UNIVERSITY MEDICINE • EXERCISE SHEET

11.3 Autonomic pharmacology

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

KEY WORDS toxidrome

Objective

Predict receptor effects; read the toxidromes.

1 Key knowledge and worked examples

■ The four rows

α1 constricts vessels/dilates pupils; β1 heart; β2 airway; M3 glands, miosis, slow gut ✓. Agonists push; blockers silence.

■ Worked example: the map upside down

Cholinergic: salivation, miosis, bronchorrhoea, bradycardia ✓. Anticholinergic: dry, fixed dilated pupils, tachycardia, retention ✓. Adrenergic: fast, tight, sweating.

2 Practice

2.1 Which receptor does a bronchodilator β-selective agonist avoid? [3]

2.2 Name three anticholinergic findings. [3]

2.3 Why does an α1 blocker cause postural hypotension? [3]

3 Exam-style questions

3.1 Four fictional INN teaching drugs: a β1 blocker, an α1 blocker, a β2 agonist, an M blocker.

Predict two effects of each straight off the receptor map (β1 blocker: rate and contractility ↓; α1 blocker: pressure ↓ with postural drop; β2 agonist: airway opens, little cardiac effect; M blocker: dry mouth, blurred vision) ✓. Explain why a cardioselective β1 blocker is preferred over non-selective in a patient with airway disease ✓. [8]

3.2 Two fictional overdoses: patient A has pinpoint pupils, sweating and slow gut; patient B is dry, dilated and tachycardic.

Assign each toxidrome (cholinergic; anticholinergic) with the receptor rows that generate every finding ✓. Explain why patient A's bronchorrhoea is the dangerous feature for ventilation ✓. [7]

Solutions

2.1

- $\beta 1$ – selectivity spares the heart ✓.

2.2

- Dry mouth, fixed dilated pupils, tachycardia, urinary retention (any three) ✓.

2.3

- $\alpha 1$ keeps venous and arterial tone; blocked, standing pools blood below the heart ✓.

3.1

- $\beta 1$ blocker: heart rate and contractility fall ✓.
- $\alpha 1$ blocker: pressure falls, postural drop ✓.
- $\beta 2$ agonist: bronchi open, cardiac effect minimal ✓.
- M blocker: secretions dry, accommodation blurs ✓.
- $\beta 1$ selectivity avoids $\beta 2$ airway blockade in airway disease ✓.

3.2

- A: cholinergic – M rows firing (miosis, secretions, gut) ✓.
- B: anticholinergic – M rows silenced (dry, dilated, fast, retention) ✓.
- Bronchorrhoea floods the airway and impairs ventilation – the dangerous row ✓.

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