



Request for Information (RFI)

Neuromuscular Junction (NMJ) Micro-Physiological Systems for Botulinum Neurotoxin (BoNT) Potency Measurement and Medical Countermeasures Evaluation

1. Purpose

The Rapid Response Partnership Vehicle (RRPV), on behalf of the Biomedical Advanced Research and Development Authority (BARDA), is issuing this Request for Information (RFI) to assess the current landscape of human-relevant neuromuscular junction (NMJ) micro-physiological systems (MPS) and their potential application for botulinum neurotoxin (BoNT) detection, potency measurement, and evaluation of medical countermeasure (MCM) neutralizing activity.

Advanced Technology International (ATI), the consortium management firm for RRPV, is conducting market research to identify organizations developing or operating NMJ platforms for these applications that could be adapted for use with BoNT serotypes A to G.

This RFI is issued for information and planning purposes only and does not constitute a solicitation or commitment to procure services or products.

2. Background

Botulinum neurotoxins (BoNT/A–G) inhibit acetylcholine release at the neuromuscular junction through cleavage of SNARE proteins (e.g., SNAP-25, VAMP, syntaxin). Currently, BoNT characterization, including toxin potency and neutralization by medical countermeasures, is measured using mouse-based bioassays, primarily the Mouse Potency Assay (MPA) and Mouse Neutralization Assay (MNA), respectively.

There is increasing scientific, ethical, and regulatory interest in transitioning to human-relevant *in vitro* systems that can provide mechanistic insight while reducing reliance on animal testing. NMJ micro-physiological systems may provide a biologically relevant platform capable of measuring BoNT potency and evaluating countermeasure efficacy.

BARDA is interested in understanding whether NMJ-based *in vitro* platforms could support future development of validated assays capable of reducing and potentially replacing reliance on mouse bioassays for BoNT potency and neutralization measurements, with specific interest in systems that can show recovery of neuronal signaling and thereby be appropriate for medical countermeasures evaluation.

3. Requested Information

Respondents are invited to provide concise information describing the following items below. Respondents may include information on how additional funding could help advance their systems to address the applications in the Purpose.

Developers should only respond if they are supporting an existing NMJ system that uses human cells and tissue as BARDA is not considering support for the development of new NMJ systems at this time.

Platform Description

- NMJ platform type and components (e.g., organ-on-chip, microfluidic system, engineered tissue, MEA-enabled system, neuromuscular co-culture, 3D or compartmentalized culture)
- Current development stage and maturity level and current throughput/scalability
- Ability to generate dose-response data (e.g., EC50 / IC50), and durability of the system to enable measurements over time.
- Ability to differentiate between botulinum neurotoxin serotypes

Biological System

- Cell sources (human primary, iPSC-derived, engineered lines)
- Evidence of functional motor neuron–muscle fibers connectivity and NMJ formation
- Reproducibility, sensitivity and stability of the system
- Capabilities for system recovery, reflective of reestablishment of signaling outputs after injury

Functional Readouts

- Assays and standards used to monitor tissue quality
- Available readouts (e.g., muscle contraction, electrophysiology, calcium imaging, SNARE cleavage, neurotransmitter release) and frequency of data recording (e.g. continuous vs endpoint)
- Quantitative readout capability and compatibility with BoNT mechanism of action

BoNT Experience

- Evidence of prior work with BoNT (A–G), including potency measurements or validation data
- Sensitivity and assay dynamic range
- If no prior experience exists, describe readiness to adapt your platform for BoNT testing

Regulatory Considerations

- Validation/qualification strategy
- Experience with FDA engagement or regulatory qualification programs (e.g., FDA iSTAND), if any, with clear description of proposed “context of use”.

Commercial/Manufacturing Considerations

- Intellectual property limitations
- Commercial strategy
- Scalability
- Platform material and manufacturing, and assembly throughput

Operational Considerations and Challenges

Respondents should identify any potential challenges associated with development of an NMJ-based BoNT assay, including but not limited to:

- Access to Select Agent-accredited laboratories capable of working with BoNT serotypes A–G and conducting animal studies, if necessary.
- Potential partnerships with contract research organizations (CROs) or research institutions.
- Scalability or throughput to generate sufficient data for potency determination in a single experiment. A single experiment or run/day is defined as the minimum number of independent cultures required to test up to 8 serial dilutions of neurotoxin in duplicate or quadruplicate to generate datapoints for the calculation of the potency titer by 4 parametric linear regression analysis.
- Potential barriers to regulatory qualification through iSTAND or incorporation into a regulatory submission for an IND product.

4. Current US Government Funding

- Describe any previous or existing US Government funding you received in this area as either a primary awardee or as part of the team. Include grant or contract number, year of award, objectives of the project and progress status and accomplishment to date.
- Describe the gaps, if any, in the existing funding that may be short of enabling full development of your BoNT-NMJ system for the evaluation of medical countermeasures.

5. Response Instructions

Interested organizations should submit a concise written response addressing the requested information. **Responses should be no more than five (5) pages, excluding references.**

Proprietary information should be clearly marked. Do not submit any classified information.

Responses should include:

- Organization name and contact information
- Brief description of the company's overall area(s) of interest, capabilities and experience
- Description of the NMJ platform or technology following the requested information listed above.

6. Submission Instructions

Responses should be submitted electronically in PDF or Microsoft Word formats.

Submission Email and Deadline:

Please submit responses by email to rrpv@ati.org no later than 1pm ET on May 11, 2026.

Subject Line:

RFI Response: NMJ MPS Platforms for BoNT Potency Assay

Disclaimer

This RFI is issued for information and planning purposes only and does not constitute a solicitation or obligation on the part of the Government, BARDA, or ATI. Responses will not be reimbursed and will be used solely for market research and planning purposes.