND THEIR TARGETS ON THE KAM-1150 MICROARRAY

Spot ID #	Ab Code	Target Protein	Ab Source	Ab Type	Uniprot ID	Type
1		**Orientation Marker**				
2	NN166	4E-BP1	External	RpAb	Q13541	
3	NN166-2	4E-BP1	External	MmAb	Q13541	
4	NN441-1	14-3-3 (KCIP-1)	External	MmAb	P31946	
5	NK001	Abl1 (Abl)	External	MmAb	P00519	Kinase
6	NK001-2	Abl1 (Abl)	Kinexus	RpAb	P00519	Kinase
7	NK002-3	Abl1 (Abl)	Kinexus	RpAb	P00519	Kinase
8	NN390-1	ACACA (ACC1; ACCA)	External	MmAb	Q13085	
9	NK002-2	ACK1 (TNK2)	External	MmAb	Q07912	Kinase
10	NK002	ACK1 (TNK2)	External	RpAb	Q07912	Kinase
11	NN364-2	ACTA1 (Alpha-actin)	External	MmAb	P68133	
12	NN364-3	ACTA1 (Alpha-actin)	External	MmAb	P68133	
13	NN218-1	beta Actin (ACTB)	External	RpAb	P60709	
14	NK357-1	ACTR-I	External	MmAb	Q04771	Kinase
15	NK358-1	ACTR-IC	External	MmAb	Q8NER5	Kinase
16	NK359-1	ACTR-IIA	External	MmAb	P27037	Kinase
17	NN189-2	ADAM22	External	MmAb	Q9P0K1	
18	NN391-1	Adducin a (ADD1)	External	MmAb	P35611	
19	NN392-1	Adducin g (ADD3)	External	MmAb	Q9UEY8	
20	NN190-2	ADRA2C (ADRA2L2)	External	MmAb	P18825	
21	NN190-1	ADRA2C (ADRA2L2)	External	MmAb	P18825	
22	NN191-2	AHSA1 (AHA1)	External	ratmAb	O95433	
23	NN191-4	AHSA1 (AHA1)	External	RpAb	O95433	
24	NN002-2	AIF	External	MmAb	O95831	
25	NN003-2	AK2	External	MmAb	P54819	
26	NK129-3	Akt1 (PKBa)	Kinexus	RpAb	P31749	Kinase
27	NK129-4	Akt1 (PKBa)	Kinexus	RpAb	P31749	Kinase
28	NK129-5	Akt1 (PKBa)	Kinexus	RpAb	P31749	Kinase
29	NK130-3	Akt2 (PKBb)	External	RpAb	P31751	Kinase
30	NK130-4	Akt2 (PKBb)	Kinexus	RpAb	P31751	Kinase
31	NK130-8	Akt2 (PKBb)	Kinexus	RpAb	P31751	Kinase
32	NK130-9	Akt2 (PKBb)	Kinexus	RpAb	P31751	Kinase
33	NK131-3	Akt3 (PKBg)	Kinexus	RpAb	Q9Y243	Kinase
34	NK003-4	ALK	External	MmAb	Q9UM73	Kinase
35	NK003-2	ALK	Kinexus	RpAb	Q9UM73	Kinase
36	NK003-3	ALK	Kinexus	RpAb	Q9UM73	Kinase
37	NN149-5	Crystallin aA (CRYAA; HSPB4)	External	MmAb	P02489	
38	NN193-1	AMIGO1 (Alivin-2; Alivin-2; ALI2)	External	MmAb	Q86WK6	
39	NK259-1	AMPKa1	Kinexus	RpAb	Q13131	Kinase
40	NK259-2	AMPKa1	Kinexus	RpAb	Q13131	Kinase
41	NK259-3	AMPKa1	External	MmAb	Q13131	Kinase
42	NK260-2	AMPKa2	Kinexus	RpAb	P54646	Kinase
43	NK260-1	AMPKa2	Kinexus	RpAb	P54646	Kinase
44	NK360-1	AMPKb2	External	MmAb	O43741	Kinase
45	NK205-2	A-Raf (ARAF; RafA)	External	RpAb	P10398	Kinase
46	NK205-3	A-Raf (ARAF; RafA)	Kinexus	RpAb	P10398	Kinase
47	NK205-4	A-Raf (ARAF; RafA)	Kinexus	RpAb	P10398	Kinase
48	NN194-1	Amyloid	External	RpAb		
49	NN195-1	Ankyrin (ANK1; Ankyrin-R)	External	MmAb	P16157	
50	NN196-2	Ankyrin B (ANK2)	External	MmAb	Q01484	

51	NN196-1	Ankyrin B (ANK2)	External	MmAb	Q01484	
52	NN197-1	Ankyrin G (ANK3)	External	MmAb	Q12955	
53	NN130-2	ANP32A/B	External	MmAb	P39687/Q92688	
54	NN004-2	APG1	External	MmAb	O95757	
55	NN004	APG1	External	RpAb	O95757	
56	NN122-2	APG2	External	MmAb	P34932	
57	NN122	APG2	External	RpAb	P34932	
58	NN199-1	Aquaporin 1 (AQP1)	External	RpAb	P29972	
59	NN200-1	Aquaporin 2 (AQP2)	External	RpAb	P41181	
60	NN201-1	Aquaporin 3 (AQP3)	External	RpAb	Q92482	
61	NN202-1	Aquaporin 4 (AQP4)	External	RpAb	P55087	
62	NN121	Arrestin b1	External	MmAb	P49407	
63	NN121-3	Arrestin b1/2	External	MmAb	P49407/P32121	
64	NN203-1	ASIC1 (BNaC2)	External	MmAb	P78348	
65	NK007-3	ASK1 (MAP3K5)	External	MmAb	Q99683	Kinase
66	NK007-2	ASK1 (MAP3K5)	External	RpAb	Q99683	Kinase
67	NK007	ASK1 (MAP3K5)	External	RpAb	Q99683	Kinase
68	NN204-1	ATAD1 ATPase	External	MmAb	Q8NBU5	
69	NN205-2	Ataxin 1 (Atxn1; SCA1)	External	MmAb	P54253	
70	NN160-2	ATF2	External	MmAb	P15336	Transcr.
71	NN213-1	ATG12 (APG12; APG12L)	External	RpAb	O94817	
72	NN214-1	ATG13	External	RpAb	O75143	
73	NN209-1	ATG2A	External	RpAb	Q2TAZ0	
74	NN373-1	ATG4A	External	RpAb	Q8WYN0	
75	NN374-1	ATG4B	External	RpAb	Q9Y4P1	
76	NN210-2	ATG4C (APG4C; AUTL1; AUTL3)	External	RpAb	Q96DT6	
77	NN210-1	ATG4C (APG4C; AUTL1; AUTL3)	External	RpAb	Q96DT6	
78	NN211-2	ATG4D (PG4D; AUTL4)	External	RpAb	Q86TL0	
79	NN211-1	ATG4D (PG4D; AUTL4)	External	RpAb	Q86TL0	
80	NN212-1	ATG5 (APG5L; ASP)	External	RpAb	Q9H1Y0	
81	NK230-2	ATM	Kinexus	RpAb	Q62388	Kinase
82	NK230-1	ATM	Kinexus	RpAb	Q62388	Kinase
83	NK230-3	ATM	Kinexus	RpAb	Q62388	Kinase
84	NN215-2	ATP7B	External	MmAb	B7ZLR4	
85	NK237-2	ATR	Kinexus	RpAb	Q13535	Kinase
86	NK237-3	ATR	Kinexus	RpAb	Q13535	Kinase
87	NK008-3	AurKA (Aurora A, AIK)	Kinexus	RpAb	O14965	Kinase
88	NK008-4	AurKA (Aurora A, AIK)	Kinexus	RpAb	O14965	Kinase
89	NK008-5	AurKA (Aurora A, AIK)	Kinexus	RpAb	O14965	Kinase
90	NK193-5	AurKB (Aurora B, AIM-1, ARK-2)	External	MmAb	Q96GD4	Kinase
91	NK193-2	AurKB (Aurora B, AIM-1, ARK-2)	Kinexus	RpAb	Q96GD4	Kinase
92	NK193-3	AurKB (Aurora B, AIM-1, ARK-2)	Kinexus	RpAb	Q96GD4	Kinase
93	NK009-2	AurKC (Aurora C, AIK3)	Kinexus	RpAb	Q9UQB9	Kinase
94	NK009-3	AurKC (Aurora C, AIK3)	Kinexus	RpAb	Q9UQB9	Kinase
95	NK010-2	Axl	Kinexus	RpAb	P30530	Kinase
96	NK010-3	Axl	Kinexus	RpAb	P30530	Kinase
97	NN393-1	BAD	External	MmAb	Q92934	
98	NN005	Bax	External	RpAb	Q07812	
99	NK257-1	BCKD	Kinexus	RpAb	O14874	Kinase
100	NK257-2	BCKD	Kinexus	RpAb	O14874	Kinase
101	NN006-1	Bcl2	External	RpAb	P10415	
102	NN006	Bcl2	External	MmAb	P10415	
103	NN389-1	BCL2A1	External	MmAb	Q16548	
104	NK362-1	Bcr	External	MmAb	P11274	Kinase
105	NN216-1	BDNF (Abrineurin)	External	RpAb	P23560	

106	NN217-1	Beclin 1 (BECN1; GT197)	External	RpAb	Q14457	
107	NN372-2	Beclin-2 (BECN2)	External	RpAb	A8MW95	
108	NN372-1	Beclin-2 (BECN2)	External	RpAb	A8MW95	
109	NN009	Bid	External	GpAb	P55957	
110	NN099-2	Bid	External	MmAb	P55957	
111	NN219-1	BK Beta2 (Kcnmb2)	External	MmAb	Q9Y691	
112	NN394-1	BLNK	External	MmAb	Q8WV28	
113	NN220-1	BLVRA (BVR; BLVR)	External	RpAb	P53004	
114	NK363-1	BMPR2 (BMPR-II)	External	MmAb	Q13873	Kinase
115	NK156	B-Raf (RafB, BRaf)	External	RpAb	P15056	Kinase
116	NK156-6	B-Raf (RafB, BRaf)	Kinexus	RpAb	P15056	Kinase
117	NK156-4	B-Raf (RafB, BRaf)	Kinexus	RpAb	P15056	Kinase
118	NK156-7	B-Raf (RafB, BRaf)	External	MmAb	P15056	Kinase
119	NN395-1	BCRA1	External	MmAb	P48754	
120	NK013-2	BRD2	External	MmAb	P25440	
121	NK364-1	BRSK1	External	MmAb	Q8TDC3	Kinase
122	NK014-2	Btk	External	MmAb	Q06187	Kinase
123	NK015-2	BUB1 (BUB1A)	External	MmAb	O43683	Kinase
124	NK365-1	BUBR1 (BUB1B)	External	MmAb	O60566	Kinase
125	NN174-2	CA IX (CA9, CAH9)	External	MmAb	Q16790	
126	NN223-1	CACNB4 (CACNLB4)	External	MmAb	O00305	
127	NN224-1	Cacng2 (Stargazin; TARP g-2)	External	MmAb	Q9Y698	
128	NN224-2	Cacng2 (Stargazin; TARP g-2)	External	MmAb	Q9Y698	
129	NP049-1	Calcineurin A (PPP3CA; CALNA)	External	RpAb	Q08209	Transcr.
130	NN396-1	CALD1 (CMD)	External	MmAb	Q05682	
131	NN136-5	Calnexin (CANX)	External	RpAb	P27824	
132	NN136-2	Calnexin (CANX)	External	RpAb	P27824	
133	NN137-3	Calreticulin (CALR; calregulin)	External	MmAb	P27797	
134	NN137-1	Calreticulin (CALR; calregulin)	External	RpAb	P27797	
135	NK211	CaMK1a (CaMKI)	External	GpAb	Q14012	Kinase
136	NK211-2	CaMK1a (CaMKI)	External	MmAb	Q14012	Kinase
137	NK016-2	CaMK1d	External	GpAb	Q8IU85	Kinase
138	NK016-3	CaMK1d	External	MmAb	Q8IU85	Kinase
139	NK302-1	CaMK2a (CaMKII)	External	MmAb	Q9UQM7	Kinase
140	NK302-2	CaMK2a (CaMKII)	External	MmAb	Q9UQM7	Kinase
141	NK302-2	CaMK2a (CaMKII)	External	MmAb	Q9UQM7	Kinase
142	NK018-4	CaMK2b (CaMKIIb)	External	MmAb	Q13554	Kinase
143	NK018-3	CaMK2b (CaMKIIb)	Kinexus	RpAb	Q13554	Kinase
144	NK019	CaMK2d	Kinexus	RpAb	Q13557	Kinase
145	NK020-1	CaMK2g	Kinexus	RpAb	Q13555	Kinase
146	NK021-3	CaMK4	Kinexus	RpAb	Q16566	Kinase
147	NK021	CaMK4	Kinexus	RpAb	Q16566	Kinase
148	NK021-4	CaMK4	External	MmAb	Q16566	Kinase
149	NK022	CaMKK (CaMKK1)	Kinexus	RpAb	Q8N5S9	Kinase
150	NK366-1	CaMKKb (CaMKK2)	External	MmAb	Q96RR4	Kinase
151	NK368-1	CK1a (CSNK1A1)	External	MmAb	P48729	Kinase
152	NK036	CK1d (CSNK1D)	External	GpAb	P48730	Kinase
153	NK036-2	CK1d (CSNK1D)	External	MmAb	P48730	Kinase
154	NK037-1	CK1e (CSNK1E)	External	MmAb	P49674	Kinase
155	NK037-2	CK1e (CSNK1E)	External	MmAb	P49674	Kinase
156	NK040-2	CK1g2 (CSNK1G2)	External	MmAb	P78368	Kinase
157	NK041-2	CK2a1 (CSNK2A1)	Kinexus	RpAb	P68400	Kinase
158	NK041-3	CK2a1 (CSNK2A1)	External	MmAb	P68400	Kinase
159	NK367-1	CK2b1	External	MmAb	Q70Z23	Kinase
160	NK023-1	CASK (/Lin2)	External	MmAb	O14936	Kinase

161	NN011	CASP1	External	RpAb	P29466	
162	NN011-3	CASP1	External	MmAb	P29466	
163	NN012-3	CASP2	External	MmAb	P42575	
164	NN013	CASP3	External	RpAb	P42574	
165	NN013-4	CASP3	External	MmAb	P42574	
166	NN015-2	CASP5 p20	External	MmAb	P51878	
167	NN016	CASP6	External	MmAb	P55212	
168	NN016-2	CASP6 p10	External	MmAb	P55212	
169	NN017	CASP7	External		P55210	
170	NN017-3	CASP7 p20	External	MmAb	P55210	
171	NN018-3	CASP8	External	MmAb	Q14790	
172	NN019-3	CASP9	External	MmAb	P55211	
173	NN397-1	CASP14	External	MmAb	P31944	
174	NN382-1	CASR	External	RpAb	P41180	
175	NN021-2	Catenin b1	External	MmAb	P35222	
176	NN021	Catenin b1	External	RpAb	P35222	Transcr.
177	NN386-1	Catenin-a1 (a-E)	External	MmAb	P35221	
178	NN388-1	Catenin a3 (a-T)	External	MmAb	Q9UI47	
179	NN225-1	Cav1.2	External	MmAb	P15381	
180	NN226-1	Cav1.3 (CACNA1D; CACH3)	External	MmAb	Q01668	
181	NN227-1	Cav3.1 (CACNA1G)	External	MmAb	O43497	
182	NN228-1	CavBeta2 (CACNB2; CAB2)	External	MmAb	Q08289	
183	NN167	Caveolin 1	External	RpAb	Q03135	
184	PN147-2	Caveolin 1	External	MmAb	Q03135	
185	NN022-1	Caveolin 2	External	MmAb	P51636	
186	PN171-2	Cbl	External	MmAb	P22681	
187	NP001	CD45	External	MmAb	P08575	Phosphatase
188	NP001-2	CD45	External	MmAb	P08575	Phosphatase
189	NN186	CD63	External	RpAb	P08962	
190	NN187-2	CD63	External	MmAb	P08962	
191	NN075-2	NT5E (NT5, NTE, CD73)	External	MmAb	P21589	
192	NN229-1	CD74	External	MmAb	P04233	
193	NK369-1	CDC7	External	MmAb	O00311	Kinase
194	NP038-4	CDC25A	External	MmAb	P30304	Phosphatase
195	NP038-1	CDC25A	Kinexus	RpAb	P30304	Phosphatase
196	NP002-5	CDC25B	External	MmAb	P30305	Phosphatase
197	NP002-2	CDC25B	Kinexus	RpAb	P30305	Phosphatase
198	NP003	CDC25C	External	RpAb	P30307	Phosphatase
199	NP003-2	CDC25C	Kinexus	RpAb	P30307	Phosphatase
200	NP003-3	CDC25C	Kinexus	RpAb	P30307	Phosphatase
201	NN023-2	CDC34	External	MmAb	P49427	
202	NN230-1	CDC37	External	RpAb	Q16543	
203	NN024-2	CDC42	External	MmAb	P60953	
204	NN184-2	CDH2 (N-Cadherin)	External	MmAb	P19022	
205	NK025-1	CDK1 (CDC2)	External	MmAb	P06493	Kinase
206	NK025-2	CDK1 (CDC2)	External	MmAb	P06493	Kinase
207	NK025-5	CDK1 (CDC2)	External	MmAb	P06493	Kinase
208	NK025-6	CDK1 (CDC2)	External	RpAb	P06493	Kinase
209	NK026-7	CDK2	External	MmAb	P24941	Kinase
210	NK026-6	CDK2	External	RpAb	P24941	Kinase
211	NK026-3	CDK2	External	MmAb	P24941	Kinase
212	NK027-2	CDK4	External	RpAb	P11802	Kinase
213	NK028-6	CDK5	External	MmAb	Q00535	Kinase
214	NK028-4	CDK5	External	RpAb	Q00535	Kinase
215	NK028-2	CDK5	Kinexus	RpAb	Q00535	Kinase

216	NK029-4	CDK6	External	MmAb	Q00534	Kinase
217	NK029-3	CDK6	External	RpAb	Q00534	Kinase
218	NK030-2	CDK7	External	MmAb	P50613	Kinase
219	NK030-1	CDK7	Kinexus	RpAb	P50613	Kinase
220	NK031-5	CDK8	External	GpAb	P49336	Kinase
221	NK031-5	CDK8	External	MmAb	P49336	Kinase
222	NK031-4	CDK8	Kinexus	RpAb	P49336	Kinase
223	NK032	CDK9	External	RpAb	P50750	Kinase
224	NK033-2	CDK10	Kinexus	RpAb	Q15131	Kinase
225	NK033-3	CDK10	Kinexus	RpAb	Q15131	Kinase
226	NK213	CDK11B (PITSLRE; CLK-1)	External	RpAb	P21127	Kinase
227	NK213-2	CDK11B (PITSLRE; CLK-1)	External	MmAb	P21127	Kinase
228	NK024	CDC2L5 (CHED, CDK13)	External	RpAb	Q14004	Kinase
229	NK024-2	CDC2L5 (CHED, CDK13)	Kinexus	RpAb	Q14004	Kinase
230	NK199	CDKL1	Kinexus	RpAb	Q00532	Kinase
231	NK261-1	CDKL2	Kinexus	RpAb	Q92772	Kinase
232	NK262-1	CDKL3	Kinexus	RpAb	Q8IVW4	Kinase
233	NN231-1	CENPA	External	MmAb	P49450	
234	NN232-1	Chapsyn-110 (DLG2; PSD-93)	External	MmAb	Q15700	
235	NN233-1	CHAT (Choline acetylase)	External	RpAb	P28329	
236	NK034	Chk1 (CHEK1)	External	MmAb	O14757	Kinase
237	NK034-2	Chk1 (CHEK1)	External	RpAb	O14757	Kinase
238	NK035	Chk2 (CHEK2)	External	RpAb	O96017	Kinase
239	NK035-2	Chk2 (CHEK2)	External	MmAb	O96017	Kinase
240	NN234-1	ClCN3 (Clcn3; ClC-3)	External	MmAb	P51790	
241	NK370-1	CLK1/4	External	MmAb	P49759/Q9HAZ1	Kinase
242	NK371-1	CLK2	External	MmAb	P49760	Kinase
243	NK372-1	CLK3	External	MmAb	P49761	Kinase
244	NN026	Cofilin 1	External	MmAb	P23528	
245	NN026-2	Cofilin 1	External	MmAb	P23528	
246	NN026-3	Cofilin 1	External	MmAb	P23528	
247	NN398-1	Connexin 43 (Cx43, GJA1)	External	MmAb	P17302	
248	NN399-1	Cortactin (CTTN)	External	MmAb	Q14247	
249	NK042	COT (MAP3K8; Tpl2)	Kinexus	RpAb	P41279	Kinase
250	NK042-2	COT (MAP3K8; Tpl2)	Kinexus	RpAb	P41279	Kinase
251	NN381-1	COX1 (PTGS1)	External	RpAb	P23219	
252	NN027	COX2	External	MmAb	P35354	
253	NN027-2	COX2	External	MmAb	P35354	
254	NN379-1	COX4I1	External	RpAb	P13073	
255	NN235-1	Cpn10 (HSPE1)	External	RpAb	P61604	
256	NN182-2	CrkL	External	MmAb	P46109	
257	NN149-3	Crystallin aB (HspB5; CRYA2; CRYAB)	External	MmAb	P02511	
258	NN149-1	Crystallin aB (HspB5; CRYA2; CRYAB)	External	RpAb	P02511	
259	NN149-6	Crystallin aB (HspB5; CRYA2; CRYAB)	External	MmAb	P02511	
260	NK234-3	CSF1R (Fms)	Kinexus	RpAb	P07333	Kinase
261	NK234-2	CSF1R (Fms)	Kinexus	RpAb	P07333	Kinase
262	NK234-4	CSF1R (Fms)	Kinexus	RpAb	P07333	Kinase
263	NK044-2	Csk	External	RpAb	P41240	Kinase
264	NK044-3	Csk	External	MmAb	P41240	Kinase
265	NK044	Csk	External	MmAb	P41240	Kinase
266	NN028	Cyclin A (CCNA)	External	RpAb	P78396	
267	NN028-2	Cyclin A (CCNA)	External	MmAb	P78396	
268	NN029	Cyclin B1 (CCNB1)	External	MmAb	P14635	

269	NN401-1	Cyclin B2 (CCNB2)	External	MmAb	O95067	
270	NN030-1	Cyclin D1 (CCND1)	External	RmAb	P24385	
271	NN030-4	Cyclin D1 (CCND1)	External	MmAb	P24385	
272	NN402-1	Cyclin D2 (CCND2)	External	MmAb	P30279	
273	NN031-2	Cyclin E1 (CCNE1)	External	MmAb	P24864	
274	NN031	Cyclin E1 (CCNE1)	External	MmAb	P24864	
275	NN403-1	Cyclin E2 (CCNE2)	External	MmAb	O96020	
276	NN032-2	Cyclin G1 (CCNG1)	External	MmAb	P51959	
277	NN404-1	Cyclin T1 (CCNT1)	External	MmAb	O60563	
278	NN033-2	Cytochrome c (CYCS)	External	MmAb	P99999	
279	NN236-1	Cytochrome P450 Reductase (POR)	External	RpAb	P16435	
280	NN405-1	DAB1	External	MmAb	O75553	
281	NK188-2	DAPK3 (DLK3; ZIPK)	External	RpAb	O43293	Kinase
282	NK188-1	DAPK3 (DLK3; ZIPK)	External	RpAb	O43293	Kinase
283	NN034	DAXX	External	RpAb	Q9UER7	
284	NN034-2	DAXX	External	MmAb	Q9UER7	
285	NK043	DCAMKL1 (CPG16; CaMKinase VI)	External	MmAb	O15075	Kinase
286	NK263-1	DDR1	Kinexus	RpAb	Q08345	Kinase
287	NK183-3	DDR2 (Tyro10)	External	MmAb	Q16832	Kinase
288	NK183-1	DDR2 (Tyro10)	External	RpAb	Q16832	Kinase
289	NK054-7	ErbB2 (Neu, HER2)	Kinexus	RpAb	P04626	Kinase
290	NN237-1	DICER1 (Dicer; HERNA; Helicase MOI)	External	MmAb	Q9UPY3	
291	NN238-1	DLG3 (SAP102)	External	MmAb	Q92796	
292	NN239-2	DLG4 (PSD95)	External	MmAb	P78352	
293	NN239-1	DLG4 (PSD95)	External	MmAb	P78352	
294	NK264-1	DMPK1 (DMPK)	Kinexus	RpAb	Q09013	Kinase
295	NK048-4	DNAPK (PRKDC)	Kinexus	RpAb	P78527	Kinase
296	NK048-7	DNAPK (PRKDC)	Kinexus	RpAb	P78527	Kinase
297	NK048-8	DNAPK (PRKDC)	External	MmAb	P78527	Kinase
298	NN241-3	DNMT1 (AIM; CXXC9; DNMT; MCMT)	External	MmAb	P26358	
299	NN241-2	DNMT1 (AIM; CXXC9; DNMT; MCMT)	External	MmAb	P26358	
300	NN242-1	DNMT3L	External	MmAb	Q9UJW3	
301	NN406-1	DOK2	External	MmAb	O60496	
302	NN406-2	DOK2	External	MmAb	O60496	
303	NP006-4	DUSP1 (MKP-1)	Kinexus	RpAb	P28562	Phosphatase
304	NP006-5	DUSP1 (MKP1)	External	MmAb	P28562	Phosphatase
305	NP006-2	DUSP1 (MKP-1)	Kinexus	RpAb	P28562	Phosphatase
306	NP008-5	DUSP2 (PAC1)	External	MmAb	Q05923	Phosphatase
307	NP008-2	DUSP2 (PAC1)	Kinexus	RpAb	Q05923	Phosphatase
308	NP008-4	DUSP2 (PAC1)	Kinexus	RpAb	Q05923	Phosphatase
309	NP030-3	DUSP3 (VHR)	Kinexus	RpAb	P51452	Phosphatase
310	NP030-4	DUSP3 (VHR)	Kinexus	RpAb	P51452	Phosphatase
311	NP030-5	DUSP3 (VHR)	External	MmAb	P51452	Phosphatase
312	NP007-2	DUSP4 (MKP2)	Kinexus	RpAb	Q13115	Phosphatase
313	NP007-4	DUSP4 (MKP2)	Kinexus	RpAb	Q13115	Phosphatase
314	NP007-5	DUSP4 (MKP2)	External	MmAb	Q13115	Phosphatase
315	NP007	DUSP4 (MKP2)	External	MmAb	Q13115	Phosphatase
316	NP039-1	DUSP5	Kinexus	RpAb	Q16690	Phosphatase
317	NP039-3	DUSP5	Kinexus	RpAb	Q16690	Phosphatase
318	NP040-1	DUSP6 (MKP3)	Kinexus	RpAb	Q16828	Phosphatase
319	NP040-2	DUSP6 (MKP3)	Kinexus	RpAb	Q16828	Phosphatase
320	NP041-1	DUSP7	Kinexus	RpAb	Q16829	Phosphatase
321	NP041-2	DUSP7	Kinexus	RpAb	Q16829	Phosphatase

322	NP041-3	DUSP7	Kinexus	RpAb	Q16829	Phosphatase
323	NP042-1	DUSP8	Kinexus	RpAb	Q13202	Phosphatase
324	NP042-3	DUSP8	Kinexus	RpAb	Q13202	Phosphatase
325	NP043-1	DUSP9 (MKP4)	Kinexus	RpAb	Q99956	Phosphatase
326	NP043-2	DUSP9 (MKP4)	Kinexus	RpAb	Q99956	Phosphatase
327	NP043-3	DUSP9 (MKP4)	Kinexus	RpAb	Q99956	Phosphatase
328	NP047-2	DUSP10 (MKP5)	Kinexus	RpAb	Q9Y6W6	Phosphatase
329	NP045-1	DUSP11	Kinexus	RpAb	O75319	Phosphatase
330	NP045-2	DUSP11	Kinexus	RpAb	O75319	Phosphatase
331	NP045-3	DUSP11	Kinexus	RpAb	O75319	Phosphatase
332	NP046-2	DUSP12	Kinexus	RpAb	Q9UNI6	Phosphatase
333	NN243-1	DUX4	External	MmAb	Q9UBX2	Transcr.
334	NK373-1	DYRK1B	External	MmAb	Q9Y463	Kinase
335	NK266-1	DYRK2	Kinexus	RpAb	Q92630	Kinase
336	NK374-1	DYRK3	External	MmAb	O43781	Kinase
337	NK375-1	DYRK4	External	MmAb	Q9NR20	Kinase
338	NK375-2	DYRK4	External	MmAb	Q9NR20	Kinase
339	NK051-2	EEF2K	External	MmAb	O00418	Kinase
340	NK052-9	EGFR (ErbB1)	External	MmAb	P00533	Kinase
341	NK052-5	EGFR (ErbB1)	Kinexus	RpAb	P00533	Kinase
342	NK052-6	EGFR (ErbB1)	Kinexus	RpAb	P00533	Kinase
343	NK052-4	EGFR (ErbB1)	Kinexus	RpAb	P00533	Kinase
344	NN038-1	eIF2a	External	RpAb	P05198	
345	PN028-3	eIF2a	External	MmAb	P05198	
346	NN407-1	eIF4B	External	MmAb	P23588	
347	NN039-1	eIF4E	External	MmAb	P06730	
348	NN039-3	eIF4E	External	MmAb	P06730	
349	NN408-1	eIF4G (eIF4G1)	External	MmAb	Q04637	
350	NN168-2	ELK1	External	MmAb	P19419	Transcr.
351	NN168	ELK1	External	RpAb	P19419	Transcr.
352	NN173-2	Ep-CAM (EPcamICD)	External	MmAb	P16422	
353	NN173-3	Ep-CAM (EPcamICD)	External	MmAb	P16422	
354	NK053	EphA1	External	RpAb	P21709	Kinase
355	NK376-1	EphA4	External	MmAb	P54764	Kinase
356	NK267-1	EphB2	Kinexus	RpAb	P29323	Kinase
357	NK267-2	EphB2	Kinexus	RpAb	P29323	Kinase
358	NN409-1	Ephrin-A1 (EFNA1)	External	MmAb	P20827	
359	NN410-1	Ephrin-B2 (ENFB2)	External	MmAb	P52799	
360	NN245-1	EPM2A (LAFPTPase)	External	MmAb	O95278	
361	NK054-4	ErbB2 (HER2; Neu)	Kinexus	RpAb	P04626	Kinase
362	NK054-5	ErbB2 (HER2; Neu)	Kinexus	RpAb	P04626	Kinase
363	NK054-6	ErbB2 (HER2; Neu)	Kinexus	RpAb	P04626	Kinase
364	NK231-5	ErbB3 (HER3)	External	MmAb	P21860	Kinase
365	NK231-2	ErbB3 (HER3)	Kinexus	RpAb	P21860	Kinase
366	NK231-3	ErbB3 (HER3)	Kinexus	RpAb	P21860	Kinase
367	NK235-1	ErbB4 (HER4)	Kinexus	RpAb	Q15303	Kinase
368	NK235-2	ErbB4 (HER4)	Kinexus	RpAb	Q15303	Kinase
369	NK235-3	ErbB4 (HER4)	Kinexus	RpAb	Q15303	Kinase
370	NK055-1	ERK1 (MAPK3; ERT2; p44-MAPK)	Kinexus	RpAb	P27361	Kinase
371	NK055-3	ERK1 (MAPK3; ERT2; p44-MAPK)	Kinexus	RpAb	P27361	Kinase
372	NK055-4	ERK1 (MAPK3; ERT2; p44-MAPK)	Kinexus	RpAb	P27361	Kinase
373	NK055-5	ERK1 (MAPK3; ERT2; p44-MAPK)	Kinexus	RpAb	P27361	Kinase
374	NK055-NK056-9	ERK1 (MAPK3; ERT2; p44-MAPK)	External	MmAb	P27361/P28482	Kinase
375	NK056-5	ERK2 (MAPK1; ERT1; p42-MAPK)	External	MmAb	P28482	Kinase
376	NK056-2	ERK2 (MAPK1; ERT1; p42-MAPK)	Kinexus	RpAb	P28482	Kinase

377	NK056-3	ERK2 (MAPK1; ERT1; p42-MAPK)	Kinexus	RpAb	P28482	Kinase
378	NK056-4	ERK2 (MAPK1; ERT1; p42-MAPK)	Kinexus	RpAb	P28482	Kinase
379	NK057-2	ERK3 (MAPK6)	External	RpAb	Q16659	Kinase
380	NK057-3	ERK3 (MAPK6)	External	MmAb	Q16659	Kinase
381	NK058	ERK4 (MAPK4)	External	RpAb	P31152	Kinase
382	NK206-4	ERK5 (MAPK7, BMK)	Kinexus	RpAb	Q13164	Kinase
383	NK206-5	ERK5 (MAPK7, BMK)	Kinexus	RpAb	Q13164	Kinase
384	NK206-3	ERK5 (MAPK7, BMK)	External	GpAb	Q13164	Kinase
385	NN411-1	ERa (ER-alpha)	External	MmAb	P03372	Transcr.
386	NN040-2	ERp57 (PDIA3)	External	MmAb	P30101	
387	NN040-3	ERp57 (PDIA3)	External	MmAb	P30101	
388	NN041-2	ERp70 (PDIA4)	External	MmAb	P13667	
389	NN400-1	Exp1 (CRM1)	External	MmAb	O14980	
390	NN412-1	Ezrin (EZR)	External	MmAb	P15311	
391	NN412-2	Ezrin (EZR)	External	MmAb	P15311	
392	NN413-1	FADD	External	MmAb	Q13158	
393	NK060	FAK (PTK2)	External	RpAb	Q05397	Kinase
394	NK060-2	FAK (PTK2)	External	MmAb	Q05397	Kinase
395	NN042	FAS (Apo1; CD95)	External	RpAb	P25445	
396	NN042-2	FAS (Apo1; CD95)	External	MmAb	P25445	
397	NN043	FasL	External	MmAb	P48023	
398	NK377-1	Fer (Tyk3)	External	MmAb	P16591	Kinase
399	NK061	Fes	External	RpAb	P07332	Kinase
400	NK061-2	Fes	External	MmAb	P07332	Kinase
401	NN246-1	FGF13 (FHF2)	External	MmAb	Q92913	
402	NK062-2	FGFR1	Kinexus	RpAb	P11362	Kinase
403	NK063-4	FGFR2 (BEK)	Kinexus	RpAb	P21802	Kinase
404	NK236-2	FGFR3	Kinexus	RpAb	P22607	Kinase
405	NK236-3	FGFR3	Kinexus	RpAb	P22607	Kinase
406	NK239-1	FGFR4	Kinexus	RpAb	P22455	Kinase
407	NK239-3	FGFR4	Kinexus	RpAb	P22455	Kinase
408	NK268-1	Fgr	Kinexus	RpAb	P09769	Kinase
409	NN414-1	FHL3	External	MmAb	Q13643	
410	NN416-1	FXR (NR1H4)	External	RpAb	Q96RI1	
411	NN247-1	FIG4 phosphatase (SAC3)	External	MmAb	Q92562	
412	NN248-1	FIH (HIF1; HIF1AN)	External	MmAb	Q9NWT6	
413	NN376-1	FIP200 (RB1CC1)	External	RpAb	Q8TDY2	
414	NN249-1	FKBP51	External	MmAb	Q13451	
415	NN127-2	FKBP52 (FKBP4; FKBP51; HBI)	External	MmAb	Q02790	
416	NK240-1	Flt3 (STK1)	Kinexus	RpAb	P36888	Kinase
417	NN044	Fos	External	RpAb	P01100	Transcr.
418	NN044-2	Fos	External	MmAb	P01100	Transcr.
419	NK269-1	Frk	Kinexus	RpAb	P42685	Kinase
420	NK269-2	Frk	Kinexus	RpAb	P42685	Kinase
421	NN415-1	FRS2	External	MmAb	Q8WU20	
422	NK065	Fyn	External	MmAb	P06241	Kinase
423	NK065-2	Fyn	Kinexus	RpAb	P06241	Kinase
424	NN250-1	GABA A Receptor (GABRA2)	External	MmAb	Q8TBI4	
425	NN253-1	GABA A Receptor (GABRB1)	External	MmAb	P18505	
426	NN254-1	GABA A Receptor (GABRB3)	External	MmAb	P28472	
427	NN256-2	GABA B Receptor 2 (GABBR2)	External	MmAb	O75899	
428	NN259-1	GABBR1 (GABA B Receptor 1)	External	MmAb	Q9UBS5	
429	NN163	GADD153 (DDIT3, CHOP)	External	MmAb	P35639	
430	NK378-1	GAK	External	MmAb	O14976	Kinase
431	NN418-1	GAP43	External	MmAb	P17677	

432	NN257-1	GABARAP (FLC3B)	External	RpAb	O95166	
433	NK066-2	GCK (MAP4K2)	External	MmAb	Q12851	Kinase
434	NK066	GCK (MAP4K2)	External	GpAb	Q12851	Kinase
435	NN260-1	GFAP	External	MmAb	P14136	
436	NN260-2	GFAP	External	MmAb	P14136	
437	NN263-2	GRIA1 (GLUH1; GLUR1)	External	MmAb	P42261	
438	NN262-1	GLUT2 (SLC2A2)	External	RpAb	P11168	
439	NN264-1	GRIN1 (NMDAR1)	External	MmAb	Q05586	
440	NK382-1	GRK1 (Rhodopsin kinase)	External	MmAb	Q15835	Kinase
441	NK067-2	BARK1 (GRK2, ADRBK1)	External	MmAb	P25098	Kinase
442	NK067	GRK2	External	RpAb	P25098	Kinase
443	NK068-2	GRK3 (BARK2)	External	MmAb	P35626	Kinase
444	NK379-1	GRK4	External	MmAb	P32298	Kinase
445	NK067-2	GRK5	External	MmAb	P34947	Kinase
446	NK380-1	GRK6	External	MmAb	P43250	Kinase
447	NK381-1	GRK7	External	MmAb	Q8WTQ7	Kinase
448	NN046	GroEL	External	RpAb	P10809	
449	NN047-3	Grp75 (HspA9)	External	MmAb	P38646	
450	NN047	Grp75 (HspA9)	External	MmAb	P38646	
451	NN047-2	Grp75 (HSPA9)	External	MmAb	P38646	
452	NN048-9	Grp78 (Hspa5; BiP)	External	MmAb	P11021	
453	NN048-4	Grp78 (Hspa5; BiP)	External	MmAb	P11021	
454	NN048-5	Grp78 (Hspa5; BiP)	External	MmAb	P11021	
455	NN049-3	Grp94 (HSP90B1)	External	ratmAb	P14625	
456	NN049-4	Grp94 (HSP90B1)	External	RpAb	P14625	
457	NN049-5	Grp94 (HSP90B1)	External	MmAb	P14625	
458	NN265-1	Grp170 (HYOU1; ORP-150)	External	MmAb	Q9Y4L1	
459	NN265-2	Grp170 (HYOU1; ORP-150)	External	MmAb	Q9Y4L1	
460	NK069-NK070-3	GSK3a/b	External	MmAb	P49840	Kinase
461	NK069-3	GSK3a/b	Kinexus	RpAb	P49840	Kinase
462	NK069-NK070-2	GSK3a/b	External	MmAb	P49840	Kinase
463	NK270-4	GSK3 Beta (GSK3b)	External	RpAb	P49841	Kinase
464	NK270-3	GSK3 Beta (GSK3b)	Kinexus	RpAb	P49841	Kinase
465	NK071	Haspin	External	RpAb	Q8TF76	Kinase
466	NN169	HDAC4	External	RpAb	P56524	
467	NN169-2	HDAC4	External	MmAb	P56524	
468	NN419-1	HDAC5	External	MmAb	Q9UQL6	
469	NN050	hHR23B	External	MmAb	P54727	
470	NN267-1	HIF 1 alpha (HIF1A)	External	MmAb	Q16665	
471	NN051	Hip	External	RpAb	P50502	
472	NN421-1	Histone H1 (HIST1H1E)	External	MmAb	P10412	
473	NN052	HO1 (HO; HMOX1)	External	RpAb	P09601	
474	NN052-6	HO1 (HO; HMOX1)	External	RpAb	P09601	
475	NN052-7	HO1 (HO; HMOX1)	External	MmAb	P09601	
476	NN420-1	HO2 (HMOX2)	External	MmAb	P50502	
477	NN053	HO2 (HMOX2)	External	RpAb	P50502	
478	NK072	Hpk1 (MAP4K1)	External	GpAb	Q92918	Kinase
479	NK072-2	Hpk1 (MAP4K1)	External	MmAb	Q92918	Kinase
480	NK383-1	HRI (HCR; EIF2AK1)	External	MmAb	Q9BQI3	Kinase
481	NN054	Hsc70	External	MmAb	P11142	
482	NN054-2	Hsc70 (HSPA8; Hsc70; HSP73; HSPA10	External	RpAb	P11142	
483	NN054-4	Hsc70 (HSP73; HSPA8)	External	MmAb	P11142	
484	NN268-1	HSF1	External	ratmAb	Q00613	

485	NN268-2	HSF1	External	ratmAb	Q00613	
486	NN268-4	HSF1	External	RpAb	Q00613	
487	NN055	HSF4	External	MmAb	Q9ULV5	
488	NN422-1	HSF4	External	MmAb	Q9ULV5	
489	NN152-1	HSP27 (HSP28; HSPB1)	External	RpAb	P04792	
490	NN152-2	HSP27 (HSP28; HSPB1)	External	RpAb	P04792	
491	NN152-4	HSP27 (HSP28; HSPB1)	External	MmAb	P04792	
492	NN057-2	HSP40 (DNAJB1; DNAJ1; HSPF1)	External	MmAb	P25685	
493	NN057-4	HSP40 (DNAJB1; DNAJ1; HSPF1)	External	MmAb	P25685	
494	NN058	HSP47 (Serpinh1)	External	MmAb	P50454.2	
495	NN058-2	HSP47 (Serpinh1)	External	MmAb	P50454.2	
496	NN058-3	HSP47 (Serpinh1)	External	MmAb	P50454.2	
497	NN059-1	Hsp60 (HspD1)	External	MmAb	P10809	
498	NN059-4	HSP60 (HSPD1)	External	MmAb	P10809	
499	NN059-3	HSP60 (HSPD1; CPN60)	External	MmAb	P10809	
500	NN060-7	HSP70 (Hsc70; HSP71; HSX70)	External	MmAb	P0DMV8	
501	NN060-9	HSP70 (Hsc70; HSP71; HSX70)	External	MmAb	P0DMV8	
502	NN060-11	HSP70 (Hsc70; HSP71; HSX70)	External	MmAb	P08107	
503	NN060-12	HSP72	External	MmAb	P54652	
504	NN061	HSP90a (HSP90AA1; HSP90; LAP2)	External	MmAb	P07900	
505	NN061-4	HSP90a (HSP90AA1; HSP90; LAP2)	External	MmAb	P07900	
506	NN061-9	HSP90a (HSP90AA1; HSP90; LAP2)	External	MmAb	P07900	
507	NN061-2	HSP90a (HSP90AA1; HSP90; LAP2)	External	MmAb	P07900/P08238	
508	NN061-3	HSP90a (HSP90AA1; HSP90; LAP2)	External	MmAb	P07900	
509	NN061-18	HSP90a (HSP90AA1; HSP90; LAP2)	External	MmAb	P08238	
510	NN061-16	HSP90a (HSP90AA1; HSP90; LAP2)	External	RpAb	P08238	
511	NN269-2	HSP105 (HSPH1, HSP110)	External	MmAb	Q92598	
512	NN062	HSP105 (HSPH1, HSP110)	External	RpAb	Q92598	
513	NN269-1	HSP105 (HSPH1, HSP110)	External	RpAb	Q92598	
514	NN270-1	HSPB2	External	RpAb	Q16082	
515	NN063	HspBP1	External	MmAb	O95351	
516	NN063-2	HspBP1	External	MmAb	O95351	
517	NN422-1	Huntingtin (HTT)	External	MmAb	P42858	
518	NN130	I1PP2A	External	RpAb	P39687	
519	NN131	I2PP2A	External	RpAb	Q01105	
520	NN025	IAP1 (BIRC2; API2)	External	RpAb	Q13490	
521	NK073-2	ICK	External	MmAb	Q9UPZ9	Kinase
522	NN377-1	IFT88 (TTC10)	External	RpAb	Q13099	
523	NK074-5	IGF1R	External	MmAb	P08069	Kinase
524	NK074-4	IGF1R	External	MmAb	P08069	Kinase
525	NK074-1	IGF1R	Kinexus	RpAb	P08069	Kinase
526	NN064-5	IkBa	External	MmAb	P25963	
527	NN064	IkBa	External	RpAb	P25963	
528	NN065	IkBb	External	RpAb	Q15653	
529	NK075-2	IKKa (IkBKA)	External	MmAb	O15111	Kinase
530	NK075-3	IKKa (IkBKA)	External	RpAb	O15111	Kinase
531	NK075-7	IKKa (IkBKA)	External	MmAb	O15111	Kinase
532	NK076-7	IKKb (IkBKB)	External	MmAb	O14920	Kinase
533	NK076-6	IKKb (IkBKB)	Kinexus	RpAb	O14920	Kinase
534	NN077-2	IKKg (NEMO)	External	MmAb	Q9Y6K9	Kinase
535	NN423-1	IKKe (IkBKE, IKKi)	External	MmAb	Q14164	Kinase
536	NK078-4	ILK1 (ILK)	External	MmAb	Q13418	Kinase
537	NN271-1	INPP5F (OCRL)	External	MmAb	Q01968	
538	NK079-2	InsR (IR)	Kinexus	RpAb	P06213	Kinase
539	NK079-3	InsR (IR)	External	MmAb	P06213	Kinase

540	NN424-1	ITGA4 (CD49D)	External	MmAb	P13612	
541	NN425-2	ITGB1 (FNRB; MDF2; MSK12)	External	MmAb	P05556	
542	NN425-1	ITGB1 (FNRB; MDF2; MSK12)	External	MmAb	P05556	
543	NK080-3	IRAK1	External	MmAb	P51617	Kinase
544	NK080-2	IRAK1	External	RpAb	P51617	Kinase
545	NK081	IRAK2	External	RpAb	O43187	Kinase
546	NK083-3	IRAK4	External	MmAb	Q9NWZ3	Kinase
547	NK273-1	IRR (INSRR)	Kinexus	RpAb	P14616	Kinase
548	NN383-2	IRS1	External	MmAb	P35568	
549	NN383-1	IRS1	External	RpAb?	P35568	
550	NK274-1	ITK	Kinexus	RpAb	Q08881	Kinase
551	NK084-2	JAK1	External		P23458	Kinase
552	NK084-6	JAK1	External	MmAb	P23458	Kinase
553	NK084-3	JAK1	Kinexus	RpAb	P23458	Kinase
554	NK085	JAK2	External	RpAb	O60674	Kinase
555	NK085-5	JAK2	External	MmAb	O60674	Kinase
556	NK085-3	JAK2	Kinexus	RpAb	O60674	Kinase
557	NK086	JAK3	External	MmAb	P52333	Kinase
558	NK086-3	JAK3	Kinexus	RpAb	P52333	Kinase
559	NK086-4	JAK3	Kinexus	RpAb	P52333	Kinase
560	NN272-1	JIP2 (Mapk8ip2)	External	MmAb	Q13387	
561	NK217-2	JNK1 (MAPK8; SAPK1)	Kinexus	RpAb	P45983	Kinase
562	NK217-3	JNK1 (MAPK8; SAPK1)	Kinexus	RpAb	P45983	Kinase
563	NK088-2	JNK1/2/3	External	MmAb	P45983	Kinase
564	NK189-5	JNK2 (MAPK9, SAPKa)	External	MmAb	P45984	Kinase
565	NK189-2	JNK2 (MAPK9, SAPKa)	Kinexus	RpAb	P45984	Kinase
566	NK196	JNK2 (MAPK9, SAPKa)	Kinexus	RpAb	P45984	Kinase
567	NK197-2	JNK3 (MAPK10, SAPKb)	Kinexus	RpAb	P53779	Kinase
568	NK197-4	JNK3 (MAPK10, SAPKb)	Kinexus	RpAb	P53779	Kinase
569	NK197	JNK3 (MAPK10, SAPKb)	Kinexus	RpAb	P53779	Kinase
570	NN162	Jun (c-Jun)	External	MmAb	P05412	Transcr.
571	NN162-2	Jun (c-Jun)	External	MmAb	P05412	Transcr.
572	NP004	KAP	External	RpAb	Q16667	Phosphatase
573	NN273-1	KCNK3 (TASK; TASK1)	External	MmAb	O14649	
574	NN274-1	KCNQ1 (KCNA8; KCNA9; KVLQT1)	External	MmAb	P51787	
575	NN275-1	KCNQ2	External	MmAb	O43526	
576	NN153	KDEL Receptor (Kdelr1; ERD2.1; PM23)	External	MmAb	P24390	
577	NK089	KHS1 (MAP4K5; KHS)	External	GpAb	Q9Y4K4	Kinase
578	NK089-3	KHS1 (MAP4K5; KHS)	External	MmAb	Q9Y4K4	Kinase
579	NN278-1	Kir2.2 (KCNJ12; IRK2; KCNJN1)	External	MmAb	Q14500	
580	NN279-1	Kir2.3 (KCNJ4)	External	MmAb	P48050	
581	NN280-1	Kir6.1 (KCNJ8; uKATP-1)	External	MmAb	Q15842	
582	NK241-4	Kit	External	MmAb	P10721	Kinase
583	NK241-1	Kit	Kinexus	RpAb	P10721	Kinase
584	NK241-2	Kit	Kinexus	RpAb	P10721	Kinase
585	NN281-1	KRAS (KRAS2; RASK2)	External	RpAb	P01116	
586	NK090-1	Ksr1	Kinexus	RpAb	Q8IVT5	Kinase
587	NN282-1	Kv3.1 (KCNC1; Kv4)	External	MmAb	P48547	
588	NN283-1	Kv3.2 (KCNC2)	External	MmAb	Q96PR1	
589	NN284-2	LAMP2	External	ratmAb	P13473	
590	NP005	LAR (PTPRF)	External	MmAb	P10586	Phosphatase
591	NP005-2	LAR (PTPRF)	External	MmAb	P10586	Phosphatase
592	NK091-3	LATS1	External	MmAb	O95835	Kinase
593	NK091-2	LATS1	Kinexus	RpAb	O95835	Kinase
594	NK092-1	LATS2	Kinexus	RpAb	Q9NRM7	Kinase

595	NK092-2	LATS2	Kinexus	RpAb	Q9NRM7	Kinase
596	NK353-4	Lck	External	MmAb	P06239	Kinase
597	NN285-1	LGI1 (Epitempin-1)	External	MmAb	O95970	
598	NK093	LIMK1	External	MmAb	P53667	Kinase
599	NK093-2	LIMK1	External	MmAb	P53667	Kinase
600	NK227-5	LKB1 (STK11; STRAD)	External	MmAb	Q15831	Kinase
601	NK227-2	LKB1	Kinexus	RpAb	Q15831	Kinase
602	NK227-3	LKB1	Kinexus	RpAb	Q15831	Kinase
603	NK384-1	LMR2 (LMTK2, KPI-2)	External	MmAb	Q8IWU2	Kinase
604	NN287-2	LRP4 (LRP10; MEGF7)	External	MmAb	O75096	
605	NN286-1	LRP4	External	MmAb	O75096	
606	NK303-1	LRRK2 (PARK8)	External	MmAb	Q5S007	Kinase
607	NN426-1	LTBR	External	MmAb	P36941	
608	NK095	Lyn	External	MmAb	P07948	Kinase
609	NK095-3	Lyn	External	MmAb	P07948	Kinase
610	NK095-2	Lyn	Kinexus	RpAb	P07948	Kinase
611	NN288-1	Malin (NHLRC1; EPM2B)	External	MmAb	Q6VVB1	
612	NK097-3	MAPKAPK2 (RPS6KC1)	External	MmAb	P49137	Kinase
613	NK097	MAPKAPK2 (RPS6KC1)	External	GpAb	P49137	Kinase
614	NK097-2	MAPKAPK2 (RPS6KC1)	Kinexus	RpAb	P49137	Kinase
615	NK356-1	MAPKAPK3 (3pk)	External	MmAb	Q16644	Kinase
616	NK396-1	MAPKAPK5 (PRAK)	External	MmAb	Q8IW41	Kinase
617	NK098-2	MARK1	Kinexus	RpAb	Q9P0L2	Kinase
618	NK275-1	MARK2	Kinexus	RpAb	Q7KZI7	Kinase
619	NK275-2	MARK2	Kinexus	RpAb	Q7KZI7	Kinase
620	NK276-1	MARK3	Kinexus	RpAb	P27448	Kinase
621	NK276-2	MARK3	Kinexus	RpAb	P27448	Kinase
622	NK277-1	MARK4	Kinexus	RpAb	Q96L34	Kinase
623	NK277-2	MARK4	Kinexus	RpAb	Q96L34	Kinase
624	NK385-1	MAST1	External	MmAb	Q9Y2H9	Kinase
625	NN427-1	Mat1 (MNAT1)	External	MmAb	P51948	
626	NN067-2	Mcl1	External	MmAb	Q07820	
627	NN067	Mcl1	External	RpAb	Q07820	
628	NN289-1	MDC1 (NFBD1)	External	MmAb	Q14676	
629	NN428-1	MDM2	External	MmAb	Q00987	
630	NN429-1	MEF2A	External	MmAb	Q02078	
631	NK099-10	MEK1 (MAP2K1; MKK1)	External	MmAb	Q02750	Kinase
632	NK099-8	MEK1 (MAP2K1; MKK1)	Kinexus	RpAb	Q02750	Kinase
633	NK099-3	MEK1 (MAP2K1; MKK1)	Kinexus	RpAb	Q02750	Kinase
634	NK099-4	MEK1 (MAP2K1; MKK1)	Kinexus	RpAb	Q02750	Kinase
635	NK100-7	MEK2 (MAP2K2; MKK2)	External	MmAb	P36507	Kinase
636	NK100-5	MEK2 (MAP2K2; MKK2)	Kinexus	RpAb	P36507	Kinase
637	NK100-4	MEK2 (MAP2K2; MKK2)	Kinexus	RpAb	P36507	Kinase
638	NK101-3	MKK3 (MAP2K3; MEK3)	External	RpAb	P46734	Kinase
639	NK101-7	MKK3 (MAP2K3; MEK3)	External	MmAb	P46734	Kinase
640	NK101	MKK3 (MAP2K3; MEK3)	External	RpAb	P46734	Kinase
641	NK101-4	MKK3 (MAP2K3; MEK3)	Kinexus	RpAb	P46734	Kinase
642	NK103-5	MKK4 (MAP2K4; MEK4)	Kinexus	RpAb	P45985	Kinase
643	NK103-6	MKK4 (MAP2K4; MEK4)	Kinexus	RpAb	P45985	Kinase
644	NK103-2	MKK4 (MAP2K4; MEK4)	Kinexus	RpAb	P45985	Kinase
645	NK103	MKK4 (MAP2K4; MEK4)	External	RpAb	P45985	Kinase
646	NK104	MEK5 (MAP2K5; MKK5)	External	GpAb	Q13163	Kinase
647	NK104-5	MEK5 (MAP2K5; MKK5)	Kinexus	RpAb	Q13163	Kinase
648	NK104-2	MEK5 (MAP2K5; MKK5)	Kinexus	RpAb	Q13163	Kinase
649	NK105-3	MKK6 (MAP2K6; MEK6)	Kinexus	RpAb	P52564	Kinase

650	NK105-4	MKK6 (MAP2K6; MEK6)	Kinexus	RpAb	P52564	Kinase
651	NK105-1	MKK6 (MAP2K6; MEK6)	External	RpAb	P52564	Kinase
652	NK106-4	MKK7 (MAP2K7; MEK7)	Kinexus	RpAb	O14733	Kinase
653	NK106-5	MKK7 (MAP2K7; MEK7)	Kinexus	RpAb	O14733	Kinase
654	NK106-7	MKK7 (MAP2K7; MEK7)	External	MmAb	O14733	Kinase
655	NK107-4	MEKK1 (MAP3K1)	External	RpAb	Q13233	Kinase
656	NK107-3	MEKK1 (MAP3K1)	Kinexus	RpAb	Q13233	Kinase
657	NK107-4	MEKK1 (MAP3K1)	External	MmAb	Q13233	Kinase
658	NK108-6	MEKK2 (MAP3K2)	External	MmAb	Q9Y2U5	Kinase
659	NK108-2	MEKK2 (MAP3K2)	External	RpAb	Q9Y2U5	Kinase
660	NK108-3	MEKK2 (MAP3K2)	Kinexus	RpAb	Q9Y2U5	Kinase
661	NK109-2	MEKK4 (MAP3K4)	External	MmAb	Q9Y6R4	Kinase
662	NK225-4	MEKK6 (MAP3K6)	Kinexus	RpAb	O95382	Kinase
663	NK225-2	MEKK6 (MAP3K6)	Kinexus	RpAb	O95382	Kinase
664	NK229-2	MELK	Kinexus	RpAb	Q14680	Kinase
665	NK229-3	MELK	Kinexus	RpAb	Q14680	Kinase
666	NK229-4	MELK	Kinexus	RpAb	Q14680	Kinase
667	NK386-1	MERTK (MER)	External	MmAb	Q12866	Kinase
668	NK110-2	Met	Kinexus	RpAb	P08581	Kinase
669	NK110-3	Met	Kinexus	RpAb	P08581	Kinase
670	NK110-4	Met	Kinexus	RpAb	P08581	Kinase
671	NN290-1	MFN2 (Marf; CPRP1)	External	MmAb	O95140	
672	NN291-2	mGluR5 (GRM5; GPRC1E)	External	MmAb	P41594	
673	NN291-1	mGluR5 (GRM5; GPRC1E)	External	MmAb	P41594	
674	NK278-1	MLK1 (MAP3K9)	Kinexus	RpAb	P80192	Kinase
675	NK279-1	MLK2 (MAP3K10)	Kinexus	RpAb	Q02779	Kinase
676	NK208	MLK3 (MAP3K11)	External	RpAb	Q16584	Kinase
677	NK208-3	MLK3 (MAP3K11)	External	MmAb	Q16584	Kinase
678	NK280-1	MLK4	Kinexus	RpAb	Q5TCX8	Kinase
679	NN292-1	MMP9 (GELB; Gelatinase B)	External	MmAb	P14780	
680	NK387-1	Mnk1 (MKNK1)	External	MmAb	Q9BUB5	Kinase
681	NK111	Mnk2 (MKNK2)	External	GpAb	Q9HBH9	Kinase
682	NK388-1	Mnk2 (MKNK2)	External	MmAb	Q9HBH9	Kinase
683	NK281-2	MOK	Kinexus	RpAb	Q9UQ07	Kinase
684	NK281-1	MOK	Kinexus	RpAb	Q9UQ07	Kinase
685	NK112	Mos	Kinexus	RpAb	P00540	Kinase
686	NK282-1	MRCKa	Kinexus	RpAb	Q5VT25	Kinase
687	NK283-1	MRCKb	Kinexus	RpAb	Q9Y5S2	Kinase
688	NN069-2	MSH2	External	MmAb	P43246	
689	NK389-1	MSK2 (RPS6KA4)	External	MmAb	O75676	Kinase
690	NK113-3	MST1 (STK4, Krs2)	External	GpAb	Q13043	Kinase
691	NK113-5	MST1 (STK4, Krs2)	External	MmAb	Q13043	Kinase
692	NK113-2	MST1 (STK4, Krs2)	External	MmAb	Q13043	Kinase
693	NK090-2	MST2 (Krs-1)	External	GpAb	Q13188	Kinase
694	NK114	MST2 (Krs-1)	External	RpAb	Q13188	Kinase
695	NK115	MST3 (STK24)	External	MmAb	Q9Y6E0	Kinase
696	NK390-1	MST4 (STK26)	External	MmAb	Q9P289	Kinase
697	NK116-6	mTOR (FRAP)	External	MmAb	P42345	Kinase
698	NK116-4	mTOR (FRAP)	Kinexus	RpAb	P42345	Kinase
699	NK116-3	mTOR (FRAP)	Kinexus	RpAb	P42345	Kinase
700	NN430-1	Myc (c-Myc)	External	MmAb	P01106	Transcr.
701	NK391-1	MYLK	External	MmAb	Q15746	Kinase
702	NN431-1	MyoD (MYOD1)	External	MmAb	P15172	
703	NP049-1	MYPT1 (MBS)	External	MmAb	O14974	
704	NN432-1	Myt1	External	MmAb	Q01538	Kinase

705	NN432-2	Myt1	External	MmAb	Q01538	Kinase
706	NK361-1	NuaK1 (ARK5)/Nuak2	External	MmAb	O60285	Kinase
707	NN293-1	NALCN (VGCNL1)	External	MmAb	Q8IZF0	
708	NN433-1	NDRG1	External	MmAb	Q92597	Kinase
709	NN434-1	NDRG2	External	MmAb	Q9UN36	Kinase
710	NK392-1	Nek1	External	MmAb	Q96PY6	Kinase
711	NK117-6	Nek2	External	MmAb	P51955	Kinase
712	NK117-5	Nek2	External	RpAb	P51955	Kinase
713	NK117-4	Nek2	External	GpAb	P51955	Kinase
714	NK393-1	Nek3	External	MmAb	P51956	Kinase
715	NK119	Nek7	External	RpAb	Q8TDX7	Kinase
716	NK119-2	Nek7	External	MmAb	Q8TDX7	Kinase
717	NN294-1	Neuroligin 1 (NLGN1)	External	MmAb	Q8N2Q7	
718	NN296-1	Neuroligin 4 (Nlgn4l; Nign4x)	External	MmAb	Q8N0W4	
719	NN070	NFkappaB p50	External	RpAb	P19838	Transcr.
720	NN070-2	NFkappaB p50	External	MmAb	P19838	
721	NN071	NFkappaB p65	External	RpAb	Q04206	Transcr.
722	NN435-1	NBS1 (NBN, Nibrin)	External	MmAb	O60934	
723	NK207	NLK (LAK1; nemo-like kinase)	External	GpAb	Q99558	Kinase
724	NK207-2	MAP3K14 (NIK; NLK; LAK1)	External	MmAb	Q99558	Kinase
725	NN074-2	NME7 (nm23-H7)	External	MmAb	Q9Y5B8	
726	NN297-1	NMDAR2A NMDA (GRIN2A)	External	MmAb	Q12879	
727	NN436-1	eNos (NOS3)	External	MmAb	P29474	
728	NN298-1	Notch1 (TAN1)	External	MmAb	P46531	
729	NN299-1	NPAS4 (BHLHE79; NXF; PASD10)	External	MmAb	Q8IUM7	
730	NN300-1	NrCAM	External	MmAb	Q92823	
731	NN437-1	Nrf2 (NFE2L2)	External	MmAb	Q16236	
732	NN177-2	B23 (NPM)	External	MmAb	P06748	
733	NN177	NPM1 (B23)	External	RpAb	P06748	
734	NK247-1	Obscn	Kinexus	RpAb	Q5VST9	Kinase
735	NK247-3	Obscn	Kinexus	RpAb	Q5VST9	Kinase
736	NN438-1	OSR1	External	MmAb	Q8TAX0	
737	NN439-1	p18 (CDKI; INK4c)	External	MmAb	P42773	
738	NN077	p18 (CDKI; INK4c)	External	RpAb	P42773	
739	NN440-1	p19-INK4d (CDKN2D)	External	MmAb	P55273	
740	NN078-2	p21 (CDKN1A; CIP1)	External	MmAb	P38936	
741	NN080-2	p27 Kip1	External	MmAb	P46527	
742	NN080	p27 Kip1	External	RpAb	P46527	
743	NN081-NN120	p35 (CDK5R1)	External	RpAb	Q15078	
744	NK120-4	p38a MAPK (MAPK14; SAPK2a)	External	MmAb	Q16539	Kinase
745	NK120-7	p38a MAPK (MAPK14; SAPK2a)	Kinexus	RpAb	Q16539	Kinase
746	NK120-10	p38a MAPK (MAPK14; SAPK2a)	Kinexus	RpAb	Q16539	Kinase
747	NK120-12	p38a MAPK (MAPK14; SAPK2a)	External	MmAb	Q16539/Q15759	Kinase
748	NK248-1	p38b MAPK (MAPK11)	Kinexus	RpAb	Q15759	Kinase
749	NK248-2	p38b MAPK (MAPK11)	Kinexus	RpAb	Q15759	Kinase
750	NK248-3	p38b MAPK (MAPK11)	Kinexus	RpAb	Q15759	Kinase
751	NK121-2	p38d MAPK (MAPK13)	Kinexus	RpAb	O15264	Kinase
752	NK121-3	p38d MAPK (MAPK13)	Kinexus	RpAb	O15264	Kinase
753	NK121-4	p38d MAPK (MAPK13)	Kinexus	RpAb	O15264	Kinase
754	NK059-3	p38g MAPK (MAPK12, SAPK3)	Kinexus	RpAb	P53778	Kinase
755	NK059-4	p38g MAPK (MAPK12, SAPK3)	Kinexus	RpAb	P53778	Kinase
756	NK059-5	p38g MAPK (MAPK12, SAPK3)	Kinexus	RpAb	P53778	Kinase
757	NN082-2	TP53 (p53)	External	MmAb	P04637	Transcr.
758	NN082-3	TP53 (p53)	External	RpAb	P04637	Transcr.
759	NN082	TP53 (p53)	External	MmAb	P04637	Transcr.

760	NK223	S6Ka (p70S6K, RPS6KB1)	External	MmAb	P23443	Kinase
761	NK223-2	S6Ka (p70S6K, RPS6KB1)	Kinexus	RpAb	P23443	Kinase
762	NK233-4	S6Ka (p70S6K, RPS6KB1)	Kinexus	RpAb	P23443	Kinase
763	NN123-2	TP73 (p73)	External	MmAb	O15350	Transcr.
764	NN083	p107 (Rb-like 1)	External	RpAb	P28749	
765	NN083-2	p107 (Rb-like 1)	External	MmAb	P28749	
766	NN084	PACSIN1	External	RpAb	Q9BY11	
767	NN084-2	PACSIN1	External	MmAb	Q9BY11	
768	NK122-4	PAK1 (PAKa)	External	RpAb	Q13153	Kinase
769	NK122	PAK1 (PAKa)	External	RpAb	Q13153	Kinase
770	NK122-2	PAK1 (PAKa)	Kinexus	RpAb	Q13153	Kinase
771	NK200-2	PAK2 (PAKg)	External	GpAb	Q13177	Kinase
772	NK200	PAK2 (PAKg)	Kinexus	RpAb	Q13177	Kinase
773	NK200-3	PAK2 (PAKg)	External	MmAb	Q13177	Kinase
774	NK123	PAK3 (PAKb)	External	GpAb	O75914	Kinase
775	NK394-1	PAK4	External	MmAb	O96013	Kinase
776	NK190-2	PAK5 (PAK7)	Kinexus	RpAb	Q9P286	Kinase
777	NK190-3	PAK5 (PAK7)	Kinexus	RpAb	Q9P286	Kinase
778	NK124-2	PAK6	Kinexus	RpAb	Q9NQU5	Kinase
779	NN301-1	PANX2	External	MmAb	Q96RD6	
780	NN085-3	PARP1	External	MmAb	P09874	
781	NK226-1	VEGFR1 (Flt1)	Kinexus	RpAb	P17948	Kinase
782	NN086	Paxillin 1 (PXN)	External	MmAb	P49023	
783	NN086-2	Paxillin 1 (PXN)	External	MmAb	P49023	
784	NN308-1	PCDH-gamma-A1 (PCDHGA1)	External	MmAb	Q9Y5H4	
785	NN308-2	PCDH-gamma-A3 (PCDHGA3)	External	MmAb	Q9Y5H0	
786	NN302-1	PCDH-gamma-A3 (PCDHGA3)	External	MmAb	Q9Y5H0	
787	NN304-1	PCDH-gamma-C3 (PCDH2)	External	MmAb	Q9UN70	
788	NN087-3	PCNA	External	MmAb	P12004	
789	NN087-2	PCNA	External	RpAb	P12004	
790	NK125-2	PCTAIRE1 (CDK16; PCTK1)	External	MmAb	Q00536	Kinase
791	NK125	PCTAIRE1 (CDK16; PCTK1)	External	RpAb	Q00536	Kinase
792	NK285-1	PCTK2 (CDK17; PCTAIRE2)	Kinexus	RpAb	Q00537	Kinase
793	NK286-1	PCTK3 CDK18; (PCTAIRE3)	Kinexus	RpAb	Q07002	Kinase
794	NK242-3	PDGFRA	External	MmAb	P16234	Kinase
795	NK242-1	PDGFRA	Kinexus	RpAb	P16234	Kinase
796	NK242-2	PDGFRA	Kinexus	RpAb	P16234	Kinase
797	NK243-1	PDGFRB	Kinexus	RpAb	P09619	Kinase
798	NK243-3	PDGFRB	Kinexus	RpAb	P09619	Kinase
799	NK243-4	PDGFRB	External	MmAb	P09619	Kinase
800	NN141-1	PDI (P4hb; PDIA1; ERBA2L; PO4DB)	External	RpAb	P07237	
801	NN141-3	PDI (P4hb; PDIA1; ERBA2L; PO4DB)	External	MmAb	P07237	
802	NN179-1	PDK1 (PDHK1)	Kinexus	RpAb	Q15118	Kinase
803	NN180-2	PDK2 (PDHK2, PyDK2)	Kinexus	RpAb	Q15119	Kinase
804	NN181-2	PDK3 (PDHK3)	Kinexus	RpAb	Q15120	Kinase
805	NN178-2	PDK4 (PDHK4)	Kinexus	RpAb	Q16654	Kinase
806	NN178-3	PDK4 (PDHK4)	Kinexus	RpAb	Q16654	Kinase
807	NK395-1	PERK (EIF2AK3; PEK; PKR)	External	MmAb	Q9NZJ5	Kinase
808	NN088	PERP	External	RpAb	Q9H230	
809	NN305-1	PEX6 (Peroxin-6; PXAAA1)	External	MmAb	Q13608	
810	NK287-1	PFTAIRE-1 (CDK14)	Kinexus	RpAb	O94921	Kinase
811	NK004-2	PFTAIRE2 (ALS2CR7; CDK15)	Kinexus	RpAb	Q96Q40	Kinase
812	NK004-3	PFTAIRE2 (ALS2CR7; CDK15)	Kinexus	RpAb	Q96Q40	Kinase
813	NN132	PHOCN (MOB4; mMOB1)	External	RpAb	Q9Y3A3	
814	NN132-2	PHOCN (MOB4; mMOB1)	External	MmAb	Q9Y3A3	

815	NN306-1	PHYH (Phytanic acid oxidase; PAHX)	External	MmAb	O14832	
816	NN089-2	PIK3R1 (PI3K p85)	External	MmAb	P27986	Kinase
817	NN089	PIK3R1 (PI3K p85)	External	MmAb	P27986	Kinase
818	NN307-2	Piccolo (Pclo)	External	RpAb	Q9Y6VO	
819	NK258-3	Pim1	External	MmAb	P11309	Kinase
820	NK258-2	Pim1	Kinexus	RpAb	P11309	Kinase
821	NK288-1	Pim2	Kinexus	RpAb	Q9P1W9	Kinase
822	NK288-2	Pim2	Kinexus	RpAb	Q9P1W9	Kinase
823	NK289-1	Pim3	Kinexus	RpAb	Q86V86	Kinase
824	NK304-1	PINK1 (BRPK)	External	MmAb	Q9BXM7	Kinase
825	NK201-2	PKCa (PRKCA)	External	MmAb	P17252	Kinase
826	NK132	PKCa (PRKCA)	External	MmAb	P17252	Kinase
827	NK201	PKCa (PRKCA)	Kinexus	RpAb	P17252	Kinase
828	NK133-2	PKCb (PRKCB1)	Kinexus	RpAb	P05771	Kinase
829	NK133	PKCb (PRKCB1)	External	RpAb	P05771	Kinase
830	NK133-3	PKCb (PRKCB1)	External	MmAb	P05771	Kinase
831	NK134-3	PKCb2 (PRKCB2)	External	MmAb	P05771-2	Kinase
832	NK134-2	PKCb2 (PRKCB2)	External	RpAb	P05771-2	Kinase
833	NK135	PKCd (PRKCD)	External	RpAb	Q05655	Kinase
834	NK135-2	PKCd (PRKCD)	External	MmAb	Q05655	Kinase
835	NK136-2	PKCe (PRKCE)	External	GpAb	Q02156	Kinase
836	NK136	PKCe (PRKCE)	External	RpAb	Q02156	Kinase
837	NK136-3	PKCe (PRKCE)	External	MmAb	Q02156	Kinase
838	NK137	PKCg (PRKCG)	External	RpAb	P05129	Kinase
839	NK137-2	PKCg (PRKCG)	External	MmAb	P05129	Kinase
840	NK218	PKCh (PRKCH)	External	RpAb	P24723	Kinase
841	NK138-1	PKCi (PRKCI)	External	GpAb	P41743	Kinase
842	NK138-2	PKCi (PRKCI)	External	MmAb	P41743	Kinase
843	NK140-2	PKCq (PRKCQ; PKC-theta)	External	MmAb	Q04759	Kinase
844	NK140	PKCq (PRKCQ; PKC-theta)	External	MmAb	Q04759	Kinase
845	NK141	PKCz (PRKCZ)	External	RpAb	Q05513	Kinase
846	NK142	PKCm (PRKCM, PRKD1, PKD1)	External	RpAb	Q15139	Kinase
847	NK139-2	PKD3 (PRKCN)	Kinexus	RpAb	O94806	Kinase
848	NK202-3	PKG1a (PRKG1A)	External	MmAb	Q13976	Kinase
849	NK143	PKG1a (PRKG1A)	External	RpAb	Q13976	Kinase
850	NK202	PKG1a (PRKG1A)	Kinexus	RpAb	Q13976	Kinase
851	NK290-1	PKG2 (PRKG2)	Kinexus	RpAb	Q13237	Kinase
852	NK290-2	PKG2 (PRKG2)	Kinexus	RpAb	Q13237	Kinase
853	NN115-2	PKM2	External	MmAb	P14618	Kinase
854	NK148-2	PRK1 (PKN1)	External	MmAb	Q16512	Kinase
855	NK149-3	PKN2 (PRK2)	Kinexus	RpAb	Q16513	Kinase
856	NK149	PKN2 (PRK2)	External	RpAb	Q16513	Kinase
857	NK149-2	PKN2 (PRK2)	External	GpAb	Q16513	Kinase
858	NK149-4	PRK2 (PKN2)	External	MmAb	Q16513	Kinase
859	NK144-1	PKR1 (PRKR; EIF2AK2)	External	MmAb	P19525	Kinase
860	NN144-2	PLCG1	External	MmAb	P19174	
861	NN156-2	PLCG2 (PLC R)	External	MmAb	P16885	
862	NK145-3	Plk1 (PLK)	External	MmAb	P53350	Kinase
863	NK145-2	Plk1 (PLK)	Kinexus	RpAb	P53350	Kinase
864	NK146-3	Plk2 (SNK)	External	MmAb	Q9NYY3	Kinase
865	NK146-2	Plk2 (SNK)	External	GpAb	Q9NYY3	Kinase
866	NK147-2	Plk3 (CNK)	Kinexus	RpAb	Q9H4B4	Kinase
867	NK291-1	Plk4 (SAK; STK18)	Kinexus	RpAb	O00444	Kinase
868	NP009-3	PP1/Ca (PPP1CA)	External	MmAb	P62136	Phosphatase
869	NP009-2	PP1/Ca (PPP1CA)	External	RpAb	P62136	Phosphatase

870	NP010-3	PP1/Cb (PPP1CB)	External	MmAb	P62140	Phosphatase
871	NP012	PP2A/Aa/b (PPP2R1A)	External	RpAb	P30153	Phosphatase
872	NP012-3	PP2A/Aa/b (PPP2R1A)	External	MmAb	P30153	Phosphatase
873	NP033	PP2A B (PPP2R5A; B56)	External	RpAb	Q15172	Phosphatase
874	NN033-3	PP2A/Bb (PPP2R2B)	External	MmAb	Q00005	Phosphatase
875	NP033-2	PP2A B (PPP2R5A; B56)	External	MmAb	Q15172	Phosphatase
876	NP035	PP2A/Bb (PPP2R2B)	External	RpAb	Q00005	Phosphatase
877	NP013-NP014	PP2A/Ca (PPP2CA)	External	MmAb	P67775	Phosphatase
878	NP013-NP014-2	PP2A/Ca (PPP2CA)	External	MmAb	P67775	Phosphatase
879	NP050-1	PP2B-B1/2	External	MmAb	Q96LZ3	Phosphatase
880	NP049-2	PP2B/Aa (PPP3CA, Calcineurin A)	External	MmAb	Q08209	Phosphatase
881	NP015	PP2B/Aa (PPP3CA, Calcineurin A)	External	RpAb	Q08209	Phosphatase
882	NP016-2	PP2Ca (PPM1A; PPPM1A)	External	MmAb	P35813/O75688	Phosphatase
883	NP018	PP2Cd (PPM1D)	External	MmAb	O15297	Phosphatase
884	NP019	PP4/A'2 (PPP4R1; MEG1)	External	RmAb	Q8TF05	Phosphatase
885	NP020	PP4C (PPP4C; PPP4; PPX)	External	RpAb	P60510	Phosphatase
886	NP020-2	PP4C (PPP4C; PPP4; PPX)	External	RpAb	P60510	Phosphatase
887	NP021-5	PP5C (PPP5C; PP5; PPT)	External	MmAb	P53041	Phosphatase
888	NP021	PP5C (PPP5C; PP5; PPT)	External	MmAb	P53041	Phosphatase
889	NP021-3	PP5C (PPP5C; PP5; PPT)	External	MmAb	P53041	Phosphatase
890	NP022-3	PP6C (PPP6C)	External	MmAb	O00743	Phosphatase
891	NN442-1	PGR (PR)	External	MmAb	P06401	Transcr.
892	NK126-3	PDK1 (PDPK1)	Kinexus	RpAb	O15530	Kinase
893	NK126-4	PDK1 (PDPK1)	Kinexus	RpAb	O15530	Kinase
894	NK127-3	PRKACA/B (PKACA/B)	External	MmAb	P17612	Kinase
895	NK127-1	PRKACA/B (PKACA/B)	External	MmAb	P17612	Kinase
896	NK402-1	PKAR2B	External	MmAb	P31323	Kinase
897	NK128-2	PKAR2A (PKR2)	External	MmAb	P13861	Kinase
898	NK292-1	PRKX (PKX1)	Kinexus	RpAb	P51817	Kinase
899	NK293-1	PRKY	Kinexus	RpAb	O43930	Kinase
900	NN142	PSD95 (DLG4)	External	MmAb	P78352	
901	NN239-3	PSD95 (DLG4)	External	MmAb	P78352	
902	NP023-6	PTEN	External	MmAb	P60484	Phosphatase
903	NP023-4	PTEN	Kinexus	RpAb	P60484	Phosphatase
904	NP023-5	PTEN	Kinexus	RpAb	P60484	Phosphatase
905	NN309-1	PTGES3 (p23)	External	MmAb	Q15185	
906	NP024-2	PTP1B (PTPN1)	External	MmAb	P18031	Phosphatase
907	NP055-1	PTPH1 (PTPN3)	External	MmAb	P26045	Phosphatase
908	NP025-2	PTP1C (PTPN6; SHP1; SHPTP1)	External	MmAb	P29350	Phosphatase
909	NP025	PTP1C (PTPN6; SHP1; SHPTP1)	External	MmAb	P29350	Phosphatase
910	NP026-2	PTP1D (PTPN11; SHP2; Syp)	External	RpAb	Q06124	Phosphatase
911	NP026-3	PTP1D (PTPN11; SHP2; Syp)	External	MmAb	Q06124	Phosphatase
912	NP027	PTP-PEST (PTPN12; PTPG1)	External	MmAb	Q05209	Phosphatase
913	NP027-2	PTP-PEST (PTPN12; PTPG1)	External	MmAb	Q05209	Phosphatase
914	NP036	PTPD1	External	RpAb	Q16825	Phosphatase
915	NP051-1	PTPε (PTPRE)	External	MmAb	P23469	Phosphatase
916	NP053-1	PTPκ (PTPRK)	External	MmAb	Q15262	Phosphatase
917	NP054-1	PTPμ ((PTPRM)	External	MmAb	P28827	Phosphatase
918	NP052-1	PTPζ (PTPRZ1)	External	MmAb	P23471	Phosphatase
919	NN310-1	PUMA (CHST9)	External	RpAb	Q9BXH4	
920	NK154	PYK2 (PTK2B, FAK2)	External	GpAb	Q14289	Kinase
921	NK154-3	PYK2 (PTK2B, FAK2)	External	MmAb	Q14289	Kinase
922	NN311-1	QKI (HKQ)	External	MmAb	Q96PU8	
923	NN378-1	RAB1B	External	RpAb	Q9H0U4	

924	NN150-3	RAB5A (Rab5)	External	MmAb	P20339	
925	NN150	RAB5A (Rab5)	External	RpAb	P20339	
926	NN092-3	Rac1	External	MmAb	P63000	
927	NN045-2	GNB2L1 (RACK1)	External	MmAb	P63244	
928	NN443-1	Rad17	External	MmAb	O75943	
929	NN050-2	hHR23B (Rad23B)	External	MmAb	P54727	
930	NK155-10	Raf1 (c-Raf)	External	MmAb	P04049	Kinase
931	NK155-5	Raf1 (c-Raf)	Kinexus	RpAb	P04049	Kinase
932	NK155-7	Raf1 (c-Raf)	Kinexus	RpAb	P04049	Kinase
933	NN093	Rb	External	MmAb	P06400	
934	NN093-2	Rb	External	MmAb	P06400	
935	NN312-1	REEP1	External	MmAb	Q9H902	
936	NN312-2	REEP2 (SGC32445)	External	MmAb	Q9BRK0	
937	NN170	RelB	External	RpAb	Q01201	Transcr.
938	NN170-2	RelB	External	MmAb	Q01201	Transcr.
939	NK244-4	Ret (c-Ret; GDNF receptor)	External	MmAb	P07949	Kinase
940	NK244-2	Ret (c-Ret; GDNF receptor)	Kinexus	RpAb	P07949	Kinase
941	NN313-2	Rhodopsin (RHO; Opsin-2)	External	MmAb	P08100	
942	NN313-1	Rhodopsin (RHO; Opsin-2)	External	MmAb	P08100	
943	NN385-2	RPS6	External	MmAb	P62753	
944	NN385-1	RPS6	External	RpAb?	P62753	
945	NK158-2	RIPK1 (RIP)	External	MmAb	Q13546	Kinase
946	NK157-3	RIPK2 (RIP2; RICK; CARD3)	External	MmAb	O43353	Kinase
947	NK157	RIP2 (RICK; RIP2; CARD3)	External	MmAb	O43353	Kinase
948	NK160-2	ROCK1 (ROKb)	External	MmAb	Q13464	Kinase
949	NK160	ROCK1 (ROKb)	External	MmAb	Q13464	Kinase
950	NK159-1	ROCK2 (ROKa)	External	MmAb	O75116	Kinase
951	NK159-2	ROCK2 (ROKa)	External	RpAb	O75116	Kinase
952	NK159-3	ROCK2 (ROKa)	External	MmAb	O75116	Kinase
953	NK161	Ron (MST1R)	External	MmAb	Q04912	Kinase
954	NK161-5	Ron (RONa; MST1R)	External	MmAb	Q04912	Kinase
955	NK161-2	Ron (MST1R)	Kinexus	RpAb	Q04912	Kinase
956	NK162-2	ROR2 (RON2)	External	MmAb	Q01974	Kinase
957	NK163-3	Ros (ROS1)	Kinexus	RpAb	P08922	Kinase
958	NK163-4	Ros (ROS1)	Kinexus	RpAb	P08922	Kinase
959	NK164-4	RSK1 (RPS6KA1, p90RSK)	External	MmAb	Q15418	Kinase
960	NK164	RSK1 (RPS6KA1, p90RSK)	External	RpAb	Q15418	Kinase
961	NK164-3	RSK1 (RPS6KA1, p90RSK)	Kinexus	RpAb	Q15418	Kinase
962	NK165-4	RSK2 (RPS6KA3)	External	MmAb	P51812	Kinase
963	NK165-2	RSK2 (RPS6KA3)	Kinexus	RpAb	P51812	Kinase
964	NK165-3	RSK2 (RPS6KA3)	Kinexus	RpAb	P51812	Kinase
965	NK166-2	RSK4 (RPS6KA6)	Kinexus	RpAb	Q9UK32	Kinase
966	NN314-1	SCN2B (NaVbeta2; Gm183)	External	MmAb	O60939	
967	NN315-1	SCN3B (NaVbeta3)	External	MmAb	Q9NY72	
968	NN316-1	SCNN1A (ENaCA; Alpha-ENaC)	External	RpAb	P37088	
969	NN317-1	SCNN1B (Beta-ENaC; SCNEB)	External	RpAb	P51168	
970	NN317-2	SCNN1B (Beta-ENaC; SCNEB)	External	MmAb	P51168	
971	NN369-1	SCNN1G (ENaCG; Gamma-ENaC)	External	RpAb	P51170	
972	NN133	SG2NA (STRN3)	External	RpAb	Q13033	
973	NK295-1	SgK288 (ANKK1)	Kinexus	RpAb	Q8NFD2	Kinase
974	NK294-1	SGK1	Kinexus	RpAb	O00141	Kinase
975	NK170-2	SGK3	External	MmAb	Q96BR1	Kinase
976	NN318-1	SHANK2 (CortBP1; PROSAP1)	External	MmAb	Q9UPX8	
977	NN319-1	SHANK3 (PROSAP2; PSAP2)	External	MmAb	Q9BYB0	
978	PN074-3	Shc1 (Shc)	External	MmAb	P29353	

979	NP044-4	SHIP1 (INPP5D)	External	MmAb	Q92835	Phosphatase
980	NP044-2	SHIP1 (INPP5D)	Kinexus	RpAb	Q92835	Phosphatase
981	NP044-3	SHIP1 (INPP5D)	Kinexus	RpAb	Q92835	Phosphatase
982	NP045-1	SHIP2 (INPPL1)	Kinexus	RpAb	O15357	Phosphatase
983	NP045-2	SHIP2 (INPPL1)	Kinexus	RpAb	O15357	Phosphatase
984	NP045-3	SHIP2 (INPPL1)	Kinexus	RpAb	O15357	Phosphatase
985	NK251-2	SIK1 (SIK; SNF1IK)	Kinexus	RpAb	P57059	Kinase
986	NK251-3	SIK1 (SIK; SNF1IK)	Kinexus	RpAb	P57059	Kinase
987	NK249-2	SIK2 (QIK)	Kinexus	RpAb	Q9H0K1	Kinase
988	NK249-3	SIK2 (QIK)	Kinexus	RpAb	Q9H0K1	Kinase
989	NK250-1	SIK3 (QSK)	Kinexus	RpAb	Q9Y2K2	Kinase
990	NK250-2	SIK3 (QSK)	Kinexus	RpAb	Q9Y2K2	Kinase
991	NK250-3	SIK3 (QSK)	Kinexus	RpAb	Q9Y2K2	Kinase
992	NN444-1	SKP2	External	MmAb	Q13309	
993	NN326-1	SLC9A3 (NHE3)	External	RpAb	P48764	
994	NN320-1	SLC12A1 (NKCC2)	External	RpAb	Q13621	
995	NN321-1	SLC12A3 (NCC)	External	RpAb	P55017	
996	NN322-1	SLC12A5 (KCC2; K-Cl cotransporter 2)	External	MmAb	Q9H2X9	
997	NN323-1	SLC17A6 (VGLUT2; Dnpi)	External	MmAb	Q9P2U8	
998	NN324-1	SLC38A1 (ATA1; NAT2)	External	MmAb	Q9H2H9	
999	NN095-2	Smac (DIABLO)	External	MmAb	Q9NR28	
1000	NN445-1	Smad1	External	MmAb	Q15797	Transcr.
1001	NN096-2	Smad2/3	External	MmAb	Q15796/P84022	Transcr.
1002	NN446-1	SMC1A	External	MmAb	Q14683	
1003	NK233-2	SMG1	Kinexus	RpAb	Q96Q15	Kinase
1004	NK233-1	SMG1	Kinexus	RpAb	Q96Q15	Kinase
1005	NK233-3	SMG1	Kinexus	RpAb	Q96Q15	Kinase
1006	NN097	SOCS4	External	RpAb	Q8WXH5	Transcr.
1007	NN098-5	SOD1 (hSod1)	External	RpAb	P00441	
1008	NN098-4	SOD1 (hSod1)	External	RpAb	P00441	
1009	NN098-3	SOD1 (hSod1)	External	RpAb	P00441	
1010	NN068-1	SOD2	External	RpAb	P04179	
1011	NN068-3	SOD2 (MnSOD)	External	MmAb	P04179	
1012	NN068-2	SOD2 (MnSOD)	External	RpAb	P04179	
1013	NN328-1	SOD3	External	MmAb	P08294	
1014	NN328-2	SOD3	External	RpAb	P08294	
1015	NK155-9	Raf1 (c-Raf)	Kinexus	RpAb	P04049	Kinase
1016	NN099-2	SODD (BAG4)	External	MmAb	O95429	
1017	NN447-1	SPHK1	External	MmAb	Q8CI15	
1018	NN101	SPHK2	External	RpAb	Q9NRA0	
1019	NN375-1	SQSTM1	External	RpAb	Q13501	
1020	NK172-4	Src	External	MmAb	P12931	Kinase
1021	NK172-2	Src	External	RpAb	P12931	Kinase
1022	NK172-3	Src	External	RpAb	P12931	Kinase
1023	NK397-1	SRPK1	External	MmAb	Q96SB4	Kinase
1024	NK296-1	SRPK2	Kinexus	RpAb	P78362	Kinase
1025	NN102-NN124	STAT1a	External	RpAb	P42224	Transcr.
1026	NN139-2	STAT1a	External	MmAb	P42224	Transcr.
1027	NN103	STAT2	External	RpAb	P52630	Transcr.
1028	NN103-2	STAT2	External	MmAb	P52630	Transcr.
1029	NN104	STAT3	External	RpAb	P40763	Transcr.
1030	NN104-3	STAT3	External	MmAb	P40763	Transcr.
1031	NN117	STAT4	External	RpAb	Q14765	Transcr.
1032	NN117-2	STAT4	External	MmAb	Q14765	Transcr.

1033	NN105	STAT5A	External	RpAb	P42229	Transcr.
1034	NN105-2	STAT5A	External	MmAb	P42229	Transcr.
1035	NN106-2	STAT5B	External	MmAb	P51692	Transcr.
1036	NK284-1	PKB (TOPK)	Kinexus	RpAb	Q96KB5	Kinase
1037	NN107-2	STAT6	External	MmAb	P42226	Transcr.
1038	NN107	STAT6	External	RpAb	P42226	Transcr.
1039	NN108	STI1	External	MmAb	P31948	
1040	NN108-2	STI1	External	MmAb	P31948	
1041	NK398-1	STK33	External	MmAb	Q9BYT3	Kinase
1042	NN134	Striatin	External	RpAb	O43815	
1043	NN340-1	SUR1 (Abcc8)	External	MmAb	Q09428	
1044	NN340-2	SUR1 (Abcc8)/SUR2B (Abcc9)	External	MmAb	Q8N4N7	
1045	NN341-1	SUR2A (Abcc9)	External	MmAb	Q8N4N7	
1046	NK174	Syk	External	MmAb	P43405	Kinase
1047	NK174-2	Syk	External	MmAb	P43405	Kinase
1048	NN171	Synapsin 1	External	RpAb	P17600	
1049	NN171-2	Synapsin 1	External	MmAb	P17600	
1050	NN370-1	Synaptophysin	External	MmAb	P08247	
1051	NN343-1	SYT9	External	MmAb	Q86SS6	
1052	NN344-1	SYT10	External	MmAb	Q6XYQ8	
1053	NN345-1	SYT10	External	MmAb	Q8IV01	
1054	NN387-1	SNCA (a-Synuclein)	External	MmAb	P37840	
1055	NN366-1	SYT3	External	MmAb	Q9BQG1	
1056	NN367-1	SYT6	External	MmAb	Q5T7P8	
1057	NK175-5	TAK1 (MAP3K7)	External	MmAb	O43318	Kinase
1058	NK175-6	TAK1 (MAP3K7)	External	MmAb	O43318	Kinase
1059	NK175-3	TAK1 (MAP3K7)	Kinexus	RpAb	O43318	Kinase
1060	NK399-1	TAOK2 (TAO2)	External	MmAb	Q9UL54	Kinase
1061	NK087-2	TAOK3 (JIK, TAO3)	Kinexus	RpAb	Q9H2K8	Kinase
1062	NK087-3	TAOK3 (JIK, TAO3)	External	MmAb	Q9H2K8	Kinase
1063	NN448-1	Tau (MAPT)	External	MmAb	P10636	
1064	NK220-2	TBK1	External	RpAb	Q9UHD2	Kinase
1065	NK220-3	TBK1	External	MmAb	Q9UHD2	Kinase
1066	NN346-1	TCP1 alpha (CCT-alpha)	External	ratmAb	P17987	
1067	NN346-2	TCP1 alpha (CCT-alpha)	External	ratmAb	P17987	
1068	NK400-1	TEC	External	MmAb	P42680	Kinase
1069	NN449-1	TH (TY3H)	External	MmAb	P07101	
1070	NK177-2	Tlk1	External	MmAb	Q9UKI8	Kinase
1071	NN368-1	TLR4 (CD284)	External	RpAb	O00206	
1072	NN347-2	TNFR1 (CD120a; TNFRSF1A; TNFAR)	External	MmAb	P19438	
1073	NN347-1	TNFR1 (CD120a; TNFRSF1A; TNFAR)	External	RpAb	P19438	
1074	NN110	TRADD	External	MmAb	Q15628	
1075	NN110-2	TRADD	External	MmAb	Q15628	
1076	NN111	Trail	External	RpAb	P50591	
1077	NN111-2	Trail	External	MmAb	P50591	
1078	NN348-1	TRAK2 (ALS2CR3)	External	MmAb	O60296	
1079	NN349-1	TRAP1 (HSP75)	External	MmAb	Q12931	
1080	NN349-2	TRAP1 (HSP75)	External	RpAb	Q12931	
1081	NK178	TrkA (NTRK1)	External	RpAb	P04629	Kinase
1082	NK178-2	TrkA (NGFR; NTRK1)	External	MmAb	P04629	Kinase
1083	NK179-2	TrkB (NTRK2)	External	MmAb	Q16620	Kinase
1084	NN350-1	TRPC5 (TRP5)	External	MmAb	Q9UL62	
1085	NK352-1	TRPM7 (CHAK1; LTRPC7)	External	MmAb	Q96QT4	
1086	NK232-2	TRRAP	Kinexus	RpAb	Q9Y4A5	Kinase

1087	NK232-3	TRRAP	Kinexus	RpAb	Q9Y4A5	Kinase
1088	NK232-1	TRRAP	Kinexus	RpAb	Q9Y4A5	Kinase
1089	NK401-1	TTBK1	External	MmAb	Q5TCY1	Kinase
1090	NK180	TTK	External	RpAb	P33981	Kinase
1091	NK180-2	TTK	External	MmAb	P33981	Kinase
1092	NN380-1	Tubulin-alpha (TUBA1B)	External	RpAb	P68363	
1093	CN002	Tubulin-gamma (TBG1)	External	RpAb	P23258	
1094	NN417-1	Tubulin-gamma (TBG1)	External	MmAb	P23258	
1095	NN363-1	TXNDC5 (TLP46; ERp46; PDI)	External	MmAb	Q8NBS9	
1096	NK181-2	TYK2	External	RpAb	P29597	Kinase
1097	NK181	TYK2	External	RpAb	P29597	Kinase
1098	NK181-3	TYK2	Kinexus	RpAb	P29597	Kinase
1099	NN154-2	Ubiquitin (UBB)	External	MmAb	P0CG47	
1100	NN154-3	Ubiquitin (UBB)	External	MmAb	P0CG47	
1101	NK298-2	ULK1	External	RpAb	O75385	Kinase
1102	NK298-1	ULK1	Kinexus	RpAb	O75385	Kinase
1103	NK354-1	ULK2	External	RpAb	Q8IYT8	Kinase
1104	NK355-1	ULK3	External	RpAb	Q6PHR2	Kinase
1105	NK299-1	ULK4	Kinexus	RpAb	Q96C45	Kinase
1106	NN355-1	UT-A1 (Slc14a2; HUT2; UT2)	External	RpAb	Q15849	
1107	NN356-1	UVRAG	External	RpAb	Q9P2Y5	
1108	NN357-1	VAChT (SLC18A3)	External	MmAb	Q16572	
1109	NN358-1	VAMP (Synaptobrevin-1; SYB1)	External	MmAb	P23763	
1110	NN384-1	Snail (SNAI1)	External	RmAb	O95863	
1111	NN176-2	VEGF-C	External	MmAb	P49767	
1112	NN360-1	Versican (GHAP; CSPG2)	External	MmAb	P13611	
1113	NK245-4	VEGFR2 (KDR, Flk1)	External	MmAb	P35968	Kinase
1114	NK226-2	VEGFR1 (Flt1)	Kinexus	RpAb	P17948	Kinase
1115	NK245-1	VEGFR2 (KDR, Flk1)	Kinexus	RpAb	P35968	Kinase
1116	NK245-2	VEGFR2 (KDR, Flk1)	Kinexus	RpAb	P35968	Kinase
1117	NK245-3	VEGFR2 (KDR, Flk1)	Kinexus	RpAb	P35968	Kinase
1118	NK064-2	VEGFR3 (Flt4)	Kinexus	RpAb	P35916	Kinase
1119	NK064-3	VEGFR3 (Flt4)	Kinexus	RpAb	P35916	Kinase
1120	NN361-1	VGLUT1 (SLC17A7; BNPI)	External	MmAb	Q9P2U7	
1121	NN362-1	VGLUT3 (SLC17A8)	External	MmAb	Q8NDX2	
1122	NN185-3	VIM	External	MmAb	P08670	
1123	NN185-2	VIM	External	MmAb	P08670	
1124	NK184-2	VRK1	External	MmAb	Q99986	Kinase
1125	NK185-2	Wee1	External	MmAb	P30291	Kinase
1126	NK185	Wee1	Kinexus	RpAb	P30291	Kinase
1127	NP037	WIP1 (PPM1D)	External	GpAb	O15297	Phosphatase
1128	NK252-1	WNK1 (PRKWNK1)	Kinexus	RpAb	Q9H4A3	Kinase
1129	NK252-3	WNK1 (PRKWNK1)	Kinexus	RpAb	Q9H4A3	Kinase
1130	NK253-1	WNK2 (PRKWNK2)	Kinexus	RpAb	Q9Y3S1	Kinase
1131	NK253-2	WNK2 (PRKWNK2)	Kinexus	RpAb	Q9Y3S1	Kinase
1132	NK254-1	WNK3 (PRKWNK3)	Kinexus	RpAb	Q9BYP7	Kinase
1133	NK254-2	WNK3 (PRKWNK3)	Kinexus	RpAb	Q9BYP7	Kinase
1134	NK254-3	WNK3 (PRKWNK3)	Kinexus	RpAb	Q9BYP7	Kinase
1135	NK255-1	WNK4 (PRKWNK4)	Kinexus	RpAb	Q96J92	Kinase
1136	NK255-3	WNK4 (PRKWNK4)	Kinexus	RpAb	Q96J92	Kinase
1137	NK151	WNK4 (PRKWNK4)	External	RpAb	Q96J92	Kinase
1138	NN112-2	XIAP	External	MmAb	P98170	
1139	NN057-6	YDJ1 (Yeast dnaJ prot. 1; HSP40)	External	MmAb		
1140	NK186-3	Yes	External	MmAb	P07947	Kinase
1141	NK186	Yes	External	MmAb	P07947	Kinase

1142	NK186-2	Yes	External	MmAb	P07947	Kinase
1143	NK214	YSK1 (STK25, SOK1)	External	GpAb	O00506	Kinase
1144	NK214-2	YSK1 (STK25, SOK1)	External	MmAb	O00506	Kinase
1145	NK256-1	YSK4	Kinexus	RpAb	Q56UN5	Kinase
1146	NK256-2	YSK4	Kinexus	RpAb	Q56UN5	Kinase
1147	NK256-3	YSK4	Kinexus	RpAb	Q56UN5	Kinase
1148	NK187-3	ZAP70	External	MmAb	P43403	Kinase
1149	NK187-2	ZAP70	External	RpAb	P43403	Kinase
1150	NK187	ZAP70	External	MmAb	P43403	Kinase
1151	NK301-1	ZC2 (TNIK)	Kinexus	RpAb	Q9UKE5	Kinase
1152		**Orientation Marker**				

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 not 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.

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