Rapid Clostridium botulinum Diagnostic for Food Safety and Biodefense Applications

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Technology description

Summary

The urgent need for a rapid diagnostic test capable of detecting all serotypes of C. botulinum is well known. Botulinum neurotoxins (BoNTs) are the most potent biological toxins known and are categorized as category A biodefense agents because of lethality and ease of production. BoNTs are also one of the most deadly agents associated with food poisoning. Current diagnostic methods include clinical observation of symptoms that could be mistaken for other neurological conditions and a mouse protection bioassay that takes as long as four days and has a number of disadvantages. The subject technology utilizes unique PCR primers for the detection of the non-toxin non-hemaglutinin (NTNH) gene of C. botulinum ; this gene is highly conserved in all C. botulinum toxin types and subtypes. Thus, samples that contain botulinum can be determined regardless of serotype involved, providing a universal means of diagnosis. Further, the technology describes different PCR primers and flurogenic probes for a BoNT-specific assay. The type-specific assay can be used independently or in conjunction with the universal assay described above. The universal and type-specific assays were successfully used first to identify positively botulinum DNA samples in a test of botulinum and non-botulinum clostridia species then to determine the toxin type. The diagnostic testing described by the subject technology requires less significantly less time than the current gold standard diagnostic tests.

Application area

Universal diagnostic test for C. botulinum
Diagnostic test for C. botulinum capable of detecting all seven toxin types
Combination diagnostic
Food safety applications
Biodefense applications

Institution

NIH - National Institutes of Health

联系我们

叶先生

电话：021-65679356
手机：13414935137
邮箱：yeyingsheng@zf-ym.com