

Highly Sensitive Assay for the Detection of Botulinum Neurotoxin



DESCRIPTION

Botulinum neurotoxins (BoNTs) play a fundamental role in the treatment of neurological diseases such as those causing uncontrolled muscle contractions, overactive bladder disorder, strabismus, migraine, and abnormally increased perspiration. BoNTs are also used for cancer treatment and in cosmetic applications. Their value is overshadowed by the excessive toxicity levels which can be lethal to humans at even low dosages. The current “gold standard” to detect BoNT is a mouse toxicity assay that can detect at levels as low as 10 picograms. However, this standard is insufficient due to the enormous potency of the toxin, with a reported lethal dose of 2 nanograms per kilogram of body weight. Not only does the mouse toxicity assay have insufficient sensitivity for most pharmaceutical applications, it is also

burdened with a long turnaround time of up to 4 days. Consequently, a more sensitive assay for detecting BoNT in samples is required for detection of sub-lethal toxin concentrations. This featured assay is capable of detecting BoNT at these lower limits. This assay is broadly applicable to all of the BoNT serotypes and can be valuable to diagnostic, biodefense, and pharmacological applications.

KEY ASPECTS

- Methods are based on specific affinity enrichment of a target toxin or target enzyme onto a solid support followed by fluorometric or luminescent readout
- Luminescence-based readout assays are provided for BoNT detection via bioluminescent substrates for BoNT serotype A
- BoNT types A, B, and E can presently be detected with the fluorogenic assay
- This assay has attomolar sensitivity even in complex biological samples, such as human serum or milk

INTELLECTUAL PROPERTY

Title	US Patent	Issued
Method for Detection of Botulinum Neurotoxin	8,067,192	11/29/2011

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