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7ᵗʰ International Conference on

Proteomics & Bioinformatics

October 24-26, 2016   Rome, Italy

Mass spectrometry in forensic identification of two main potential agents of bioterrorism and warfare: Botulinum toxins and ricin

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Protein toxins such as botulinum neurotoxins and plant toxin ricin are considered as potential agents for bioterrorism and warfare. Botulinum neurotoxins are produced by *Clostridium botulinum* commonly found in plants, soils, water and in the intestinal tract of animals. They act by blocking the release of acetylcholine, the principal neurotransmitter at neuromuscular junctions, causing muscle paralysis. Botulinum toxins are among the most poisonous substances. Ricin, on the other hand, is produced by the seeds of castor bean plant (*Ricinus communis*) which is used to process the castor oil. Ricin is very toxic against eukaryotic cells by inhibiting the protein synthesis and causing cell death. Unambiguous identification of these toxins is required not only for the implementation of effective countermeasures in case of terrorism event but also for law enforcement. This is the reason why we have developed a specific strategy for the detection and identification of botulinum toxins and ricin in complex matrices, by LC-QqQ-MS/MS method operating in Multiple Reaction Monitoring (MRM) mode. In order to be compatible with complicated samples, the mass spectrometry analysis was coupled with an immunocapture step. This method was successfully applied to the identification of botulinum toxins type A subtypes and ricin from complex matrices.

Biography

Valerie Morineaux is an Engineer in the Toxicology department, DGA, regarding NRBC (Nuclear, Radioactive, Biology and Chemical) risks. She has completed her PhD from DGA and Pasteur Institute. She has been working for several years on "The development of analytical methods in toxin identification".

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J Proteomics Bioinform 2016
ISSN: 0974-276X JPB, an open access journal

Proteomics & Bioinformatics 2016
October 24-26, 2016

Volume 9, Issue 11(Suppl)

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