Michal R. Popoff, J Bacteriol Parasitol 2013, 4:4
http://dx.doi.org/10.4172/2155-9597.S1.002

OMICS Group Conferences
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International Congress on
Bacteriology & Infectious Diseases
November 20-22, 2013 DoubleTree by Hilton Baltimore-BWI Airport, MD, USA

Genetic variation in *Clostridium botulinum*, types of botulism in France

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Clostridium botuinum is a spore-forming bacterium, which produces potent neurotoxins (BoNT) and which is responsible for a severe flaccid paralysis (botulism) in man and animals. According to their immunological properties, BoNTs are divided into 7 types (A to G) and each type is generally synthesized by only one strain. *C. botulinum* strains are genetically and physiologically heterogeneous and are classified into 4 groups. In addition, some atypical strains belong to two other *Clostridium* species (*C. baratii* and *C. butyricum*). Certain strains produce two types of toxin, but in different proportions, and other contain two BoNT genes, one of them being mutated and silent. Moreover, each BoNT type is subdivided into several subtypes based on nucleotide sequence variations of their genes. In France, 20 to 40 cases of human botulism are identified every year, and severe outbreaks occurred in the last years. Type B botulism is traditional in our country subsequently to ingestion of contaminated pork meat products. However, in the recent years, human botulism was more diverse, and type A botulism outbreaks were predominant. Various subtypes (A1, A1(B), A2, A5, A6) have been identified indicating diverse sources of contamination. Most of botulism outbreaks were food borne botulism originated from home made or commercial food products. Infant botulism is rarely observed in France, but an increased number of cases have been evidenced during these last years.

Biography

Michal R. Popoff (D.V.M., Ph.D.) is the head of the Research Unit of Anaerobic bacteria and Toxins as well as of the National Reference Center for Anaerobic bacteria and Botulism at Institut Pasteur, Paris, France. The main research activity is devoted to clostridial toxins. He has published more than 190 papers in peered reviewed journals and 69 book chapters. He is academic editor for PlosOne.

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