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8.2 CONTROL OF GENE EXPRESSION

Cells

- **Multipotent stem cells**
  - Can differentiate into some cell types
  - Bone marrow stem cells and umbilical cord stem cells
- **Unipotent stem cells**
  - Found in adult tissue
  - Can differentiate into one type of cell
  - Cardiomyocytes
- **Pluripotent stem cells**
  - Induced pluripotent stem cells
    - Made from adult somatic cells
    - Requires transcription factors
  - Found in embryos
  - Can differentiate into almost any type of cell
- **Totipotent stem cells**
  - In early embryo
  - Can differentiate into any type of cell
  - Totipotent cells only translate some of their DNA
    - Allows them to specialise into one type of cell e.g. specific proteins for that cell

Cancer

- **Tumour suppressor genes**
  - Slow down cell division
  - Can mutate and become inactivated
  - Methylation
- **Proto-oncogenes**
  - Can mutate to become oncogenes
  - Oncogenes cause uncontrolled cell division
- Benign and malignant tumours

Regulation of translation and transcription

- **Oestrogen**
  - Breast cancer
  - Oestrogen binds to a receptor of a transcription factor
  - Transcription factor can now bind to DNA
  - Increased transcription and translation of a particular gene e.g. proto-oncogene
- Transcription factors control transcription and expression of particular genes
- **Epigenetics**
  - Acetylation of histones
  - Methylation of DNA
    - Changes accessibility of DNA
  - Heritable changes in gene function, without changing the base sequence of DNA
- **RNA interference**

AQA

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