OCR B Biology A-level

3.3.1 - The cellular basis of cancer and treatment

Flashcards

Give some examples of non-communicable diseases.

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- Cancer
- Cardiovascular disease
- Chronic respiratory disease
- Diabetes

Give some risk factors of non-communicable diseases.

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Heredity, ageing, radiation, carcinogens, viruses, air pollution, lifestyle e.g. smoking.

How do tumours develop?

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Uncontrolled mitosis. Cell division is normally well controlled, however mutations can cause a problem with this mechanism.

Describe the role of proto-oncogenes.

Describe the role of proto-oncogenes.

- Control cell division
- Code for proteins that stimulate cell division

Give some examples of proto-oncogenes.

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- Ras = regulates cell signals
- Myc = maintains constant expression of a certain gene

Explain how proto-oncogenes can be involved in developing cancer.

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Mutation in the gene could turn it into a permanently activated oncogene. Decreased methylation or increased acetylation can cause excess transcription.

This results in uncontrolled cell division and formation of a tumour.

Describe the role of tumour-suppressor genes.

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Code for proteins that control cell division; in particular, stopping the cell cycle when damage is detected.

Give an example of a tumour-suppressor gene.

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p53 gene

Explain how tumour-suppressor genes can be involved in developing cancer.

Explain how tumour-suppressor genes can be involved in developing cancer.

A mutation in the gene could code for a nonfunctional protein. Increased methylation or decreased acetylation could prevent transcription.

Cells will divide uncontrollably, replicating damaged DNA and resulting in a tumour.

How has epidemiological evidence provided links between risk factors and cancers?

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- Smoking → lung cancer
- Diet → bowel cancer
- BRCA1 gene mutation → breast cancer

Evidence is **correlation** not causation; there may be a third variable involved.

Give methods of detecting cancer.

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- MRI scans
- X-rays
- Mammography
- CT scans
- Ultrasound
- PET scans
- Biopsies
- Blood tests

Give methods of treating cancer.

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- **Surgery** - to remove tumours
- **Chemotherapy** - use chemicals to kill cancer cells
- **Radiotherapy** - use radiation to kill cancer cells
- **Immunotherapy** - use of the body's own immune system and introduction of antibodies
- **Hormone therapy** - blocks hormones that may be accelerating tumour growth e.g. oestrogen

What considerations must be made when conducting genetic tests for cancer?

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- Ethical = positive result would be very upsetting, problems with false-positives or false-negatives
- Economic = high cost of screening