6. Gene Expression and Regulation

Starter Quiz · 课前小测

AP Biology Name: _____ Score: _____

1. The two long sides of the DNA ladder are made of a repeating…
   - ☐ sugar-phosphate backbone
   - ☐ chain of amino acids
   - ☐ row of fatty acids
   - ☐ string of metals
2. Why must a cell copy its DNA before dividing?
   - ☐ so each daughter cell gets a full set of DNA
   - ☐ to make ATP
   - ☐ to break down glucose
   - ☐ to send a hormone
3. **Transcription** copies a gene from DNA into…
   - ☐ messenger RNA (mRNA)
   - ☐ a protein
   - ☐ ATP
   - ☐ a lipid
4. **Translation** builds a protein by reading…
   - ☐ the mRNA into a chain of amino acids
   - ☐ DNA into more DNA
   - ☐ glucose into ATP
   - ☐ a protein into DNA
5. **Gene expression** means…
   - ☐ a gene being switched on to make its product
   - ☐ a gene being deleted
   - ☐ copying all the DNA
   - ☐ a cell dividing
6. A cell keeps every one of its genes switched on all the time.

   ☐ True ☐ False

7. The repeating unit of a nucleic acid — a sugar, phosphate, and base — is a _____.

   _____

8. Because each new DNA keeps one old strand, replication is called _____-conservative.

   _____

9. The enzyme that builds the mRNA copy is RNA _____.

   _____

10. The molecule that carries an amino acid to the ribosome is called _____ RNA.

    _____

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Answers · 答案

AP Biology

1. **sugar-phosphate backbone**

   Each strand's backbone is an alternating **sugar-phosphate** chain; the bases stick out from it.

2. **so each daughter cell gets a full set of DNA**

   Replication ensures both daughter cells receive a complete, identical copy of the DNA.

3. **messenger RNA (mRNA)**

   Transcription makes an **mRNA** copy of one gene, which can leave the nucleus.

4. **the mRNA into a chain of amino acids**

   Translation reads the mRNA message and builds the matching chain of amino acids — a protein.

5. **a gene being switched on to make its product**

   Gene expression is a gene being used — transcribed and translated to make its protein.

6. **False**

   A cell expresses only the genes it needs right now; the rest are switched off.

7. **nucleotide**

   Each **nucleotide** is one sugar + one phosphate + one base; many joined make a strand.

8. **semi**

   Replication is **semi-conservative**: each copy has one original strand and one new strand.

9. **polymerase**

   RNA polymerase reads the DNA template and joins RNA nucleotides into mRNA.

10. **transfer**

    Transfer RNA (tRNA) carries an amino acid and has an anticodon that matches the mRNA codon.