10.1 Cell injury, adaptation and death

Name: _____ Class: _____ Date: _____ **Total: 24 marks**

KEY WORDS necrosis • metaplasia

Objective

Match injury stage and death pattern to mechanism.

1 Key knowledge and worked examples

■ Reversible to irreversible

ATP ↓ → Na^+/K^+ pump fails → swelling (reversible); membrane damage with Ca^{2+} influx is the point of no return ✓. Adaptations: atrophy, hypertrophy, hyperplasia, metaplasia.

■ Worked example: patterns name causes

Coagulative (ischaemia, solid organs) · liquefactive (brain, abscess) · caseous (TB) · fat (pancreas) · fibrinoid (vessels) ✓. Apoptosis: regulated, quiet, single cells.

2 Practice

2.1 Name the ion whose influx marks irreversibility. [3]

2.2 Which necrosis pattern belongs to TB granulomas? [3]

2.3 Bronchial lining turning squamous under smoke – name the adaptation. [3]

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3 Exam-style questions

3.1 A fictional ischaemic tubule experiment: 20 minutes of hypoxia then reperfused, versus 4 hours then reperfused.

Explain the first outcome (ATP-low swelling, pumps resume, recovery) and the second (membrane damage, Ca^{2+} entry, enzyme leak – LDH/ALT rise readable from blood). State which necrosis pattern a solid-organ infarct shows and why (slow proteolysis keeps outlines – coagulative) ✓. [8]

3.2 Four fictional scenarios: bed rest (disuse), hypertension (cardiac), pregnancy (uterine), smoking (bronchus).

Assign atrophy, hypertrophy, hyperplasia or metaplasia with the defining distinction for each (smaller cells / bigger cells / more cells / new lining type) ✓. [7]

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