**BACKGROUND INFORMATION**

**Clostridium botulinum** (Latin: *Clostridium* = rod-shaped bacteria; botulinum = poison). Bacterium was named by Kingdom, a French scientist who first isolated the organism in 1888. The botulism toxin was discovered in 1897 by Clostridium botulinum was the first bacterial illness to be recognized as having a definite toxin, and it remains one of the most dangerous known toxins. The botulism toxin is produced by several species of *Clostridium*, including *C. botulinum*, *C. tetani*, *C. perfringens*, and *C. novyi*. The toxin is produced by the bacterium during anaerobic conditions, and it is the most potent neurotoxin known to science. The botulism toxin is a large, complex protein that blocks the release of neurotransmitters at the neuromuscular junction. It affects the autonomic nervous system and paralyzes the muscles.

**Structure of botulinum toxin A**

Botulinum toxin A is a large, complex protein that is composed of two parts: the A链 (light chain) and the B链 (heavy chain). The A链 is responsible for the neurotoxic activity of the toxin, while the B链 is responsible for the binding to the synaptic vesicles. The B链 is a disulfide-linked dimer, and it contains a domain that binds to the synaptic vesicles and a domain that contains the active site of the neurotoxin.

**Mode of action**

The botulinum toxin A binds to the synaptic vesicles at the neuromuscular junction and inhibits the release of neurotransmitters. The toxin then enters the nerve terminal and blocks the release of acetylcholine at the neuromuscular junction. This leads to a loss of muscle function and paralysis. The toxin also affects the autonomic nervous system, which can lead to symptoms such as constipation, dry mouth, and urinary retention.

**Commercially available forms of botulinum toxin A**

There are several commercial forms of botulinum toxin A available, including Botox (Allergan Inc., Irvine, California), Dysport (Speywood Pharmaceuticals), and Neurobloc (TetraBio Pharmaceuticals). These forms are used for various medical conditions, including muscle spasms, strabismus, and cosmetic treatments.

**Doses used for the treatment of human disease**

The FDA specifications for the botulinum toxin A are 100 ± 30 U or per vial. The dose used for the treatment of human disease varies depending on the condition being treated. For example, the dose used for muscle spasms is typically lower than the dose used for cosmetic treatments.

**Further applications of botulinum toxin A**

Botulinum toxin A has been approved for the treatment of a variety of conditions, including muscle spasms, strabismus, and cosmetic treatments. It has also been studied for use in various medical procedures, such as the treatment of facial and neck wrinkles, inhibition of muscle growth, and treatment of other muscle disorders.