

INKBIOLOGY FLASHCARDS

Nucleic acids, genomes and protein synthesis

Unit B05 · 31 cards · fronts and backs

Print double-sided, flipping on the long edge, and each answer lands behind its question. Cut along the card borders.

Definitions in mark-scheme wording, and the misconceptions that lose marks. These cards and each lesson's whole-lesson check run on the website with spaced-repetition scheduling, at inkphysics.co.uk/biology/flashcards.

DEFINITION

Define: Nucleotide.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Define: Polynucleotide.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Define: Phosphodiester bond.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Define: Antiparallel.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Define: Complementary base pairing.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Define: Double helix.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Define: Messenger RNA (mRNA).

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Define: Transfer RNA (tRNA).

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

A chain of nucleotides joined by phosphodiester bonds between the sugar of one and the phosphate of the next.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

A phosphate group, a pentose sugar and a nitrogenous base joined together.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

The two strands of a DNA molecule run in opposite directions: the 5' end of one lies alongside the 3' end of the other.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

The covalent bond joining the phosphate group of one nucleotide to the sugar of the next, formed by condensation.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Two antiparallel polynucleotide strands wound into a spiral, bases inside and backbones outside.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Adenine pairs with thymine by two hydrogen bonds and guanine pairs with cytosine by three, so the sequence of one strand fixes the sequence of the other.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

A small folded RNA of about 80 nucleotides with an anticodon at one end and a binding site for a specific amino acid at the other.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

A single-stranded copy of one gene, made in the nucleus and carrying codons to a ribosome in the cytoplasm.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Define: Ribosomal RNA (rRNA).

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

SPOT THE ERROR

Say what is wrong with this claim:

The two strands of a DNA molecule are identical, so either one is a spare copy of the other.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

Define: Semi-conservative replication.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

DEFINITION

Define: Template strand.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

DEFINITION

Define: Mutation.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

DEFINITION

Define: Substitution.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

DEFINITION

Define: Deletion.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

SPOT THE ERROR

Say what is wrong with this claim:

Replication copies one strand, so you end up with the old molecule and a brand new one beside it.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

SPOT THE ERROR

Complementary, not identical. Where one strand reads ATGGC the other reads TACCG, and no base matches the one it faces. That is what makes the spare useful: the fixed pairing rule lets either strand specify the other exactly.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

RNA which, with proteins, forms the two subunits of a ribosome and catalyses the formation of peptide bonds.

DNA AND RNA: FOUR LETTERS AND A RULE ABOUT PAIRING

DEFINITION

A strand of DNA whose base sequence determines the sequence of the new strand built against it.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

DEFINITION

Replication in which the two strands of the parent molecule separate and each acts as a template, so every daughter molecule contains one original strand and one newly synthesised strand.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

DEFINITION

A mutation in which one base is replaced by another.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

DEFINITION

A change in the base sequence of DNA.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

SPOT THE ERROR

Replication is semi-conservative. Both strands act as templates at once, so each daughter molecule is one original strand paired with one newly built one. No parent molecule survives intact and none is built entirely from scratch.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

DEFINITION

A mutation in which a base is lost; within a coding region, losing a number of bases not divisible by three shifts the reading of every triplet that follows.

DNA REPLICATION: ONE OLD STRAND IN EVERY NEW MOLECULE

DEFINITION

Define: Codon.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Define: Degenerate.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Define: Non-overlapping.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Define: Gene.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Define: Exon.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Define: Intron.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Define: Genome.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Define: Pre-mRNA.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Describing a code in which most amino acids are specified by more than one triplet.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

A sequence of three bases in mRNA that specifies one amino acid or a stop signal.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

A sequence of DNA bases coding for a polypeptide or a functional RNA.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Describing a code in which each base is part of one triplet only and triplets are read in sequence.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

A non-coding section of a gene, transcribed into pre-mRNA and then removed before the mRNA leaves the nucleus.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

A section of a gene that is represented in the mature mRNA.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

The immediate product of transcription in a eukaryote, containing both exons and introns.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

The complete set of DNA in a cell, including the DNA that does not code for polypeptides.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Define: Splicing.

THE GENETIC CODE AND TRANSCRIPTION

SPOT THE ERROR

Say what is wrong with this claim:

The genetic code is degenerate, so it is a wasteful system evolution has not got round to tidying up.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

Define: Ribosome.

TRANSLATION: TURNING A MESSAGE INTO A WORKING PROTEIN

DEFINITION

Define: Codon.

TRANSLATION: TURNING A MESSAGE INTO A WORKING PROTEIN

DEFINITION

Define: Anticodon.

TRANSLATION: TURNING A MESSAGE INTO A WORKING PROTEIN

DEFINITION

Define: Post-translational modification.

TRANSLATION: TURNING A MESSAGE INTO A WORKING PROTEIN

SPOT THE ERROR

Say what is wrong with this claim:

tRNA carries the codon to the ribosome, where it is matched against the mRNA.

TRANSLATION: TURNING A MESSAGE INTO A WORKING PROTEIN

SPOT THE ERROR

Degeneracy is a safety margin rather than waste. Most amino acids have several triplets, usually differing only in the third base, so a copying error in that position often produces the same amino acid and the same protein.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

The removal of introns from pre-mRNA and the joining of exons to produce mature mRNA.

THE GENETIC CODE AND TRANSCRIPTION

DEFINITION

A triplet of bases on mRNA specifying one amino acid or a stop signal.

TRANSLATION: TURNING A MESSAGE INTO A WORKING PROTEIN

DEFINITION

An organelle of ribosomal RNA and protein, in two subunits, which holds mRNA and tRNA in position while a polypeptide is assembled.

TRANSLATION: TURNING A MESSAGE INTO A WORKING PROTEIN

DEFINITION

Changes made to a polypeptide after translation, such as cutting out sections or adding carbohydrate or lipid groups, carried out in the endoplasmic reticulum and the Golgi apparatus. Folding is not one of them: it begins on the ribosome and is finished in the endoplasmic reticulum.

TRANSLATION: TURNING A MESSAGE INTO A WORKING PROTEIN

DEFINITION

A triplet of bases on tRNA, complementary to a codon on mRNA.

TRANSLATION: TURNING A MESSAGE INTO A WORKING PROTEIN

SPOT THE ERROR

The codon is on the mRNA; the tRNA carries the anticodon, the complementary triplet. Codon CCU is read by the tRNA whose anticodon is GGA, and that tRNA carries proline. Swap the two words and the mechanism described could not work.

TRANSLATION: TURNING A MESSAGE INTO A WORKING PROTEIN