AP BIOLOGY • EXERCISE SHEET

# 6.3 Transcription and RNA Processing

Name: _____ Class: _____ Date: _____ **Total: 11 marks**

## Objective

Build the skills to answer exam questions on **transcription and RNA processing**.

**You must be able to:**

- describe **transcription** 转录 (DNA → mRNA) by RNA polymerase
- state the RNA processing steps (**cap, tail, splicing** 剪接)
- distinguish **introns** and **exons**

## 1 Worked examples

Study these first. Each one shows the method for a question type used later —follow the steps and you can do the Practice and Exam-style questions yourself.

### Transcription

**Transcription** copies a gene from DNA into **messenger RNA (mRNA)**. **RNA polymerase** reads the DNA template and builds an mRNA strand with complementary bases (using **U** instead of T).

### A worked transcript

Template 3′-TACGGA-5′ transcribes to mRNA 5′-AUGCCU-3′.

### RNA processing (in eukaryotes)

Before leaving the nucleus, the mRNA is processed: a **cap** and a **poly-A tail** are added for stability, and **introns** are removed by **splicing**, joining the **exons**.

### Introns and exons

- **Exons** —coding parts, kept in the final mRNA.
- **Introns** —non-coding parts, spliced out.

## 2 Practice

Now apply the methods above.

**2.1** What enzyme carries out transcription? [1]

**2.2** Transcribe the template 3′-TACG-5′ into mRNA. [2]

**2.3** What is removed during splicing? [1]

## 3 Exam-style questions

**3.1** During RNA processing, the parts removed from the pre-mRNA are the [1]

- **A** exons
- **B** introns
- **C** caps
- **D** tails

**3.2** A gene is transcribed and processed.

(a) State two modifications made to the mRNA. [2]

(b) Distinguish introns from exons. [2]

**3.3** Explain why processing is needed before the mRNA leaves the nucleus. [2]

## 4 Go further

You are now ready for the real exam questions on this subtopic:

- work through the **6.3 Transcription and RNA Processing** lesson on the **Learn** page;
- read the **Transcription and RNA Processing** section of the AP Biology handout on the **Know** page.

## Solutions

**2.1** RNA polymerase.

**2.2** mRNA 5′-AUGC-3′.

**2.3** Introns.

**3.1 B** —introns.

**3.2** (a) Any two: adding a 5’ cap, adding a poly-A tail, splicing out introns. (b) Exons are the coding parts kept in the mRNA; introns are non-coding parts spliced out.

**3.3** Processing (cap, tail, splicing) stabilizes the mRNA and removes non-coding introns, so the mature mRNA can be exported and correctly translated.