

Cancer

4.2.2.7 · Biology · revision notes

Cancer is the result of changes in cells that lead to uncontrolled growth and division. You need to know the difference between benign and malignant tumours, how malignant tumours spread, and the lifestyle and genetic risk factors for cancer.

Key facts

- Cancer = changes in cells → uncontrolled growth and division
- Benign: contained in one area, usually within a membrane; does not invade other parts of the body
- Secondary tumour = a new tumour formed where spreading cancer cells settle
- Genetic risk factors: inherited alleles, e.g. faulty BRCA alleles and breast cancer
- Tumour = a mass of abnormal cells
- Malignant: cancer; invades neighbouring tissues; spreads in the blood
- Lifestyle risk factors: e.g. smoking, obesity, UV exposure, some viral infections

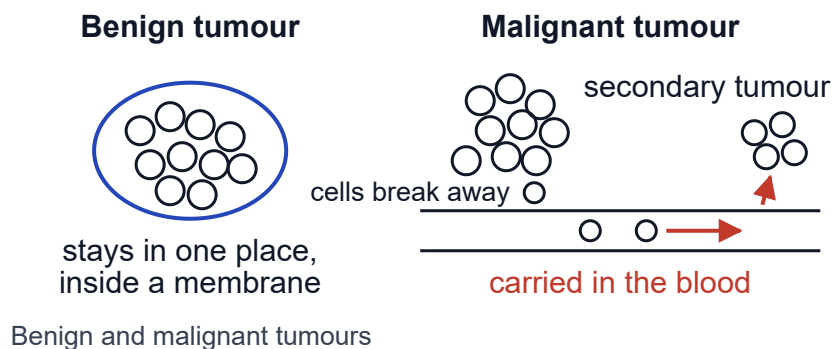
Notes

What cancer is

- Normally, cells divide by mitosis only when the body needs new cells, e.g. for growth or repair.
- **Cancer** is the result of changes in cells that lead to **uncontrolled growth and division**.
- A mass of abnormal cells is called a **tumour**.

Benign and malignant tumours

- **Benign** tumours are growths of abnormal cells that are contained in one area, usually within a membrane. They do not invade other parts of the body. They are not cancer, but they can still cause harm by pressing on nearby organs.
- **Malignant** tumour cells are cancers. They invade neighbouring tissues and spread to different parts of the body in the blood, where they form **secondary tumours**.



- Because they spread, malignant tumours are harder to treat and more likely to be fatal.

Risk factors for cancer

- Scientists have identified **lifestyle** risk factors for various types of cancer, e.g. smoking (lung, mouth and throat cancers), obesity (e.g. bowel, liver and kidney cancers), too much UV light from the Sun or sunbeds (skin cancer), and infection with some viruses (e.g. HPV and cervical cancer).
- Carcinogens, including ionising radiation, are also risk factors.
- There are **genetic** risk factors for some cancers: some people inherit alleles that make certain cancers more likely, e.g. faulty BRCA alleles greatly increase the risk of breast cancer.
- A risk factor increases the chance of developing cancer. It does not mean the person will definitely get it.

How to answer each type of question

Compare benign and malignant tumours

2 to 4 marks

Grade 5

1. Make each point a comparison: 'benign ... whereas malignant ...'.
2. Cover: contained in one area (in a membrane) or invades neighbouring tissue; stays put or spreads in the blood; secondary tumours or not.

Example. Describe **two** differences between a benign tumour and a malignant tumour.

Model answer. A benign tumour is contained in one area, usually within a membrane, whereas a malignant tumour invades neighbouring tissues (1). Malignant tumour cells spread in the blood to other parts of the body and form secondary tumours, whereas benign tumour cells do not spread (1).

Don't lose marks

- ✗ Saying benign tumours are cancer. Only malignant tumour cells are cancers.
- ✗ Saying cancer cells simply divide 'too fast'. The key phrase is uncontrolled growth and division.
- ✗ Saying cancer spreads from person to person. Cancer is non-communicable; malignant cells spread within the body, in the blood.
- ✗ Saying a risk factor 'will' cause cancer. It increases the chance.
- ✗ Forgetting 'in the blood' when describing how malignant tumours spread.

More tips

Memory tricks

- Benign = Bound (stays in one place, in a membrane). Malignant = Moves (invades and spreads).
- Secondary tumour chain: break off → travel in the blood → settle in another organ → divide → new tumour.
- Lifestyle risk factors can be changed (smoking, diet, sunbathing); genetic risk factors cannot.

Exam technique

- Use the specification wording: uncontrolled growth and division; invade neighbouring tissues; secondary tumours.
- In comparison questions, use 'whereas' so that each point mentions both types of tumour.
- If the question mentions family members with the same cancer, think genetic risk factor; if it describes habits, name the lifestyle factor.

What each grade needs

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

Grade 3

Define cancer

Cancer is the result of changes in cells that lead to uncontrolled growth and division.

Grade 4

Describe a benign tumour

A growth of abnormal cells contained in one area, usually within a membrane, that does not invade other parts of the body.

Grade 5

Describe malignant tumours and secondary tumours

Malignant tumour cells are cancers: they invade neighbouring tissues and spread in the blood to form secondary tumours.

Grade 5

Give lifestyle risk factors for cancer

For example smoking (lung cancer), obesity (e.g. bowel cancer), too much UV light (skin cancer) and some viral infections (e.g. cervical cancer).

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