Class 3. Gram-positive long rods: *Bacillus* and *Clostridium*.

1. Production of **endospores**:

2. Virulence factors of *Bacillus anthracis* and diseases caused by this microbes:

   **Three toxic protein components:**
   - Protective antigen (PA)
   - Lethal factor (LF)
   - Edema factor (EF)
   - Polypeptide capsule

   **Forms of anthrax:**
   - Cutaneous
   - Gastrointestinal
   - Pulmonary

3. Diseases caused by *Bacillus cereus*:

4. Two forms of food poisoning caused by *B. cereus*:

<table>
<thead>
<tr>
<th>GIT infections</th>
<th>Implicated food</th>
<th>Incubation period</th>
<th>Symptoms</th>
<th>Duration</th>
<th>Enterotoxin</th>
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</thead>
<tbody>
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5. Diseases caused by *Clostridium*:

   cellulitis, foodborne botulism, gas gangrene, antibiotic-associated diarrhea, localized tetanus, intoxication, necrotizing enteritis, wound botulism, sepsis, pseudomembranous colitis, generalized tetanus, infants botulism

<table>
<thead>
<tr>
<th>Species of bacteria</th>
<th>Toxins</th>
<th>Diseases</th>
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<tbody>
<tr>
<td><em>C. botulinum</em></td>
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<tr>
<td><em>C. tetani</em></td>
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<td><em>C. difficile</em></td>
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<td><em>C. perfringens</em></td>
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6. Functions of toxins produced by *C. perfringens*:

   - α-toxin
   - β-toxin

7. Functions of toxins produced by *C. difficile*:

   - Toxin A
   - Toxin B

8. Mechanism of action of botulinum toxin and tetanospasmin:

   Use: activates/blocks, increases/decreases, and spastic/flaccid.

This is only scientific help, it is necessary to broaden the knowledge from the book.