

17.1 Chromosomes, genes and proteins

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS proteins 蛋白质 • ribosome 核糖体 • amino acids 氨基酸 • base sequence 碱基序列
• codes 编码

Objective

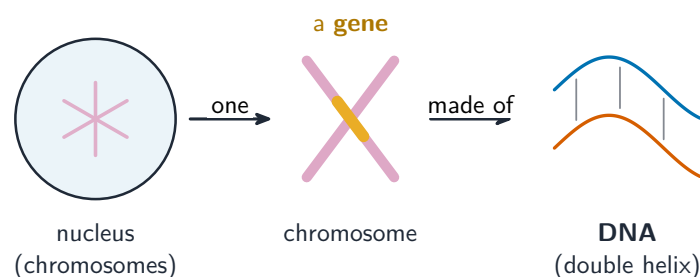
Build the skills to answer exam questions on **chromosomes, genes and proteins** 染色体、基因与蛋白质 — the terms, sex chromosomes, and how DNA controls a cell.

You must be able to:

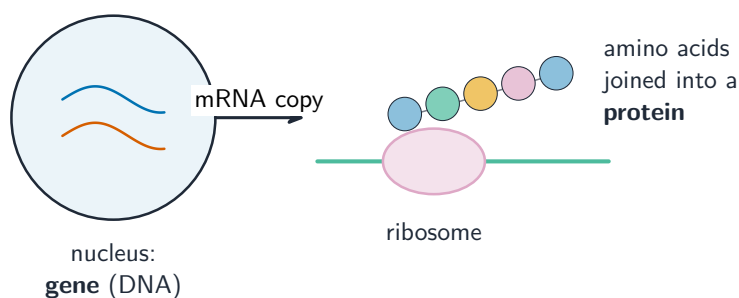
- define chromosome, gene and allele
- explain sex determination (XX/XY)
- describe how a gene's base sequence codes for a protein

1 Worked examples

■ Genes and protein synthesis



A gene is a length of DNA that codes for one protein; an allele is one form of a gene



The base sequence sets the order of amino acids → the protein's shape → its job

- **sex:** XX female, XY male; sperm (X or Y) decides the sex → 1:1 ratio.

2 Practice

2.1 Define a gene. [1]

2.2 State the sex chromosomes of a human female. [1]

3 Exam-style questions

3.1 An allele is: [1]

- **A** a whole chromosome
 - **B** an alternative form of a gene
 - **C** a protein
 - **D** a ribosome
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3.2 The sex of a baby is determined at fertilisation.

(a) Explain why the sperm, not the egg, determines the sex. [2]

(b) State the ratio of males to females this produces. [1]

3.3 Explain how the base sequence of a gene determines the protein made. [2]

Solutions

2.1 a length of DNA that codes for one protein.

2.2 XX.

3.1 B. An allele is an alternative form of a gene.

3.2 (a) the egg always carries an X; the sperm carries either an X or a Y; so whether it is XX or XY depends on the sperm.

(b) 1:1.

3.3 the base sequence sets the order of amino acids in the protein; this gives the protein its shape, which decides its job.