

When we get ill, pathogens (i.e., bacteria that cause a disease) mix up our body quite a bit. But why? What are the characteristics that cause certain bacteria to be pathogenic? This is what you are going to find out here.



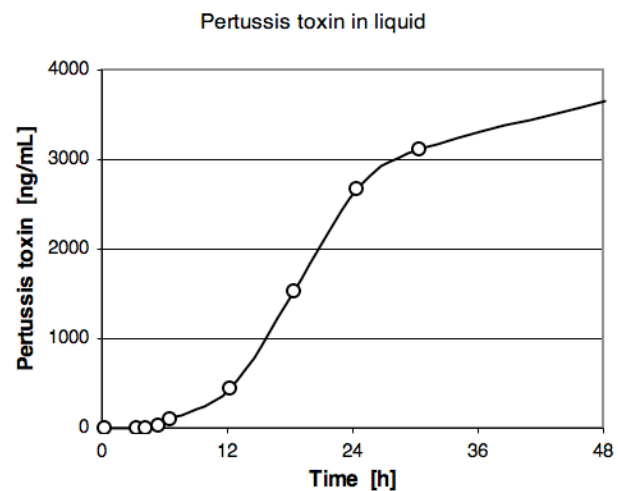
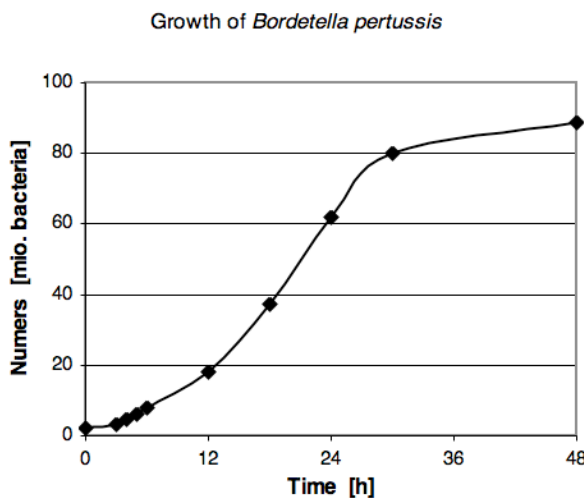
Microscopic view of bacteria (red) that cause diarrhea (salmonellae).

(Source: NH2005)

M1 - Generation time of different pathogenic bacteria

<i>Escherichia coli</i>	20 min.
<i>Pseudomonas aeruginosa</i>	30 min.
<i>Vibrio cholerae</i>	25 min.
<i>Staphylococcus aureus</i>	29 min.
<i>Mycobacterium tuberculosis</i>	6 to 18 h

M2 - Characteristics of the bacterium causing pertussis³ (*Bordetella pertussis*)



(Source: Data from Rambow-Larsen & Weiss, J. Bac. 186(1):2004: 43-50)

M3 - Toxins

„The strongest poisons in nature are produced by bacteria. These poisons are called toxins. Botulinus bacteria for example can easily grow in food that goes bad. These bacteria produce a toxin (botulinus toxin), which is currently the most poisonous substance known. As little as 1,5 nanograms (1,5 parts of a billion) of this toxin are lethal⁴, an amount absolutely invisible." A risk of getting poisoned exists especially if meat or animal products get bad.

(Source: <http://www.seilnacht.com/Lexikon/Gifte.htm>)

Tasks:

1. Calculate the number of bacteria after one, two, ... generations for one of the pathogens mentioned in **M1**. Start with one single bacterium at t = 0 and calculate the number until t = 10h in a table.
2. Prepare a chart from these data with x axis: Time and y axis: number of bacteria.
3. Describe both charts in **M2**.
4. Explain how both charts in **M2** are linked to each other. Information from **M3** will help you.
5. Conclude from your results (2. and 4.) which characteristics of bacteria cause them to be pathogenic after infection. Summarise your conclusion in two sentences.

¹ diarrhea - Durchfallerkrankung
² intestine - Darm
³ pertussis - Keuchhusten
⁴ to be lethal - tödlich sein