UNIVERSITY MEDICINE • EXERCISE SHEET

10.4 Neoplasia

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

KEY WORDS neoplasia • metastasis

Objective

Separate grade from stage; trace the metastatic cascade.

1 Key knowledge and worked examples

■ **Benign vs malignant**

Benign: differentiated, slow, capsulated, local. Malignant: atypia, invasion, METASTASIS – the defining property ✓. Cascade: detach (E-cadherin lost) → MMPs degrade BM → intravasate → survive (few of 10,000) → extravasate → colonise.

■ **Worked example: two axes**

GRADE = appearance (Gleason 2–10); STAGE = extent (TNM: T1–T4, N0–N3, M0/M1) ✓. Routes: lymphatic (carcinoma), blood (sarcoma, kidney, liver), transcoelomic (ovary).

2 Practice

2.1 What single property defines malignancy? [3]

2.2 Grade vs stage – define each in one clause. [3]

2.3 Which route do sarcomas favour? [3]

3 Exam-style questions

3.1 A fictional report reads: poorly differentiated; invades muscle; 3 of 12 nodes positive; no distant deposits.

Extract the grade cue (poorly differentiated) and the TNM reading (muscle invasion raises T; N1 for nodes; M0) ✓. Explain why prognosis follows stage first (reach beats look) and which finding would change management most (a new M1 deposit) ✓. [8]

3.2 A fictional teaching calculation: a tumour sheds ~10^6 cells/day into the circulation; few of 10,000 survive to colonise.

Explain why circulating cells ≠ metastases (six low-probability gates: detach, degrade, intravasate, survive, exit, colonise – seed AND soil) ✓. Predict first destinations for breast carcinoma (axillary nodes, lymphatic) vs osteosarcoma (lung, haematogenous) ✓. [7]

Solutions

2.1

- Metastasis – benign tumours never metastasise ✓.

2.2

- Grade = how the cells LOOK (differentiation); stage = how FAR they have reached (TNM) ✓.

2.3

- Haematogenous (bloodstream) – carcinomas go lymphatic-first ✓.

3.1

- Grade cue: poorly differentiated ✓.
- Stage: muscle invasion (high T), N1 (3/12 nodes), M0 ✓.
- Prognosis follows stage – reach outranks look; grade refines ✓.
- An M1 deposit (distant spread) changes management most ✓.

3.2

- Circulating cells die or fail to colonise: each gate filters – few of 10,000 found a hospitable soil ✓.
- Cascade: detach → MMPs → intravasate → survive → extravasate → colonise ✓.
- Breast carcinoma: lymphatic-first → axillary nodes ✓.
- Osteosarcoma: haematogenous → lung ✓.

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