School Science: Microscopic Organisms and Bacteria Related To Food Poison

Food Poisoning Chart	
Statistical Source →	Health Protection Agency

Bacteria	# of Cases
Salmonella	16,987
Campylobacter	62,867
E.coli O157	1,147
Clostridium Perfringens	166
Listeria	133
Total	**81,280**

←**Table 1:** Laboratory reports of the five main foodborne bacteria that caused illness in the UK during the course of a single year.

5.2 Bacteria

Most foodborne illness is caused by bacteria. These single-celled microbes reproduce by splitting in two - often very rapidly. In the right conditions of warmth, acidity and moisture they can produce millions of cells in a few hours.

Some bacteria form spores which are resistant to drying and heating. They can survive cooking and will start to grow again in good conditions.

How do they cause food poisoning?

Food poisoning bacteria cause illness in different ways. For example:

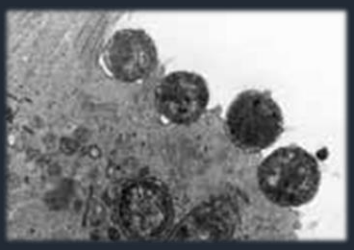
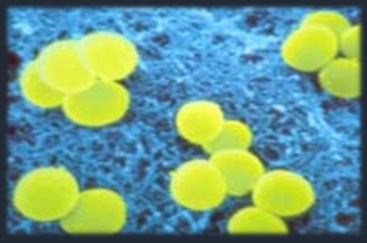
- They grow in food and produce a toxin. When swallowed this irritates the stomach lining, causing pain, nausea and sickness. The toxins may also enter the intestines and cause diarrhea. Toxins can survive cooking, even though the bacteria that produced them are killed.

- They are eaten with food and burrow into the intestine wall where they multiply and may produce toxins. Painful inflammation and diarrhea follow. More severe symptoms such as kidney and liver damage may occur if the bacteria and toxins enter the blood stream.

- They enter the body in food and do not cause symptoms in the gut but in other parts of the body.

Which bacteria cause food poisoning?

The tables below show some of the types of bacteria that cause food poisoning.

Lab Visuals of 3 Different Bacteria		
E.coli	Salmonella	Staphylococcus aureus
		
Picture 5.2a ▲ E.coli bacteria – a common cause of food poisoning.	**Picture 5.2b ▲** Salmonella with its flagella for moving around.	**Picture 5.2c ▲** Staphylococcus Aureus bacteria.

Bacteria 1				
Name of Bacterium	**Original Source**	**Risky Foods**	**Time to Develop**	**Symptoms**
Bacillus Cereus	Soil	Cooked rice and pasta; meat products; vegetables.	1–5 hours	Nausea, vomiting and diarrhea.
Notes →	A soil organism and spore-former. It produces toxins in food that is chilled too slowly. One toxin causes nausea and vomiting within 1-5 hours, the other causes diarrhea within 8-16 hours.			

Bacteria 2				
Name of Bacterium	**Original Source**	**Risky Foods**	**Time to Develop**	**Symptoms**
Campylobacter Jejuni	Raw meat and poultry.	Undercooked meat and poultry; raw milk and cross-contaminated food.	3–5 days of eating infected food.	Fever, severe pain and diarrhea.
Notes →	A very common cause of food poisoning. It colonizes the intestine wall producing enterotoxins.			

Bacteria 3				
Name of Bacterium	**Original Source**	**Risky Foods**	**Time to Develop**	**Symptoms**
Clostridium Botulinum	Soil	Faulty processed canned meat and vegetables; cured meat and raw fish.	1–7 days	Affects vision, causes paralysis and can be fatal.
Notes →	This is an anaerobic, spore forming soil organism. It produces a powerful neurotoxin in food which is absorbed into the bloodstream through the gut wall. Cases are very rare.			

Bacteria 4				
Name of Bacterium	**Original Source**	**Risky Foods**	**Time to Develop**	**Symptoms**
Clostridium Perfringens	The environment.	Large joints of meat; reheated gravies.	8-24 hours	Nausea, pain and diarrhea.
Notes →	An anaerobic spore-former found widely in the environment. A common cause of food poisoning – though illness is not usually serious. Spores survive cooking and multiply if the food is inadequately chilled. They produce a toxin in the gut. Millions of cells must be eaten to cause infection.			

Bacteria 5				
Name of Bacterium	**Original Source**	**Risky Foods**	**Time to Develop**	**Symptoms**
Escherichia Coli	The gut of all humans and animals.	Contaminated water, milk, inadequately cooked meat, cross-contaminated foods.	3-4 days	Inflammation, sickness and diarrhea.
Notes →	Some types cause short attacks of gastro-enteritis, invading the gut wall and causing inflammation, sickness and diarrhea. *E. coli* O157:H7 is a very nasty strain. Ingesting a few cells of this bacterium causes fever, bloody diarrhea and kidney damage. If affects the very old and young worst, and can be fatal.			

Bacteria 6				
Name of Bacterium	**Original Source**	**Risky Foods**	**Time to Develop**	**Symptoms**
Listeria Monocytogenes	Everywhere	Soft cheeses, pâté, pre-packed salad; cook-chill products.	Varies	Fever, headache, septicemia and meningitis.
Notes →	It is carried by most animals and humans without harm if they are healthy. These bacteria are cold-tolerant, although growth is slow below 5°C. When eaten it colonizes the gut and then spreads to other parts of the body. It mostly affects the young, old and immuno-compromised, pregnant women and their babies.			

Bacteria 7				
Name of Bacterium	**Original Source**	**Risky Foods**	**Time to Develop**	**Symptoms**
Salmonella	Gut of animals, birds and humans - spread by feces into water and food.	Poultry, eggs and raw egg products, vegetables.	6-48 hours	Diarrhea, sickness and headaches.
Notes →	There are many types, most of which are human pathogens. It produces toxins in the gut wall, leading to illness. Bacteria can be excreted long after the symptoms have gone. Typhoid fever is a severe *Salmonella* infection.			

Bacteria 8				
Name of Bacterium	**Original Source**	**Risky Foods**	**Time to Develop**	**Symptoms**
Staphylococcus Aureus	The skin and noses of animals and humans.	Cured meat; milk products; unrefrigerated, handled foods.	2-6 hours	Vomiting, pain and sometimes diarrhea.
Notes→	A salt tolerant. Produces a toxin as it grows in food. The illness is common but short-lived.			