



## Morphology quiz: Identification of the origin of metastatic cells in pleural effusion

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## **Morphology quiz: Identification of metastatic cells in pleural effusion**

### **Summary “Inside this month's Cytopathology »**

Quiz related to cytological examination of pleural effusion in a patient with history of latero-thoracic malignant melanoma

### **Case history**

- 46-year-old man.
- Diagnosed with a melanoma on the right lateral thoracic wall (SSM, Clark level IV, Breslow thickness 1.72 mm).
- Treated with local surgery and resection of sentinel lymph nodes.
- Presenting with a pleural effusion, 19 months after initial diagnosis, which was collected and sent for cytology.

*See images page 5.*

### **Question 1**

Based on the images provided on the following page (Figure 1), the pleural effusion contains:

- A. macrophages
- B. numerous lymphocytes
- C. mainly neutrophils
- D. dyskaryotic cells suspicious of malignancy

### **Question 2**

What component(s) can be identified with the Fontana Masson stain (Figure 1 D)?

- A. Argentaffin granules
- B. Melanin
- C. Iron
- D. Lipids

### **Question 3**

What is your interpretation of the immunocytochemical staining on Figure 2?

- A. Reactive mesothelial cells
- B. Metastatic non small cell carcinoma
- C. Metastatic carcinoid tumor
- D. Metastatic malignant melanoma

#### Question 4

Concerning the etiology (primary tumour) of malignant pleural effusions, classify the following malignancies in order of frequency:

- A. Breast cancer
- B. Malignant melanoma
- C. Lung cancer
- D. Non-Hodgkin's lymphoma

#### Question 5

Which mutation(s) should be tested in the case of malignant melanoma for therapeutic management?

- A. KRAS mutation
- B. EGFR mutation
- C. BRAF V600E mutation
- D. ALK rearrangement

#### Answers on page 3

#### Recommended Reading

1. Ordóñez NG .Value of melanocytic-associated immunohistochemical markers in the diagnosis of malignant melanoma: a review and update. Review article. *Hum Pathol*. 2014 Feb;45(2):191-205. doi: 10.1016/j.humpath.2013.02.007

2. Porcel JM, Etiology of pleural effusions: analysis of more than 3,000 consecutive thoracenteses. *Arch Bronconeumol*. 2014 May; 50(5):161-5. doi: 10.1016/j.arbres. 2013.11.007.

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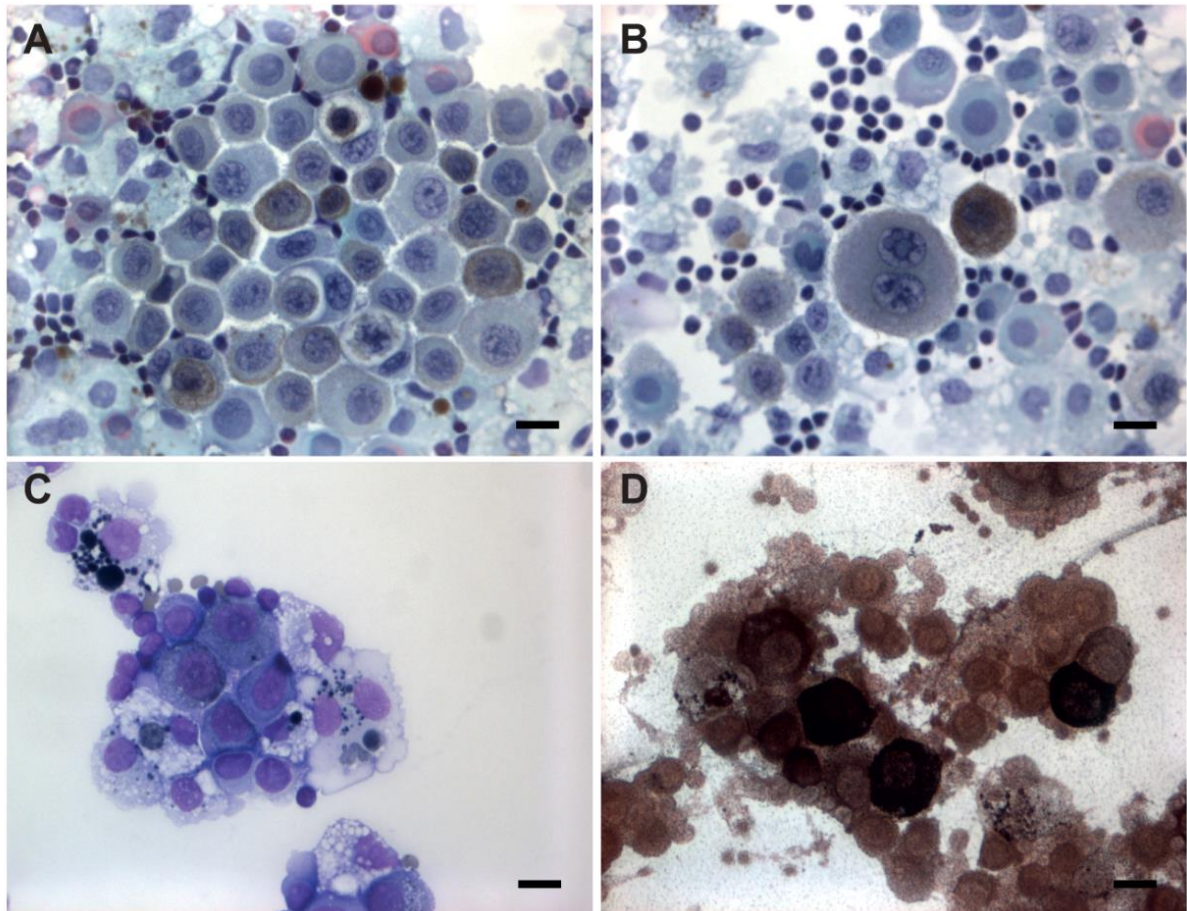
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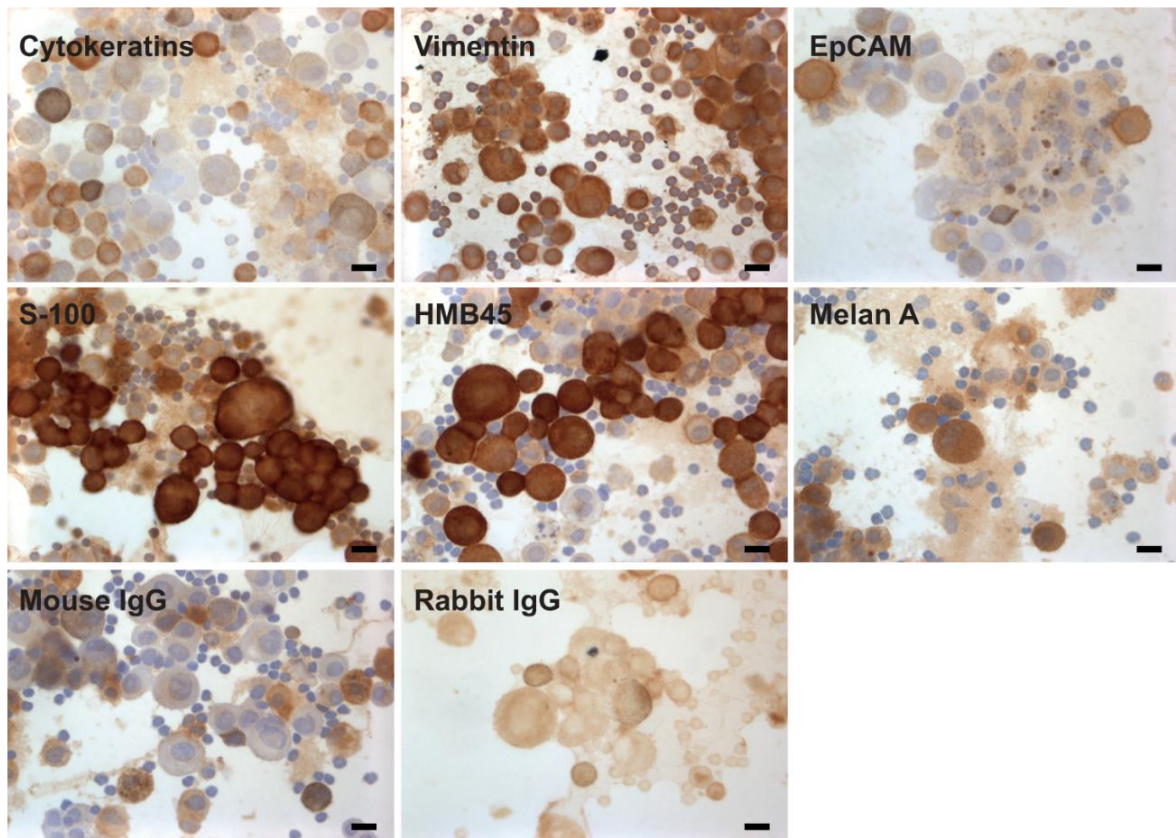
**Figure 1.**

Cytology of pleural effusion: Papanicolaou stain, x40 (panels A, B); May-Grünwald-Giemsa stain, x40 (Panel C); Fontana-Masson stain, x40 (Panel D). Scale bar: 10µm



**Figure 2.**

Immunocytochemistry (peroxidase staining, x40) using antibodies against cytokeratins (clones AE1/AE3/PCK26), vimentin (clone V9), EpCAM (clone MOC31), S-100 protein (rabbit polyclonal), HMB45 (clone HMB45) and melan A (clone A103). Mouse IgG and polyclonal rabbit IgG were used as isotypic controls. Scale bar: 10µm



## **Answers to Morphology Quiz: Page 1**

### **Question 1**

**Answer: A, B and D.**

### **Question 2**

**Answer: A and B.**

Comments: Fontana stain will stain melanin, lipofuschins, and argentaffin granules which are observed in carcinoid tumors.

### **Question 3**

**Answer: A and D.**

Comments: malignant cells show cytoplasmic staining with vimentin, S-100 protein, HMB45 and melan A antibodies, whereas no staining was observed with antibodies against cytokeratins and EpCAM. Reactive mesothelial cells are negative with melanoma markers and show a cytoplasmic staining with cytokeratin, vimentin and EpCAM antibodies.

### **Question 4**

**Answer: C>A>D>B.**

Comments: in a study of 840 malignant pleural effusions, lung cancer represented 37% of cases with 18% for lung adenocarcinoma, breast cancer 16%, non-Hodgkin's lymphoma 7% and melanoma 0,01% (Porcel *et al.*)

### **Question 5**

**Answer: C.**

Comments: For the patient, the V600E mutation in BRAF was positive on sentinel node at diagnosis. The mutation was detected for a second time at the relapse in the 11R mediastinal node. In France, BRAF V600E is found in 34.7% of malignant melanoma ([www.e-cancer.fr](http://www.e-cancer.fr)). This mutation is not specific for malignant melanoma and can also be found in other malignant tumours such as lung cancer (2% of cases) or Hairy cell leukemia (79 to 97% of cases) for example.