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**THE REQUIREMENTS IDENTIFIED HEREIN WILL BE FUNDED BY THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009. (RECOVERY ACT)**

This is amendment 1 to request for proposal originally sent October 16, 2009. This amendment incorporates the revised technical specifications dated October 19, 2009. As outlined in the **Amendments to the RFP** clause, those provisions not modified remain unchanged.

**TECHNICAL SPECIFICATIONS**

The enclosed Technical Specification dated October 19, 2009 outlines the requirements for this solicitation. Suppliers shall provide a separate technical proposal stating how each of the technical specifications are met in the quoted instrumentation.

<p>We offer to sell the above items (or alternate items as specified) at the prices indicated, on the terms and conditions stated and the referenced general provisions which will be a part of any resulting order.</p>		<p>F.O.B. DESTINATION</p>	
		<p>Delivery Date at F.O.B. Point</p>	
		<p><b>Terms of Payment</b> - Payment terms shall be 80% at receipt of system and 20% after installation and acceptance of system. Payment shall be Net 30 upon completion or receipt of invoice, whichever is later. If prompt payment discounts are available, please state</p>	
<p>Firm Name</p>	<p>Offer Date</p>	<p>Weight</p>	<p>Recommended Carrier</p>
<p>Dimensions</p>	<p>Number of Boxes</p>	<p>Origin Zip Code</p>	
<p>Telephone No.</p>	<p>Fax No.</p>	<p>Email Address</p>	
<p>Name/Title</p>	<p>Signature</p>		

## TECHNICAL SPECIFICATIONS FOR LIQUID CHROMATOGRAPHY (LC) TRIPLE QUADRUPOLE MASS SPECTROMETER

### Background

Triple quadrupole mass spectrometry is unmatched in terms of sensitivity and specificity for targeted molecular analysis. These instruments can be operated in so-called selected reaction monitoring (SRM) or multiple reaction monitoring (MRM) modes, which essentially filter all untargeted molecules from the experiment and focus only on the analytes of interest. In addition, they can be operated in parent, product, or neutral-loss ion scanning modes, which offer additional power for determining the structures of unknown but related molecules, such as drugs and drug metabolites. The triple quadrupole platforms will be utilized for targeted MS-based profiling of important metabolic pathways (e.g. amino acid synthesis and degradation), fatty acids and volatile molecules. The mass spectrometers will be coupled with liquid chromatography (LC) separation.

### Performance Specifications/ Acceptance testing

The LC triple quadrupole mass spectrometer shall meet the following specifications. Demonstration of the instrument meeting specifications must be performed prior to instrument acceptance. Any proposal not meeting the technical specification will be considered non-responsive. Demonstration of the instrument meeting the following specifications must be documented by submission of representative mass spectra and shall be performed on-site prior to instrument acceptance:

1. The LC triple quadrupole shall have an operational mass range of 10-1500  $m/z$  with a resolution of at least 0.2  $m/z$  FWHM.
2. The mass stability of the triple quadrupole system shall be within  $\pm 0.050$  Da over 24-hr as determined by four or more on-site MRM measurements of two or more analytes over a 24 hr or greater time period.
3. System sensitivity shall be demonstrated by obtaining an S/N greater than 500:1 in SRM mode for 500 fg or less of reserpine (or equivalent analyte) monitoring the 609.3  $m/z$  to 195  $m/z$  transition.
4. To our knowledge, particularly for our targeted applications, coupling electrospray ionization with ion funnel technologies in the source ion optics leads to substantial improvements in limit of detection (LOD) and reproducibility, key requirements for our planned applications and 1) utilizing these ion funnel or equivalent technologies or 2) demonstrating equivalent LOD shall be required.
  - a. Typical LC MRM results near the LOD with funnel technology in a triple quad mass spectrometry for 0.05 nM bradykinin (265.1 fg in 5  $\mu$ L), 0.05 nM methionin enkephalin (143.4 fg in 5  $\mu$ L), and 0.05 nM D-ala2-deltorphin (195.7 fg in 5  $\mu$ L) spiked into 0.5  $\mu$ g/ $\mu$ L mouse plasma protein (in 5  $\mu$ L injected on column) are an S/N of at least 170, 350, and 300 respectively. S/N values are reported as minimum acceptable values. Routine analysis typically produces results a factor of 3 higher.
  - b. Additional analysis details and sufficient sample for 3 nano-LC MRM analysis can be provided per request.
  - c. This requirement must be passed by method 1) or 2) prior to proposal consideration and again on-site during acceptance testing.
5. Full scan, product-ion scan, precursor-ion scan, neutral-loss ion scan, and multiple reaction monitoring capabilities shall be demonstrated with comparable S/N as those obtained for the SRM reserpine (or equivalent analyte) per manufacturer's preferred standard analysis procedures.
6. A dynamic range of over 5 orders of magnitude shall be demonstrated by analysis of an analyte containing at least two compounds, one of which has a concentration at least 5 times greater than the other.

7. Polarity switching between positive and negative ions with comparable transmission efficiency shall be demonstrated per manufactures choice of analysis.
8. The LC triple quadrupole shall be capable of simultaneous data-dependent MS/MS during multiple reaction monitoring for compound confirmation and timed- or scheduled-selected reaction monitoring of at least 3,000 transitions within a 100 minute LCMS analysis.
9. Demonstration of incorporating acquired triple quadrupole MS datasets into our automated data analysis pipeline shall be required. Manufactures shall be willing to provide information or software tools as required to incorporate the mass spectrometers and acquired datasets into our automated procedures. We anticipate the need to make minor modifications to incorporate the systems into our analysis structure. However, we also anticipate the need for specific information or access to hardware or software systems to enable this integration.
10. A minimum one year warranty for parts and labor shall be included.

### **Options**

Optional items should be included in the proposal, but will not be part of the final evaluated amount. Options may or may not be exercised under the original purchase. The options to be priced:

1. A splitless two column 10,000 PSI nano-liquid chromatography platform, detailed specifications available.
2. Annual service contract for the LC triple quadrupole mass spectrometer
  - a. Full service contract
  - b. Parts only contract

### **Documentation**

Proposals must include documentation of previous demonstration of successful delivery of a nano-LC coupled triple quadrupole mass spectrometer meeting the above specifications within the past 2 years. The documentation shall provide references contact information.