

- *C. tetani*, like the previous 2 bacteria, is a species of bacteria of the family Clostridiaceae
  - It, again, is a bacillus
  - It is **anaerobic**
  - It is **motile**
  - They also produce spores
- The bacteria can be found in **soil, dust and the GI tract of animals**
  - Humans can contract *C. tetani* by getting wounds infected with **soil, dust or animal faeces**
- *C. tetani* produces the highly potent toxin known as **tetanospasmin**, a potent **neurotoxin** (this causes tetanus) when they die
  - Tetanospasmin is composed of **2 polypeptides, a heavy and light chain**
    - **The heavy chain binds to a receptor in the motor neurones cytoplasmic membrane**
      - This **removes the lighter chain and transports it to the CNS**
      - At the CNS, the **lighter chain enters the inhibitory neurone** and **blocks the release of the inhibitory neurotransmitter**
      - With the inhibition blocked, the **excitatory neurones are unregulated** and act without restraint
        - This causes **repeat and random muscular contractions on both sides of joints**
  - The disease, tetanus can cause muscular spasms so strong that they can **break bones**
    - For example, when both the **abdominal muscles and erector spinae group contract**, the **erector spinae group is strongest and so will break the back and cause the patient to fold in on themselves**
      - This causes excruciating pain and usually death
  - These are the symptoms as they progress:
    - **Initial tightening of jaw and neck (lockjaw)**
    - **Spasms that spread across the body**
    - Finally, death is usually caused by **unrelenting contraction of the diaphragm**
  - Most deaths are in developing countries due to inadequate medical care
    - **Recovery requires the growth of new neuronal connections**
    - **The mortality rate is ~10%**
- The diagnosis for *C. tetani* is comprised of the following:
  - **Characteristic muscle contraction** (which often shows it's too late)
  - The bacteria cannot be cultured fast enough as it **grows slowly in culture and is extremely sensitive to oxygen**
- The treatment for the bacterium consists of:
  - **The cleansing of wounds** to remove the endospores
  - **The administration of immunoglobulins** to remove the toxin
  - **Muscle relaxants** may be used to lessen the symptoms
  - **Antimicrobial drugs** such as penicillin are used
  - Finally, the **active immunisation with the tetanus toxoid** is used
- To prevent an infection of *C. tetani*, clean wounds properly, and take a **tetanus booster vaccine every 10 years in order to stay protected**