Food Manufacture

Food safety in manufacture

Lesson 2

This is a level 2 standard course which explores all aspects of food safety, within food manufacturing businesses.

foodsphere.co.uk

There are 3 types of bacteria:

- Helpful bacteria
- Spoilage bacteria
- Pathogenic bacteria

Helpful bacteria

Helpful bacteria is used in food production, drug manufacture and food digestion.

For example, the friendly bacteria in Yakult.

Helpful bacteria is good for the gut. It can help the digestion system.

Spoilage bacteria

Spoilage bacteria makes food rot.

It is easy to detect as you can see it, smell it and taste it, unlike pathogenic bacteria.

Pathogenic bacteria

You cannot see, smell or taste pathogenic bacteria.

You are most likely to get food poisoning by eating pathogenic bacteria.

Different sources of Pathogenic Bacteria

- Bacteria can be airborne in dust, you may not realise it is all around you
- Untreated water and sewage. Tap and bottled water is filtered to clean it.

Different sources of Pathogenic bacteria

- Pests and domestic pets carry bacteria on them.
- Humans carry bacteria on there hands, hair, in their nose and in infected cuts.

That's why you should always wash your hands and don't sneeze or cough near food.

Different sources of Pathogenic bacteria

Food waste can contain bacteria. This is why a clean as you go procedure is important. Always take full waste bags out and don't let them build up, or overflow. They should be tied securely before being removed.

Different sources of Pathogenic bacteria

Raw foods such as raw meats and fish. That's food which is not cooked as cooking kills bacteria.

Different sources of Pathogenic bacteria

Soil, dirt and dust, from vegetables and salads being unwashed or not washed properly.

Examples of the most common pathogen micro-organisms are:

- Campylobacter jejuni
- Staphylococcus aureus
- Bacillus cereus
- Salmonella
- E. coli O157 H7
- Clostridium perfringens
- Norovirus

Campylobacter jejuni – sources

- Raw or undercooked meat such as poultry, beef, pork and lamb
- Untreated milk and other raw dairy products
- Raw vegetables
- Shellfish
- Untreated drinking water

Campylobacter jejuni – symptoms

- Diarrhoea (frequently bloody)
- Abdominal pain
- Fever
- Headache
- Nausea, and/or vomiting

The symptoms typically last 3 to 6 days.

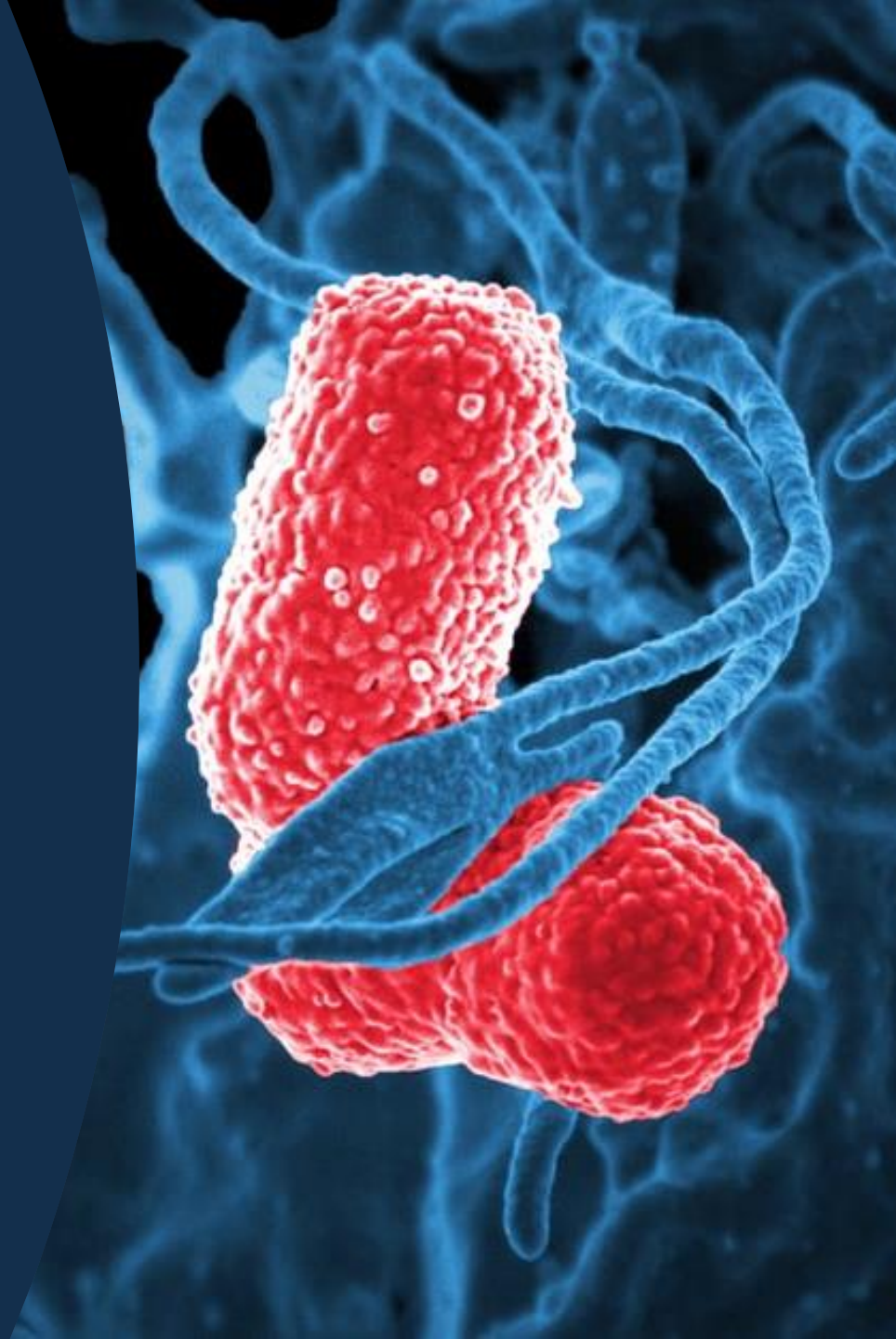
Staphylococcus aureus – sources

- Meats
- Poultry and egg products
- Salads such as egg, tuna, chicken, potato, and macaroni
- Bakery products such as cream-filled pastries, cream pies, and chocolate eclairs
- Sandwich fillings
- Milk and dairy products
- Passed on from another person

Staphylococcus aureus – symptoms

- Vomiting
- Nausea
- Stomach cramps

The symptoms typically last for 1 day.



Bacillus cereus – sources

- Soil
- Raw plant foods such as rice, potatoes, peas, beans
- Spices are common sources
- Processed foods, from contamination of raw materials

Bacillus cereus – symptoms

- Diarrhoea
- Abdominal cramps
- Nausea and vomiting

The symptoms typically last for about 24 hours.

Salmonella – sources

- Beef, chicken
- Eggs
- Fruits and vegetables
- Pork
- Soft cheese and ice cream
- Processed foods, such as nut butters, frozen pies and chicken nuggets.

Salmonella – symptoms

- Diarrhoea
- Fever
- Stomach cramps

The symptoms typically last for about 4 to 7 days.

Escherichia coli (E. coli) – sources

- Undercooked ground beef
- Unpasteurized (raw) milk and juice
- Soft cheeses made from raw milk
- Raw fruits and vegetables, such as lettuce, other leafy greens, and sprouts
- Contaminated water, including drinking untreated water
- Swimming in contaminated water

Escherichia coli (E. coli) – symptoms

- Stomach pains and cramps
- Diarrhoea that may range from watery to bloody
- Fatigue
- Loss of appetite or nausea
- Vomiting
- Low fever

The symptoms typically last for about 5 to 7 days.

Clostridium perfringens – sources

- Meat
- Poultry
- Gravies
- Foods cooked in large batches and held at an unsafe temperature.
- Outbreaks tend to happen in places that serve large groups of people, such as hospitals, school cafeterias, prisons, and nursing homes, and at events with catered food.

Clostridium perfringens – symptoms

- Intense abdominal cramps
- Watery diarrhea
- Some strains cause mild to moderate gastroenteritis

The symptoms typically last for about 24 hours.

Norovirus – sources

Infected food workers are frequently the source of outbreaks, often by touching ready-to-eat foods, such as raw fruits and vegetables, with their bare hands before serving them.

Norovirus - sources

- Fresh produce
- Shellfish
- Ice
- Fruit and ready-to-eat foods, especially salads, sandwiches and cookies that have been prepared by someone who is infected.

Norovirus – symptoms

- Nausea
- Vomiting
- Stomach pain or cramps
- Watery or loose diarrhea
- Feeling ill
- Low-grade fever
- Muscle pain

The symptoms typically last for about 1 to 3 days.

Pathogenic Bacteria's – spore forming bacteria

Bacillus cereus and clostridium perfringens are spore forming bacteria that produce a protective coating to survive high temperatures, making it harder to kill the bacteria.

Quick onset Pathogenic micro-organisms

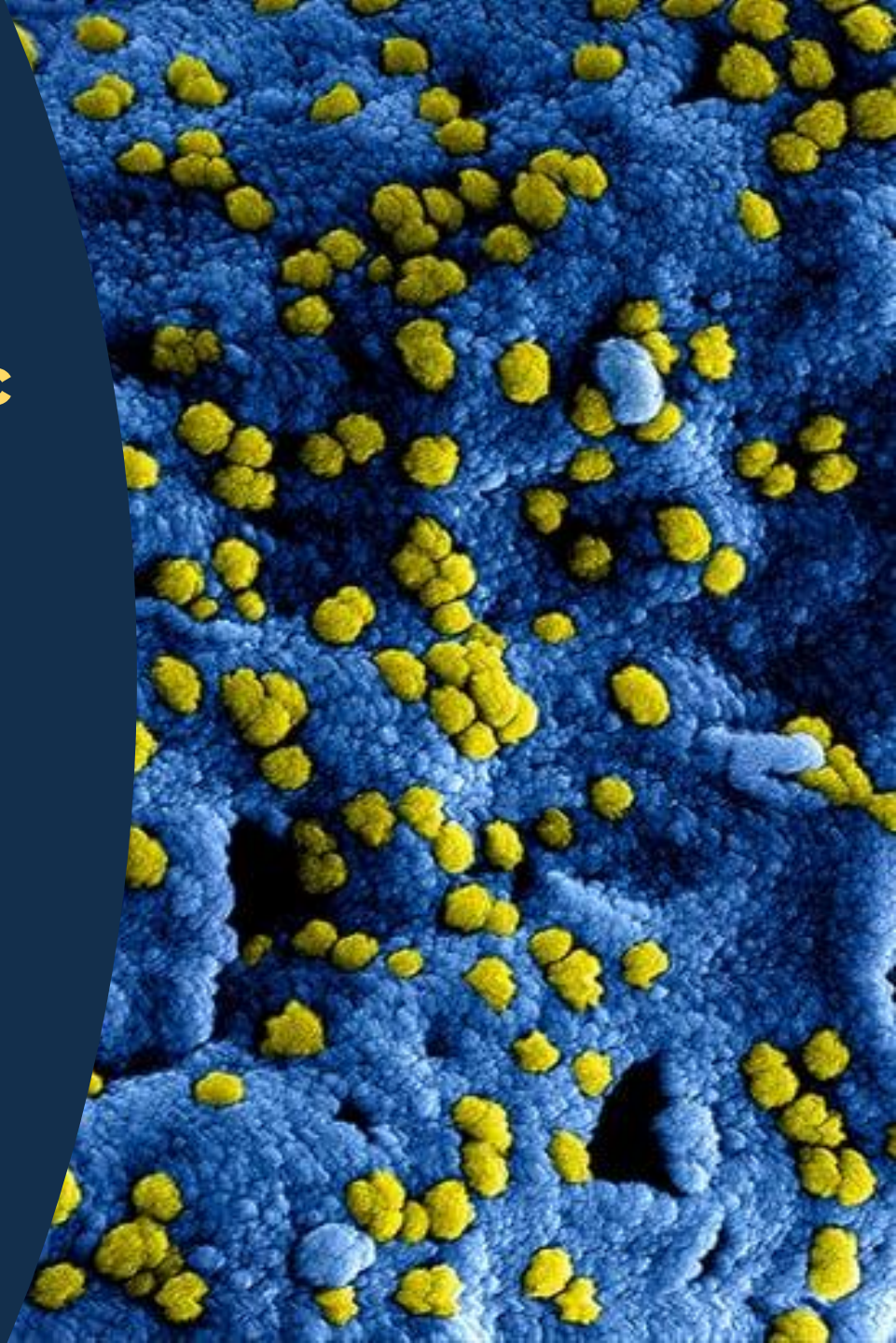
Staphylococcus aureus,
Bacillus cereus.

Quick onset means if you eat any of these, you will start vomiting within 1 to 6 hours later.

Quick onset Pathogenic micro-organisms

The body will reject the bacteria quickly, so you don't normally have diarrhoea.

The bacteria will not grow within the gut, so you are normally only ill for a short amount of time.



Slower onset Pathogenic micro-organisms

Campylobacter jejuni, Salmonella, E. coli, Clostridium perfringens.

Slower onset means it will take longer for you to become ill after you have eaten contaminated food. You will start to vomit, have diarrhoea and have abdominal pains within 8 to 36 hours.

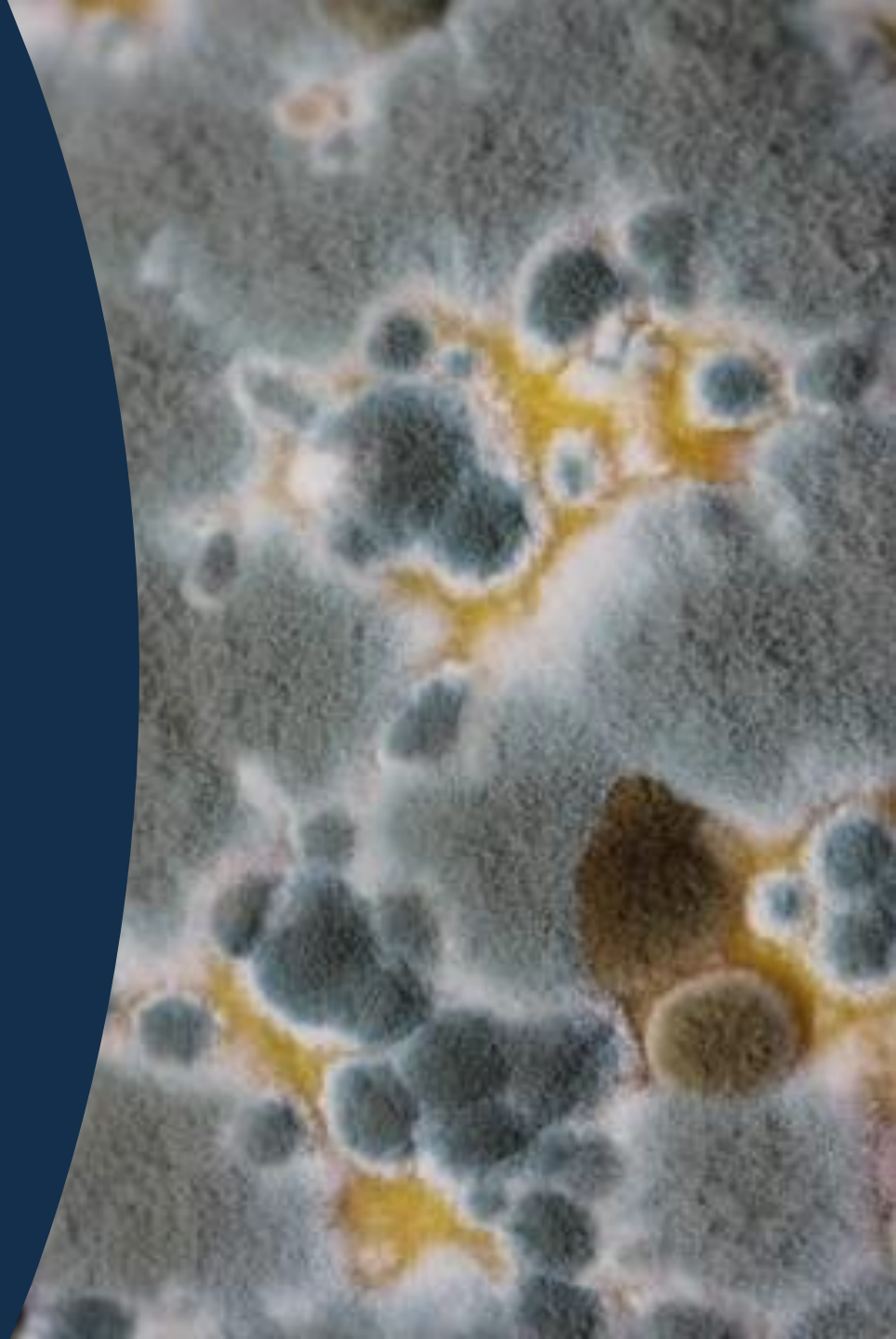
Slower onset Pathogenic micro-organisms

The bacteria will reach your gut, it will start to produce toxins, therefore you will have diarrhoea as well as vomiting.

It will take a lot longer to recover from and you are more likely to be hospitalised. It can lead to other long-term complications like issues with your kidneys.

Binary fission (bacteria division)

Binary fission is when the bacteria multiplies in food, when not stored or cooked correctly.



Binary fission (bacteria division)

In the right conditions the bacteria can multiply every 10 to 20 minutes, so after several hours there can be millions of bacteria's living in the food.

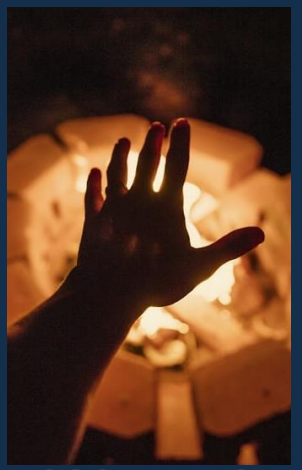
Cooking would not kill enough bacteria to make the food safe to eat.

Bacteria needs the right conditions to multiply

To multiply bacteria needs -

Food

Moisture



Warmth

Time

Bacteria needs food to grow. Bacteria also grows on humans. It sees us as food.

Bacteria needs moisture to multiply.

That's why uncooked pasta which is dry lasts for a long time. The water has been taken out, so the bacteria will not multiply.

Bacteria multiplies between 5°C and 63°C.

Temperatures higher than 63°C kills most bacteria.

Temperatures lower than 5°C makes bacteria stop multiplying but it doesn't kill it. It means the bacteria is dormant.

The longer the bacteria is kept between 5°C to 63°C, it will multiply every 10 to 20 minutes.

Revision Activity 2

What conditions does bacteria need to grow?