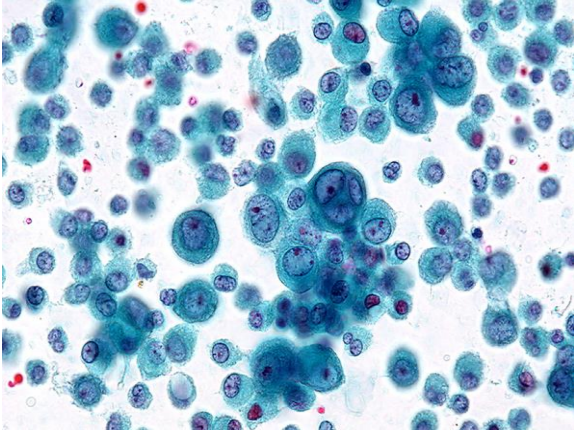
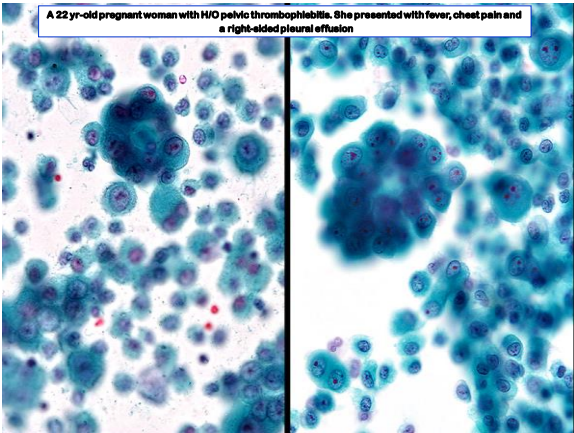


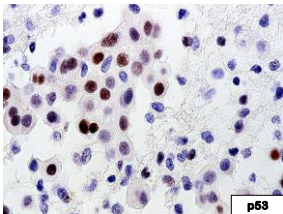
- Centrally-placed nuclei
- "Two Tone" Cytoplasm (denser)
- BI/multinucleation
- Macronucleoli
- Fine Cytoplasmic Vacuoles
- Cytoplasmic Processes





p53 Immunostaining In Mesothelial Hyperplasia Vs. Malignancy

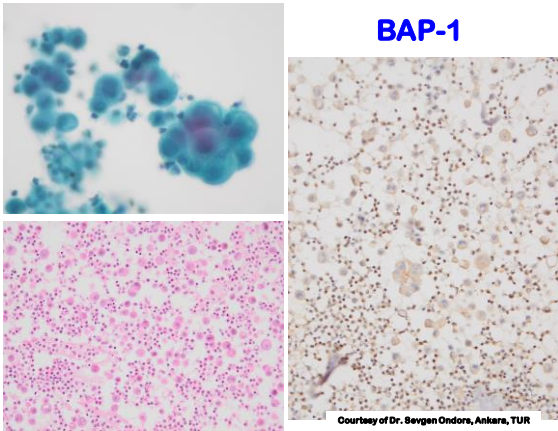
- mo AB Do -7
- Positivity In Malignancy - 32% To 55%
- None Of The Benign Effusions Stained
- Highly Specific (100%)
- Moderately Sensitive



BAP1 Immunostain and p16 HDFISH Analysis

- BAP1 expression loss ~ 67%
- p16 homozygous del by FISH* ~ 80%
- Coexistence of both ~ 42%

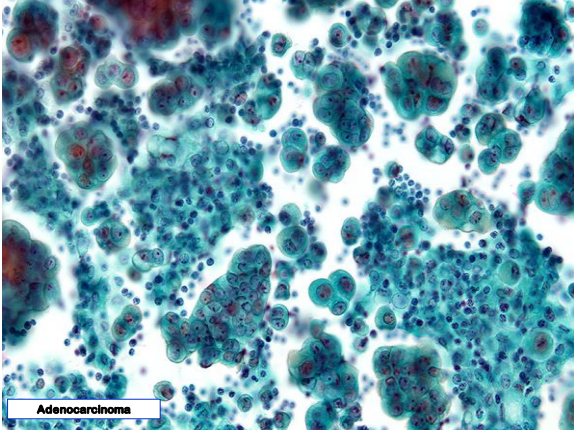
*more specific

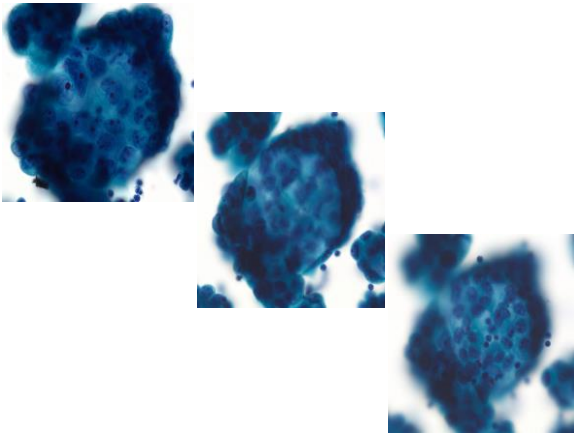


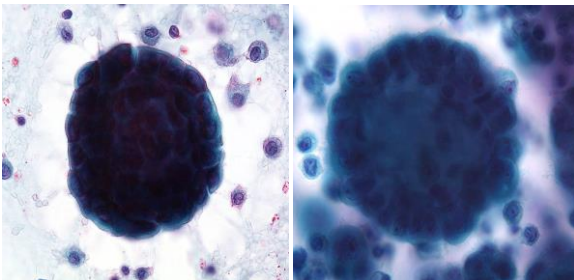
Serous Effusion Cytopathology

“Diagnostic Issues”

- Reactive Mesothelial Hyperplasia Vs. Malignant Mesothelioma
- **Malignant Mesothelioma Vs. Metastatic Adenocarcinoma**
- Unusual Phenotypes of Metastatic Adenocarcinoma
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Mesothelioma Vs. Adenocarcinoma

IHC Markers

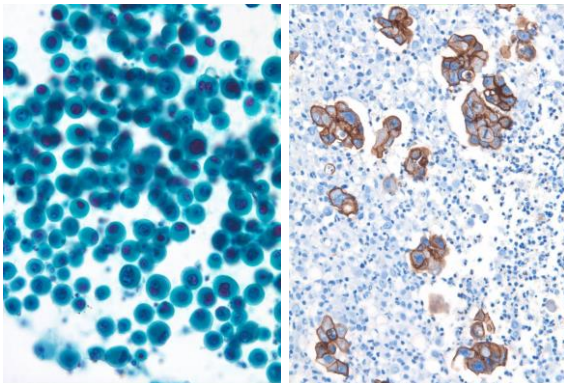
- Cytoskeletal Proteins ✘
- Cell Surface Glycoproteins
- Oncoplacental Antigens
- Myelomonocytic Antigens ✘
- Intracellular Calcium-binding Proteins
- Other Antigens

Cell Surface Glycoproteins

- Epithelial Membrane Antigen (EMA)
- B72.3, Ber-EP4, MOC-31
 - Extremely high sensitivity
 - ~15% of mesothelioma are positive

EMA

- Polymorphic Epithelial Mucin
- Membranous/ Spiky Staining Pattern In Mesothelioma, Focal Staining In Benign Mesothelium
- Limited Practical Value



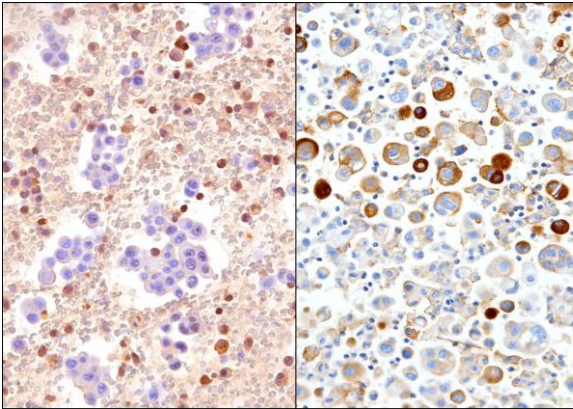
Ber-EP4

Oncoplacental Antigens

- Carcinoembryonic Antigen (CEA)
- Placental Antigens (PLAP)

CEA

- Oldest, And Most Widely Used Antibody
- Mesothelioma - 15% TO 45% - pCEA, ~3% -mCEA
- Adenocarcinoma - 85% To 95% (Lung)

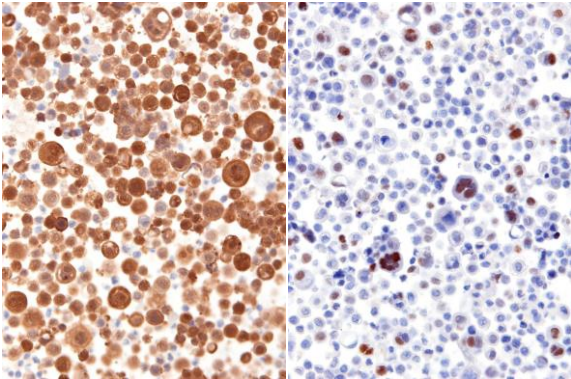


IC Ca++ Binding Proteins

- S-100 Protein
- Calretinin

Calretinin

- Expressed By Neurons, Gonads, Adipose Tissue, Kidney, Sweat Glands, Thymus And Mesothelium
- Mesothelioma – 42% To 100% (~80%)
- Adenocarcinoma – 6% To 30% (Focal)
- Most Useful Positive Marker For Mesothelium



p53

Other Antibodies For Mesothelioma

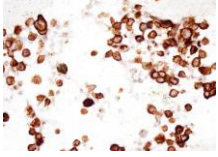
- CK7 +, CK 20 - (Breast, Lung, Ovary, Panc)
- CK 5/6 (Epithelial Mesothelioma) [83 to 91% Vs ~ 25-35%]
- WT-1 [76-100% Vs 100% Ov Serous]
- Thrombomodulin [77% Vs 14%]
- Mesothelin [100% Vs 39-91%]
- AMAD-2 [100% Vs 7%]
- D2-40 [90% Vs 36% weak]

JHH Panel

- Calretinin, WT-1, CK 5/6 (D2-40, p53)
- BAP1 - Loss of nuclear staining in > 50% of atypical meso cells
- Ber EP4, Claudin-4, mCEA (Napsin-A, TTF-1, PAX-8, Other site-specific markers)

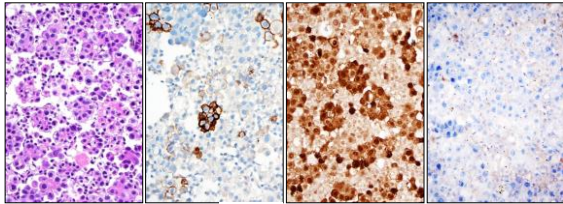
Claudin-4

- Transmembrane protein (tight-junction-associated protein)
- Ideal "single shot" epithelial marker
- Sensitivity – 99.1%
- Specificity – 100%
- Membranous staining (diffuse and strong)



Mesothelioma vs. Carcinoma IHC

64/F, non-smoker, history of Breast Cancer



BerEp4

Calretinin

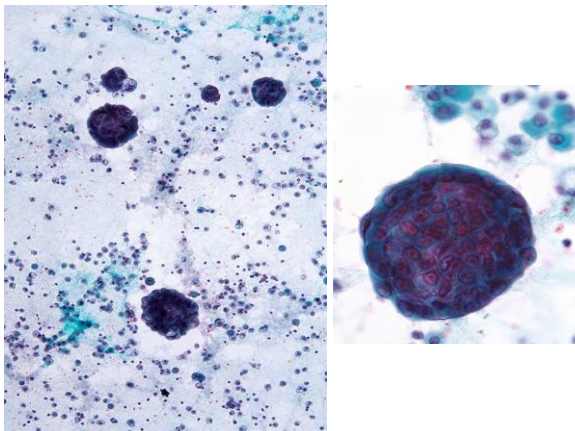
Claudin-4

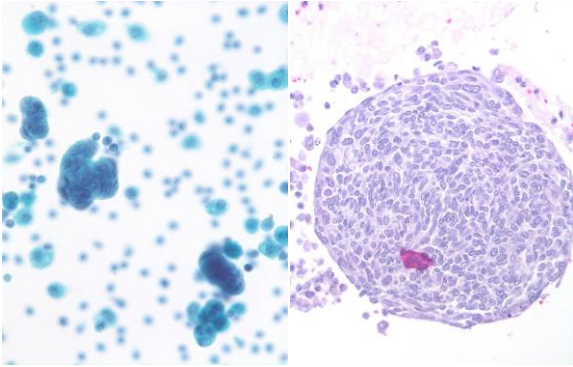
(Courtesy: Peter Iliet, MD)

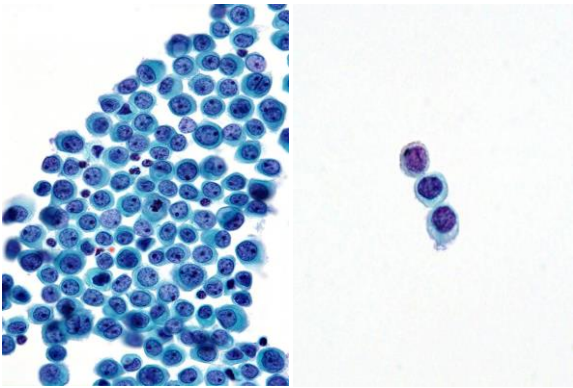
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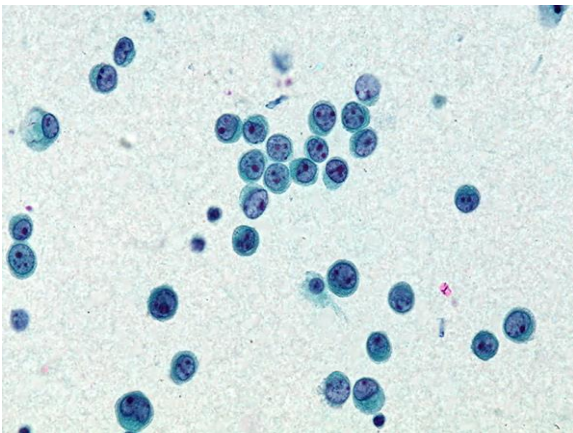
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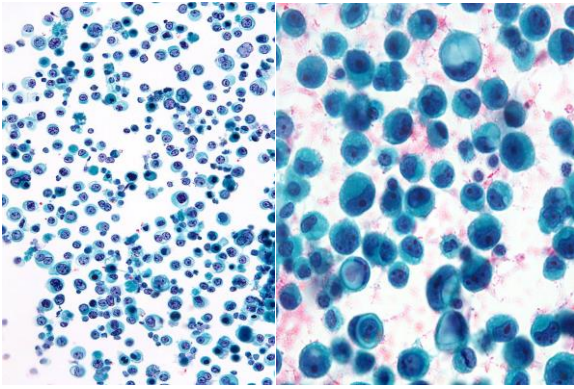
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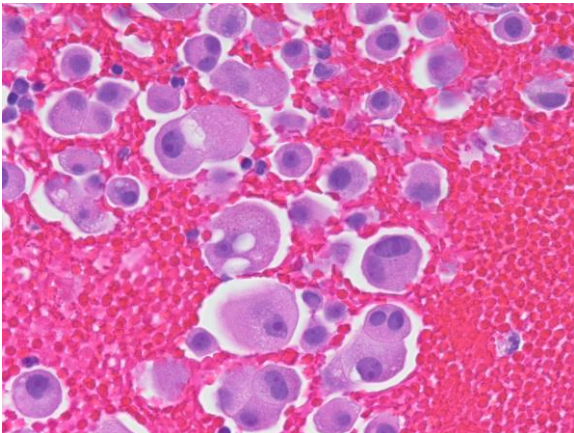


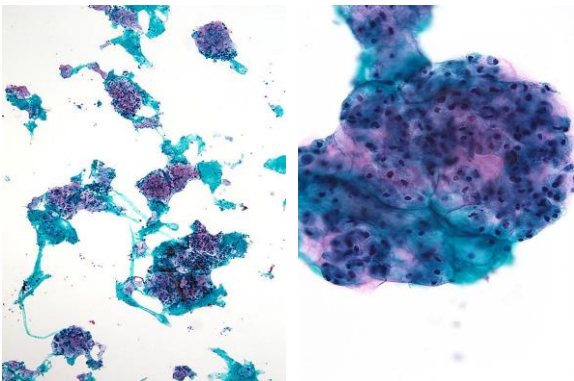


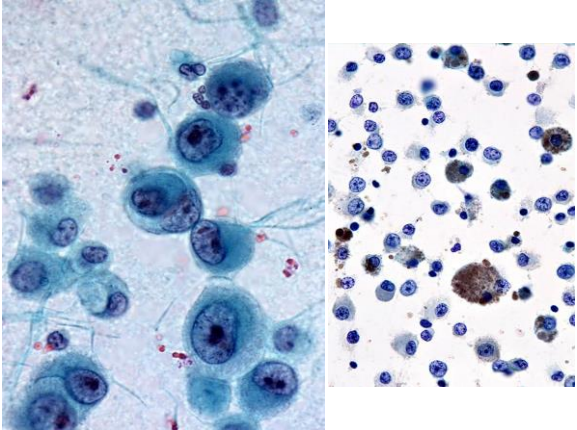


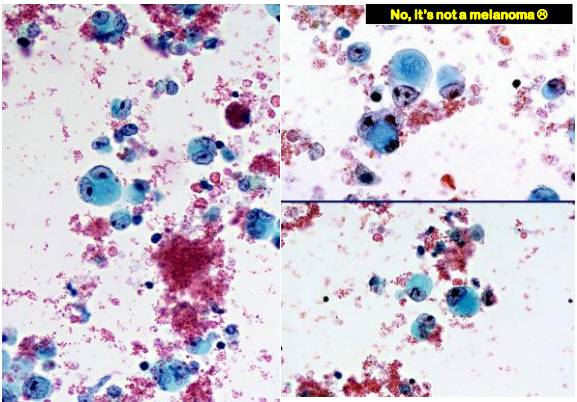


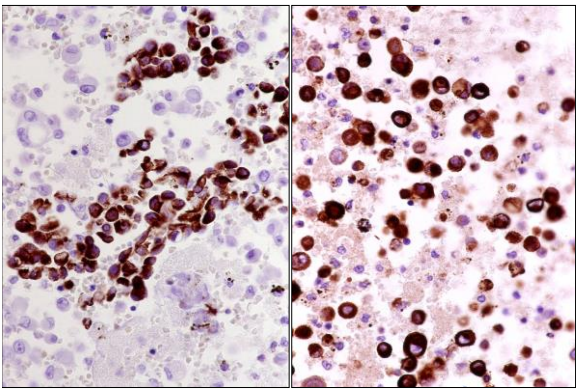






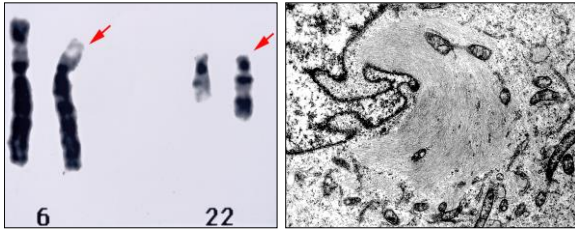






Desmin

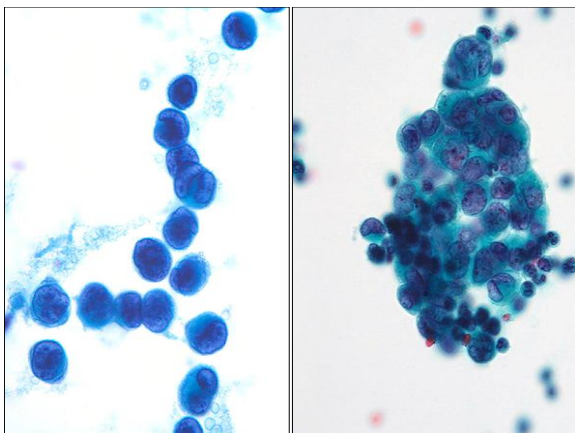
EMA

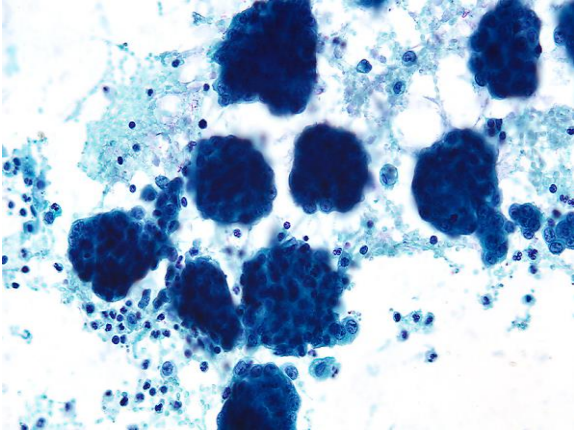


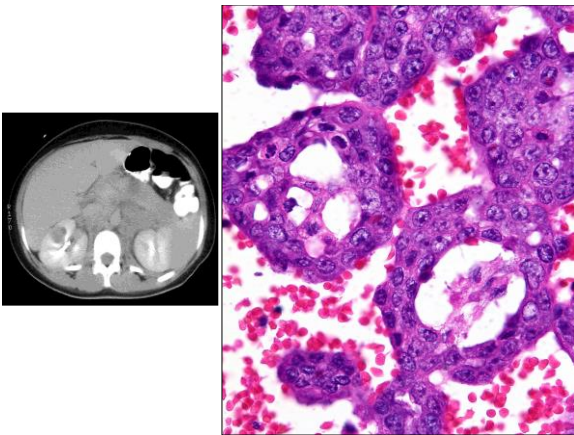
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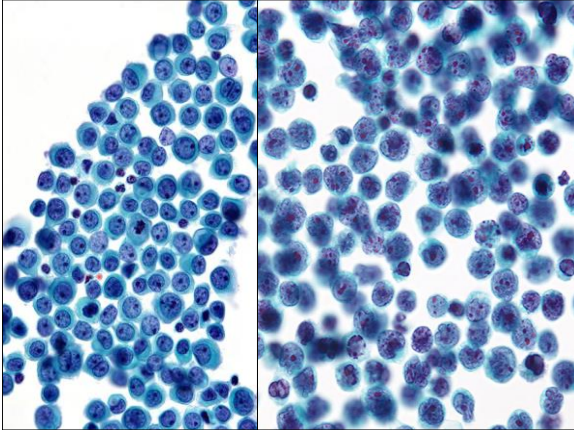


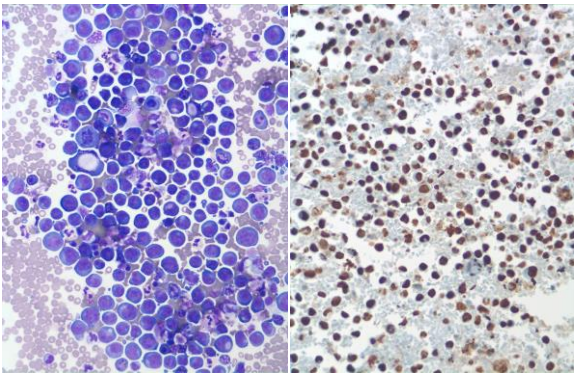


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Reporting System for Serous Effusions and Body Cavity Washings

An IAC-ASC Initiative



- Porto-Madrid System
- Madrid System
- International System

