

**Immunohistochemical Antibody Panel for the Differential Diagnosis of Pancreatic  
Ductal Carcinoma from Gastrointestinal Contamination and Benign Pancreatic  
Duct Epithelium in Endoscopic Ultrasound-Guided Fine Needle Aspiration**

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**Abstract**

**Objectives:** The diagnosis of pancreatic ductal carcinoma (PDAC) by endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) can be challenging to distinguish tumor cells from benign epithelium (BE). The aim of the present study was to set a minimal antibody panel to differentiate PDAC from contaminated BE in EUS-FNA specimens.

**Methods:** Immunohistochemistry, using claudin 4, EZH2, Ki-67, maspin, p53, and S100P, was performed on tissue microarray (TMA) sections containing 53 PDAC and 33 BE, and cell blocks of EUS-FNA including 53 PDAC and 22 BE. The positive rate was scored as 0 to 4+. The receiver-operating characteristic curve was applied to

determine a cut-off point, and the Classification And Regression Trees method was used to obtain a classification tree of the best panel.

**Results:** The cut-off point was 1+ for claudin 4, EZH2, Ki-67, p53, and S100P, and 2+ for maspin. All BE scored 0 for p53. Classification tree revealed using p53, S100P, and claudin 4 was the most powerful. The sensitivity and specificity of the tree were 96.2% and 100% in TMAs and 100% and 95.5% in EUS-FNA, respectively.

**Conclusions:** The classification tree using p53, S100P, and claudin 4 appears to successfully distinguish PDAC from the accompanying BE.

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