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
    - Recovery requires the growth of new neuronal connections
    - The mortality rate is ~50%

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