AP BIOLOGY • EXERCISE SHEET

2.1 Organelles and the Endomembrane System

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS golgi 高尔基体 • mitochondria 线粒体 • endomembrane system 内膜系统 • organelles 细胞器 • nucleus 细胞核

Objective

Build the skills to answer exam questions on **organelles and the endomembrane system**.

You must be able to:

- state the functions of key **organelles** 细胞器 (nucleus, mitochondria, ribosomes, ER, Golgi)
- describe the **endomembrane system** 内膜系统 pathway
- link each organelle's structure to its role

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.

Key organelles

- **Nucleus** — holds DNA, controls the cell.
- **Ribosomes** — build proteins.
- **Mitochondria** — carry out cellular respiration (make ATP).
- **Rough ER** — has ribosomes; makes and folds proteins.
- **Smooth ER** — makes lipids.
- **Golgi apparatus** — modifies, sorts, and ships proteins.

The endomembrane system

The **endomembrane system** is a set of connected membranes that make, process, and transport proteins and lipids: nuclear envelope → ER → Golgi → vesicles → membrane/secretion.

A worked pathway

A protein for export is made on the **rough ER**, sent in a **vesicle** to the **Golgi** for modification, then packaged and released at the cell membrane.

Structure fits function

More mitochondria appear in cells needing lots of energy (e.g. muscle); many ribosomes appear in cells making lots of protein.

2 Practice

Now apply the methods above.

2.1 Which organelle makes ATP by respiration? [1]

2.2 State the function of the Golgi apparatus. [1]

2.3 Which organelle builds proteins? [1]

3 Exam-style questions

3.1 Proteins destined for export are first made on the [1]

A smooth ER
B rough ER
C Golgi
D nucleus

3.2 A protein is secreted from a cell.

(a) List, in order, the organelles it passes through from synthesis to export. [3]

(b) State the role of the Golgi in this pathway. [1]

3.3 Explain why a muscle cell contains many mitochondria. [2]