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BIOL 206: Human Anatomy and Physiology

Fall 2018

Assignment #3

The muscular disorder I will be discussing is Botulism. This disease is caused by a toxin called botulinum toxin that attacks neurons all throughout the body. The toxin itself is caused by three possible different types of bacteria. Those being Colstridium botulnum, Clostridium butyricum, or Clostridium baratii (CDC, 2018). The toxin is formed when the bacteria spores grow. This disease can be contracted by consuming certain foods that have been contaminated with the toxin, having an open wound, bacteria spores enter infants or even adults digestive tract, or injections. In fact, the bacteria that is responsible for producing this fatal toxin is found in many natural places such as honey (Foodsafety, 2018). The spores grow and produce the toxin when the the right environment is present for it to thrive. This environment includes anaerobic, low acid, low sugar, low salt, specific temperature range, and a specific amount of water (CDC, 2018). When the disease is contracted by foods that have been contaminated, this is called food-borne botulism. This occurs when foods, commonly homemade, but also store-bought, are improperly canned, preserved, or fermented. Having an open wound and contracting the toxin is called wound botulism. The spores of bacteria can enter the body through the wound. Bacteria spores entering an infants digestive tract is called infant botulism. These spores specifically grow in the infants intestines. Spores entering the adult digestive tract is very similar to infant botulism, however it is called adults intestinal toxemia and is much more rare. Toxin formed by injections is called iatrogenic botulism. It can be caused when too much of the toxin is injected for cosmetic or medical reasons (CDC, 2018).

When the toxin enters the body, it blocks the release of acetylcholine at the neuromuscular junctions causing paralysis of the skeletal muscle. Acetylcholine is an important aspect of muscle tension. Without the release of acetylcholine, the permeability of the muscle membrane does not change causing calcium to not enter into the muscle. Calcium is needed to move troponin which exposes the active site on actin so that myosin can attach and pull. Because the release of acetylcholine is blocked, muscle tension cannot occur resulting in muscle weakness or paralysis, in other words, the inability to move. Some signs of muscle weakness would include drooping eyelids, difficulty breathing, difficulty chewing and swallowing, and much more (Medlineplus, 2018). In terms of bottles being lethal, the muscle paralysis can cause you to stop breathing because there would be no tension in the diaphragm.

Once diagnosed with botulism, antitoxin is given to treat it if diagnosed early. This drug prevents the toxin from causing more harm by binding with the harmful toxins in the blood stream and neutralizing them, however, it does not reverse the harm that has already been done (Innovateus, 2018). Botulism immune globulin is a type of antitoxin that is given to infants with infant botulism. There is one kind of treatment that can be used for wound botulism, but no other kind and that is antibiotics. It should not be used for other kinds because it can speed up the release of the toxin rather than decrease. Inducing vomiting, breathing assistance, and rehabilitation is also used and can be beneficial in the treatment of botulism. Overall, treatment by antitoxin is the most well known. Although it does prevent more harm from occurring, depending on the severity, one may have to remain in the hospital for a lengthy amount of time from weeks to months. Rate of improvement is slow, however, it is effective. Long-term therapy may even need to occur for full recovery (Mayo Clinic, 2018).

Botulism. (2018, October 4.). *Centers for Disease Control and Prevention*. Retrieved from

https://www.cdc.gov/botulism/index.html

Botulism. (2018, July 3.). *Mayo Clinic.* Retrieved from https://www.mayoclinic.org/diseases-

conditions/botulism/symptoms-causes/syc-20370262

Botulism. (2018, September 21.). *MedlinePlus.* Retrieved from https://medlineplus.gov/ botulism.html

Botulism. (2018, October 28.). *Food Safety.* Retrieved from https://www.foodsafety.gov/ poisoning/causes/bacteriaviruses/botulism/index.html

What is an Antitoxin? (2018.). *Innovate Us.* Retrieved from http://www.innovateus.net/ innopedia/what-antitoxin