Bacterial diseases

4.3.1.3 · Biology · revision notes

The two bacterial diseases of humans in the specification: *Salmonella* food poisoning and gonorrhoea. You need their symptoms, how they are spread and how their spread is controlled, including why gonorrhoea is now harder to treat.

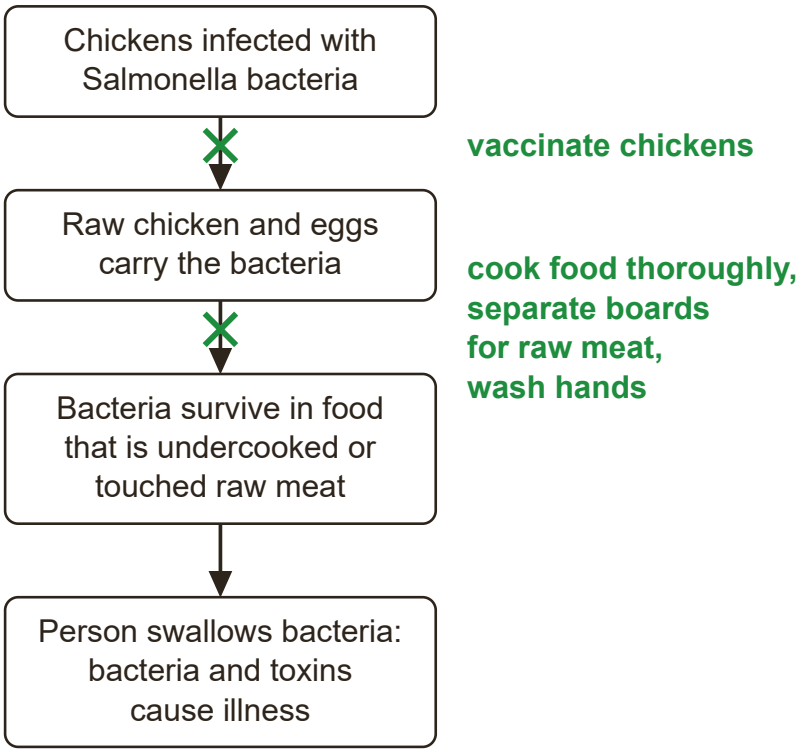
Key facts

- *Salmonella*: bacteria swallowed in contaminated food
- UK poultry are vaccinated against *Salmonella*
- Gonorrhoea symptoms: thick yellow or green discharge, pain on urinating
- Many strains of the gonorrhoea bacterium are now resistant to penicillin
- *Salmonella* symptoms: fever, abdominal cramps, vomiting, diarrhoea (from the bacteria and their toxins)
- Gonorrhoea: STD caused by a bacterium, spread by sexual contact
- Gonorrhoea control: antibiotics and condoms

Notes

Salmonella food poisoning

- Caused by *Salmonella* bacteria that are swallowed in food, or on food prepared in unhygienic conditions.
- Symptoms: **fever**, **abdominal cramps**, **vomiting** and **diarrhoea**. These are caused by the bacteria and the **toxins** they secrete.
- In the UK, **poultry** (e.g. chickens) are **vaccinated** against *Salmonella* to control the spread.
- Hygienic food preparation also reduces spread: cook food thoroughly to kill the bacteria, wash hands, clean surfaces, and keep raw meat away from food that will not be cooked.



Each control measure breaks a link in the chain.

Gonorrhoea

- A **sexually transmitted disease (STD)** caused by a bacterium. It is spread by **sexual contact**.
- Symptoms: a thick **yellow or green discharge** from the vagina or penis, and **pain on urinating**.
- It used to be easily treated with the antibiotic **penicillin**, until many **resistant strains** appeared. Penicillin does not kill these strains.
- The spread is controlled by treating infected people with **antibiotics** and by using a barrier method of contraception such as a **condom**, which stops the bacteria passing between partners.

Bacteria and treatment

- Bacteria reproduce rapidly inside the body and may release toxins that damage tissues.
- Bacterial diseases can be treated with antibiotics, but the antibiotic must be one that kills that particular bacterium, and it will not work on a resistant strain.

How to answer each type of question

Give symptoms and their cause

1 to 3 marks | **Grade 4**

1. Learn the four *Salmonella* symptoms and the two gonorrhoea symptoms.
2. If asked what causes the symptoms, mention the toxins.

Example. (a) Give **two** symptoms of *Salmonella* food poisoning.
(b) What causes these symptoms?

Model answer.

(a) Any two from: fever, abdominal cramps, vomiting, diarrhoea (1) (1)
(b) The bacteria and the toxins they secrete (1)

Suggest how to reduce food poisoning

2 to 4 marks | **Grade 5**

1. Give a specific hygiene method (cook thoroughly, wash hands, separate raw meat, clean surfaces).
2. For each method, explain how it kills the bacteria or stops them reaching food that will be eaten.

Example. A restaurant was linked to an outbreak of *Salmonella* food poisoning.
Suggest **two** ways the restaurant could reduce the risk of this happening again. Give a reason for each.

Model answer. Cook chicken and eggs thoroughly (1), so the high temperature kills the bacteria (1). Keep raw meat away from cooked or ready-to-eat food, e.g. use separate chopping boards (1), so bacteria are not transferred to food that will not be cooked (1).

Explain why gonorrhoea is harder to treat, and how spread is controlled

2 to 3 marks | **Grade 5**

1. Use the word 'resistant': many strains are resistant to penicillin.
2. Say what that means: penicillin does not kill them, so the infection is not cured.
3. For condoms, say they are a barrier that stops the bacteria passing between partners.

Example. (a) Gonorrhoea used to be treated with penicillin. Doctors now use other antibiotics. Explain why.
(b) Explain how using condoms reduces the spread of gonorrhoea.

Model answer.

(a) Many strains of the bacterium are now resistant to penicillin (1), so penicillin does not kill them and the infection is not cured (1).
(b) A condom is a barrier that stops the bacteria passing from one partner to the other during sex (1).

Explain how vaccinating animals protects people 3 marks **Grade 6**

1. Vaccinated animals are immune, so they are not infected.
2. So their meat or eggs are less likely to contain the bacteria.
3. So fewer people swallow the bacteria in food.

Example. In the UK, most chickens are vaccinated against *Salmonella*.
Explain how this reduces the number of cases of *Salmonella* food poisoning in people.

Model answer. The vaccinated chickens are immune, so they are not infected with *Salmonella* (1). So chicken meat and eggs are less likely to contain the bacteria (1). So fewer people swallow the bacteria in their food (1).

Don't lose marks

- Calling *Salmonella* or gonorrhoea a virus. Both are caused by bacteria.
- Writing just 'be more hygienic'. Name the method (cook thoroughly, wash hands, keep raw meat separate) and say how it helps.
- Saying gonorrhoea is spread by blood or through the air. It is spread by sexual contact.
- Saying the bacteria 'become immune' to penicillin. Bacteria become resistant; immunity is something your body develops.
- Saying any contraceptive stops gonorrhoea. Only a barrier method, such as a condom, stops the bacteria being passed on.

More tips

Memory tricks

- *Salmonella* = stomach trouble: cramps, vomiting and diarrhoea, plus fever.
- Gonorrhoea = 'discharge and pain': thick yellow or green discharge and pain on urinating.
- Both are bacteria, so both can be treated with antibiotics, unless the strain is resistant.

Exam technique

- When asked why the symptoms happen, mention toxins: the bacteria secrete toxins that damage tissues.
- Use 'resistant', not 'immune', for bacteria that are not killed by an antibiotic.
- For every control measure, give the reason: say how it stops the bacteria reaching the next person.

What each grade needs

What you need to be able to do, from the first marks up to the top grade.

Grade 3 **Name two bacterial diseases**
Salmonella food poisoning and gonorrhoea, a sexually transmitted disease.

Grade 4 **Give the symptoms of *Salmonella* food poisoning**
Fever, abdominal cramps, vomiting and diarrhoea, caused by the bacteria and the toxins they secrete.

Grade 4

Give the symptoms of gonorrhoea

A thick yellow or green discharge from the vagina or penis, and pain on urinating.

Grade 5

Describe how each disease is spread

Salmonella: bacteria swallowed in food or on food prepared in unhygienic conditions; gonorrhoea: sexual contact.

Grade 5

Describe how the spread of each is controlled

Vaccinating poultry and hygienic food preparation for *Salmonella*; antibiotics and condoms for gonorrhoea.

Grade 5

Explain why gonorrhoea is harder to treat now

Many strains are resistant to penicillin, so penicillin no longer kills them and other antibiotics must be used.

Grade 6

Explain how vaccinating poultry protects people

Vaccinated chickens are not infected, so their meat and eggs are less likely to carry the bacteria.

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