

# Tumors of the Kidney and Urinary Tract

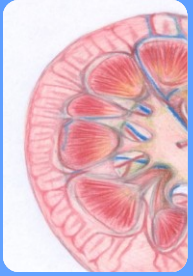
*Hala Kfoury Kassouf MD, KSUF, RCPA, EBP*

*Assistant Professor of pathology*

*Consultant Pathologist*

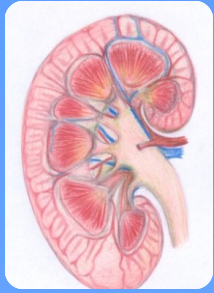
*King Saud University*

*King Khaled University Hospital*



## ***RENAL NEOPLASMS AND CYSTS***

- I. Neoplasms of the Renal Parenchyma
  - A. Renal cell carcinoma (renal adenocarcinoma; hypernephroma)
  - B. Nephroblastoma (Wilms's tumor)
  - C. Urothelial tumors

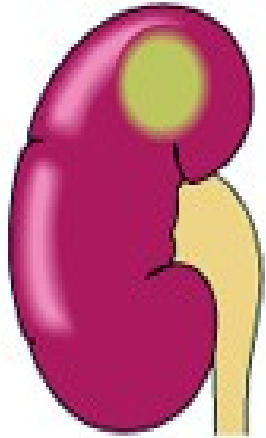


## ***RENAL NEOPLASMS AND CYSTS***

- Gross pathology and histology
- Histogenesis
- Clinical manifestations
- Diagnosis: radiographic imaging
- Treatment and prognosis
- Pathophysiology

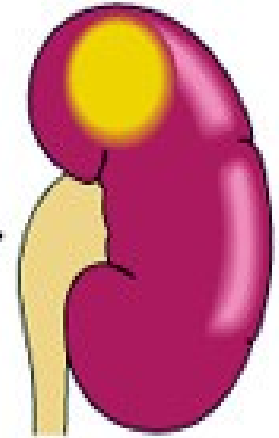
# Human renal cell carcinoma

SPORADIC PAPILLARY



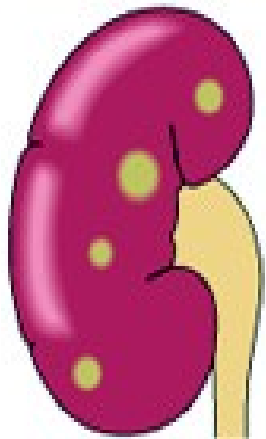
Trisomy 7, 16, 17  
Loss of Y  
Mutated, activated MET  
 $t(X;1) \rightarrow$  PRCC oncogenes

SPORADIC CLEAR CELL



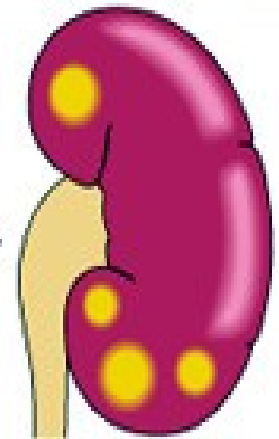
Translocations 3;6, 3;8, 3;11  
Deletions on chromosome 3  
Loss of VHL  
Inactivated, mutated VHL  
Hypermethylation of VHL

HEREDITARY PAPILLARY

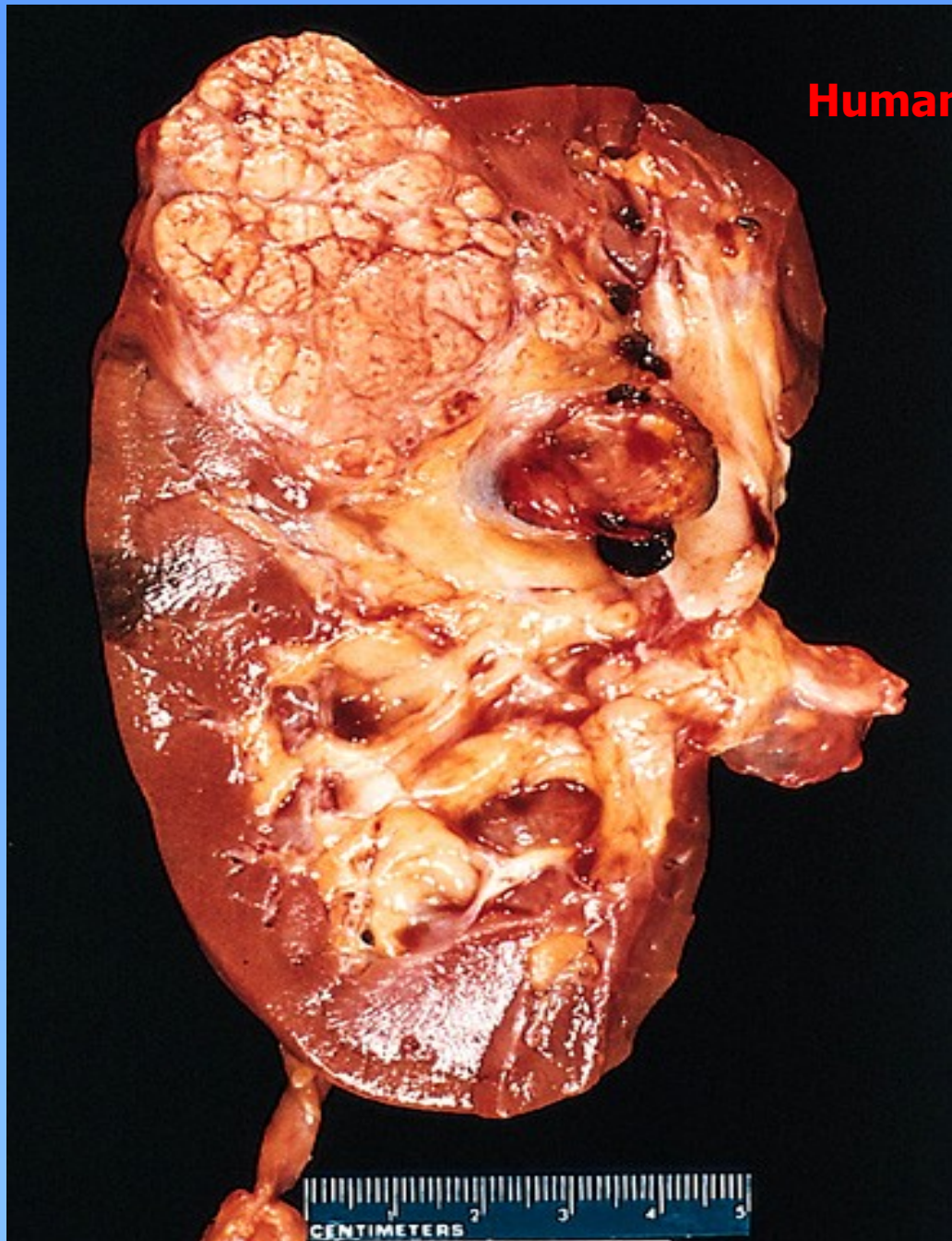
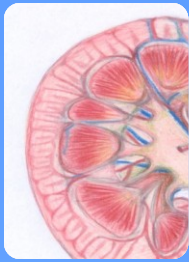


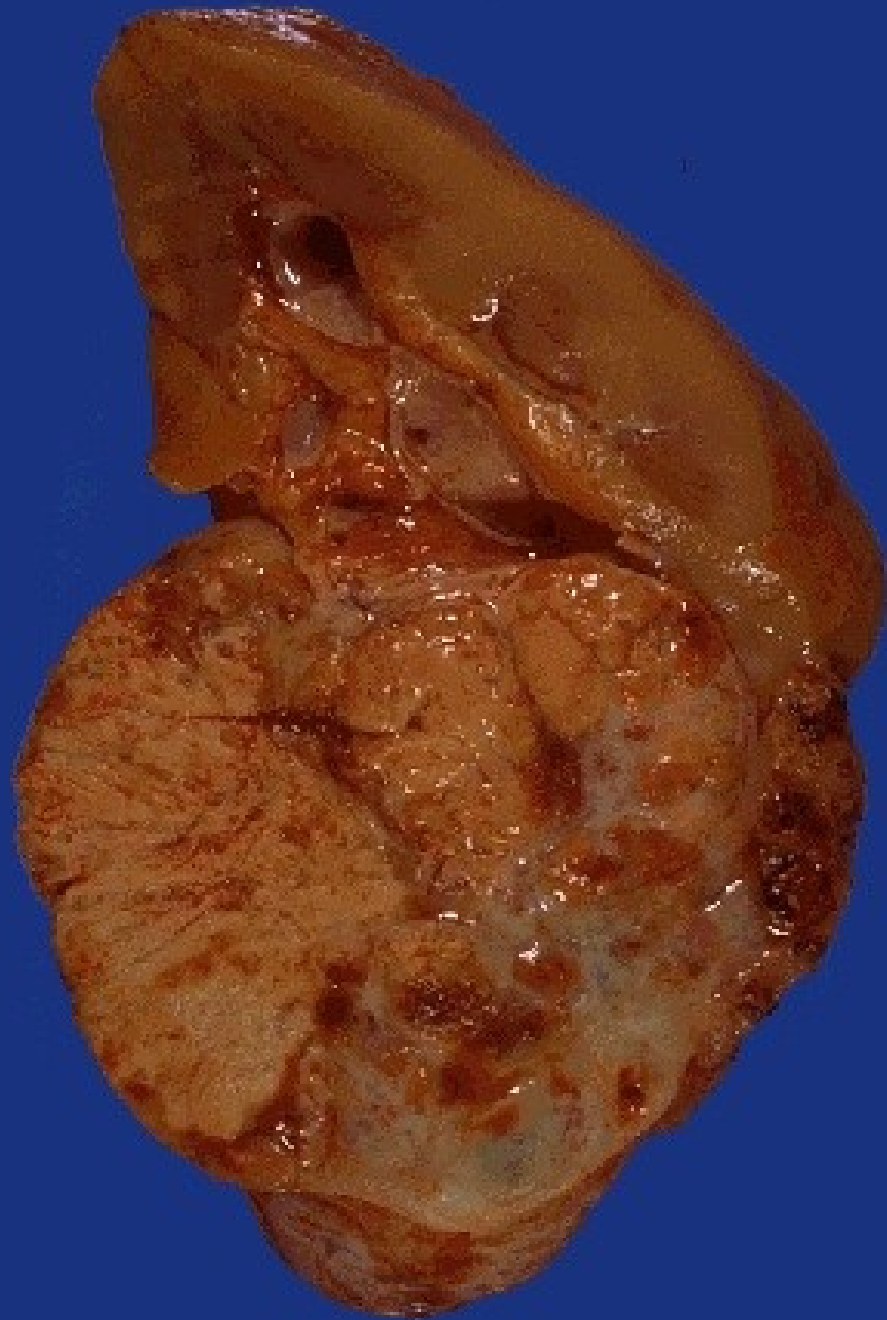
Trisomy 7  
Mutated, activated MET

HEREDITARY CLEAR CELL

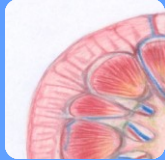


## Human renal cell carcinoma





**Renal cell carcinoma arising  
in the lower pole  
of the kidney.**



**Renal cell carcinoma that on sectioning is mainly cystic with extensive hemorrhage.**



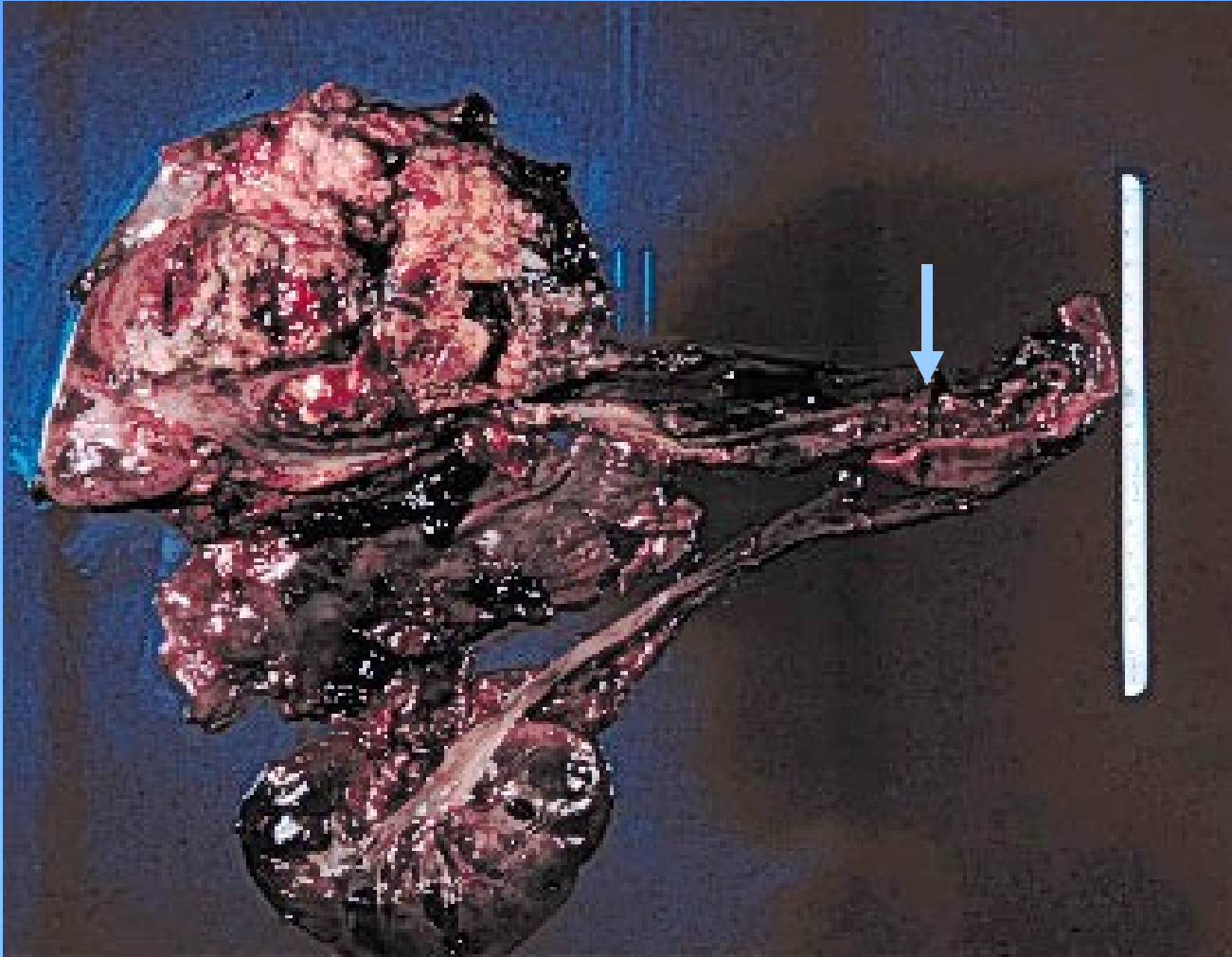
## Renal cell carcinoma

In the upper pole of this kidney is a well circumscribed tumor which has a yellowish-brown color and shows central necrosis.



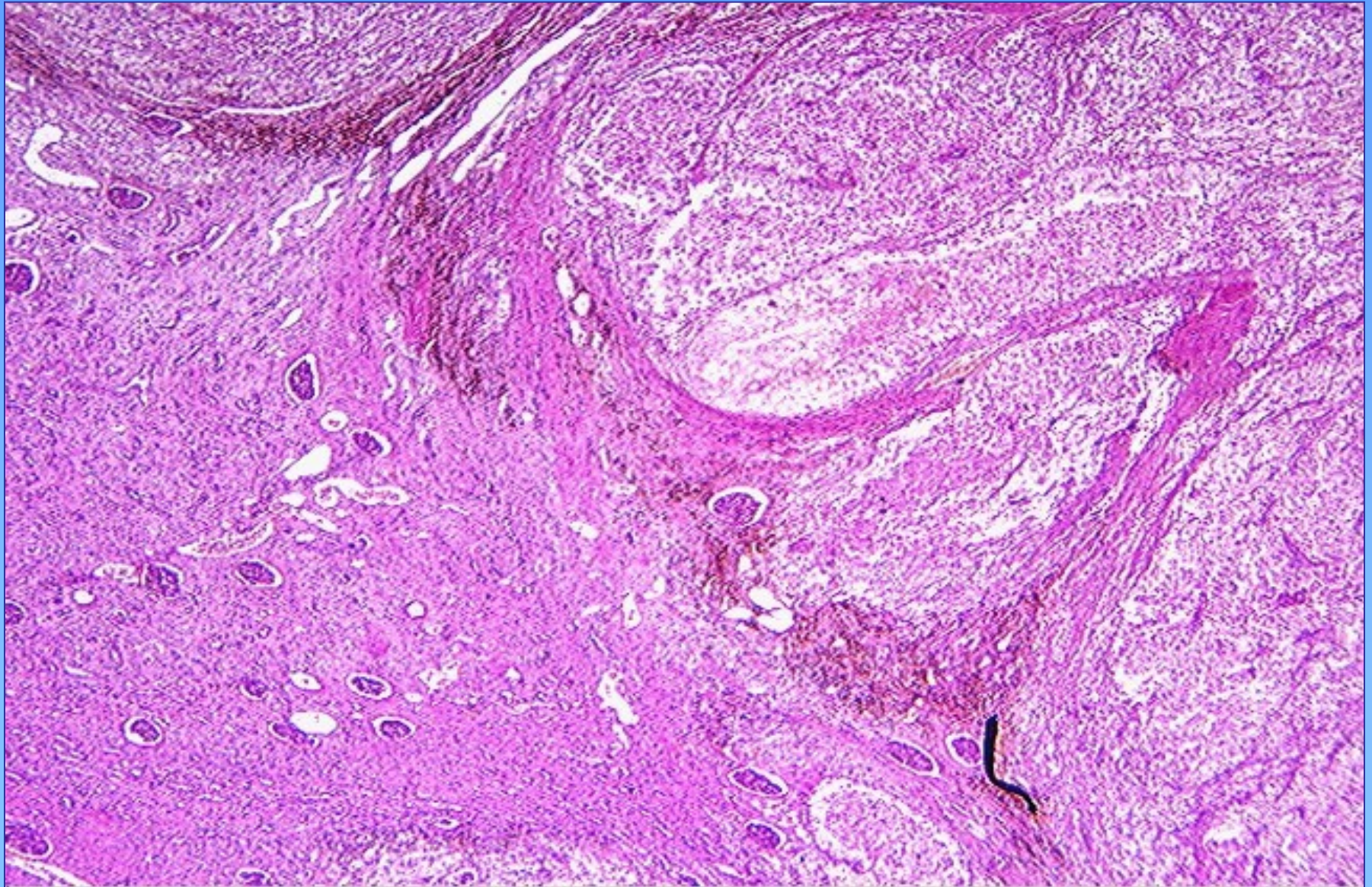


Advanced **renal cell carcinoma** involving the left kidney - a huge mass of necrotic yellowish brown material replacing the lower pole of the kidney. The vena cava is filled with tumor. This is typical of this neoplasm.



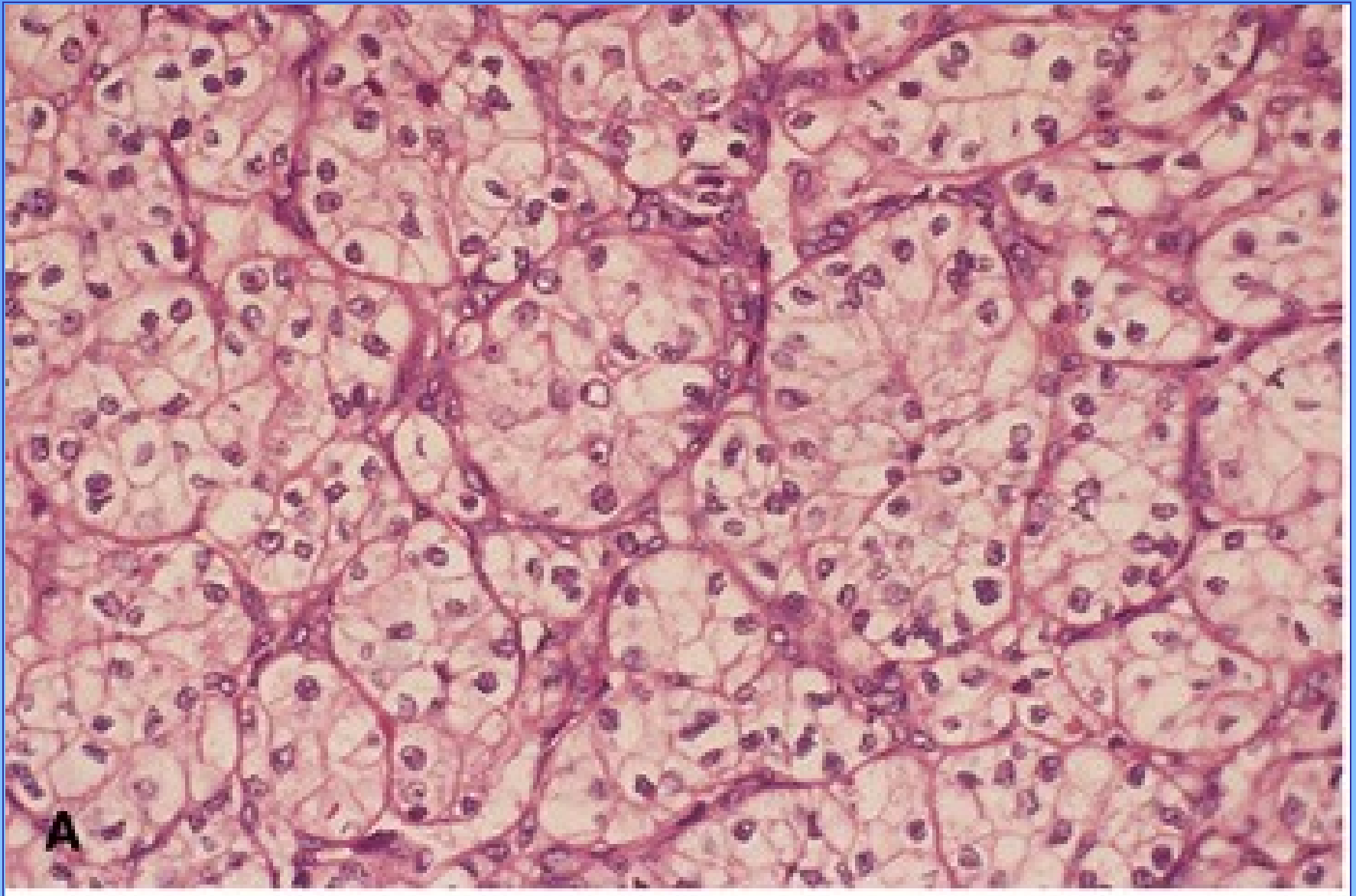


## Human renal clear cell carcinoma



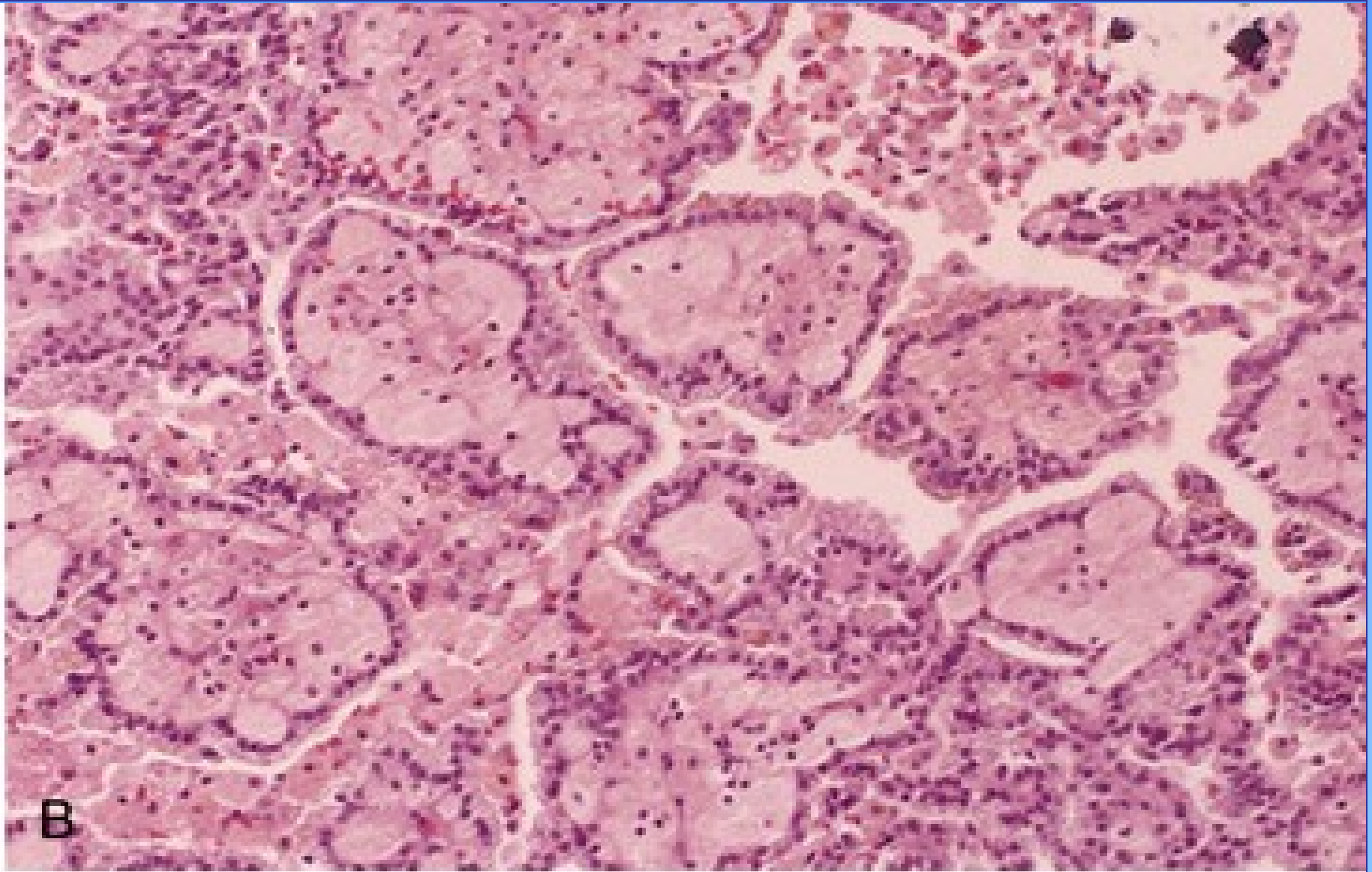


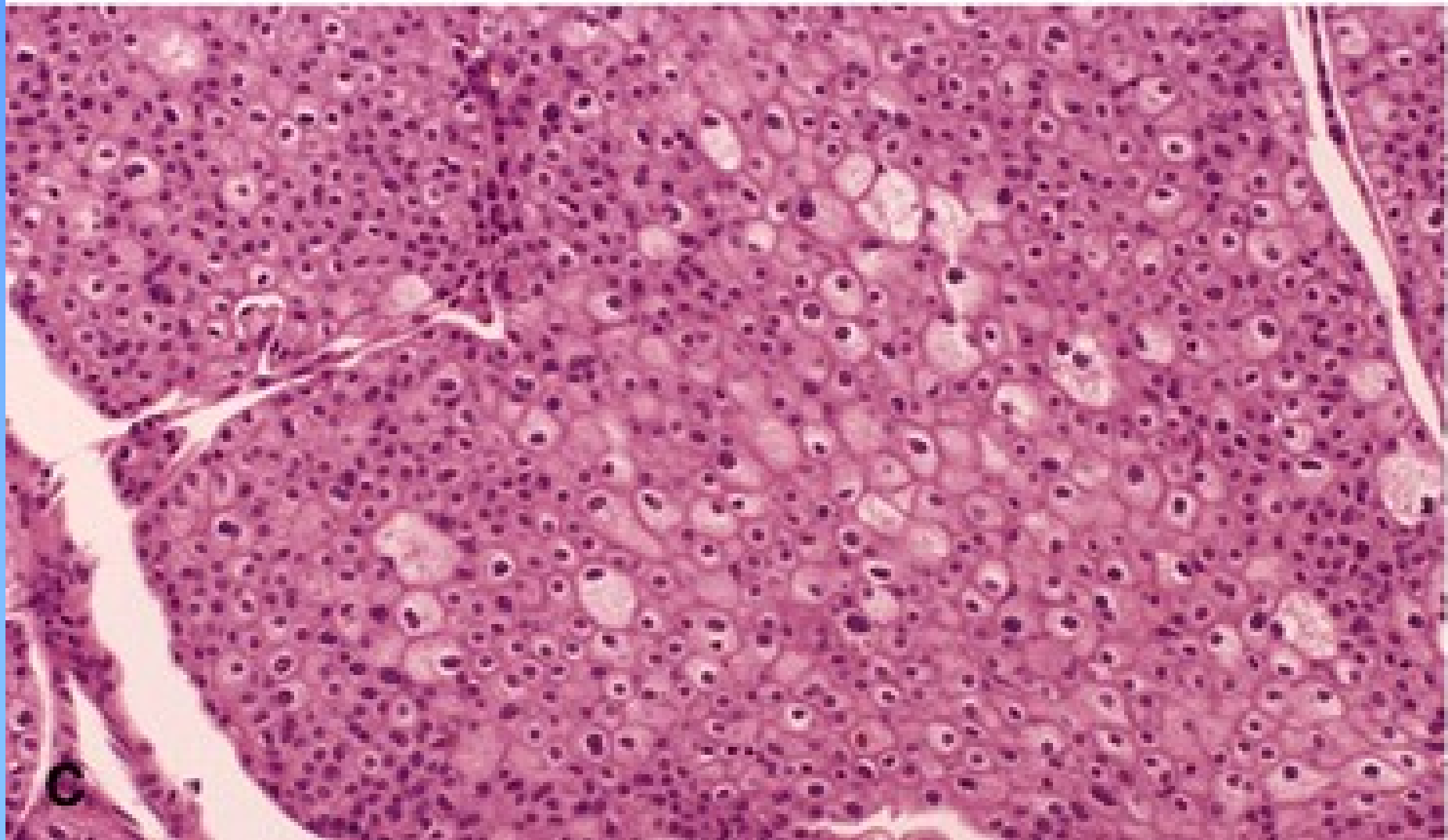
## Human renal clear cell carcinoma



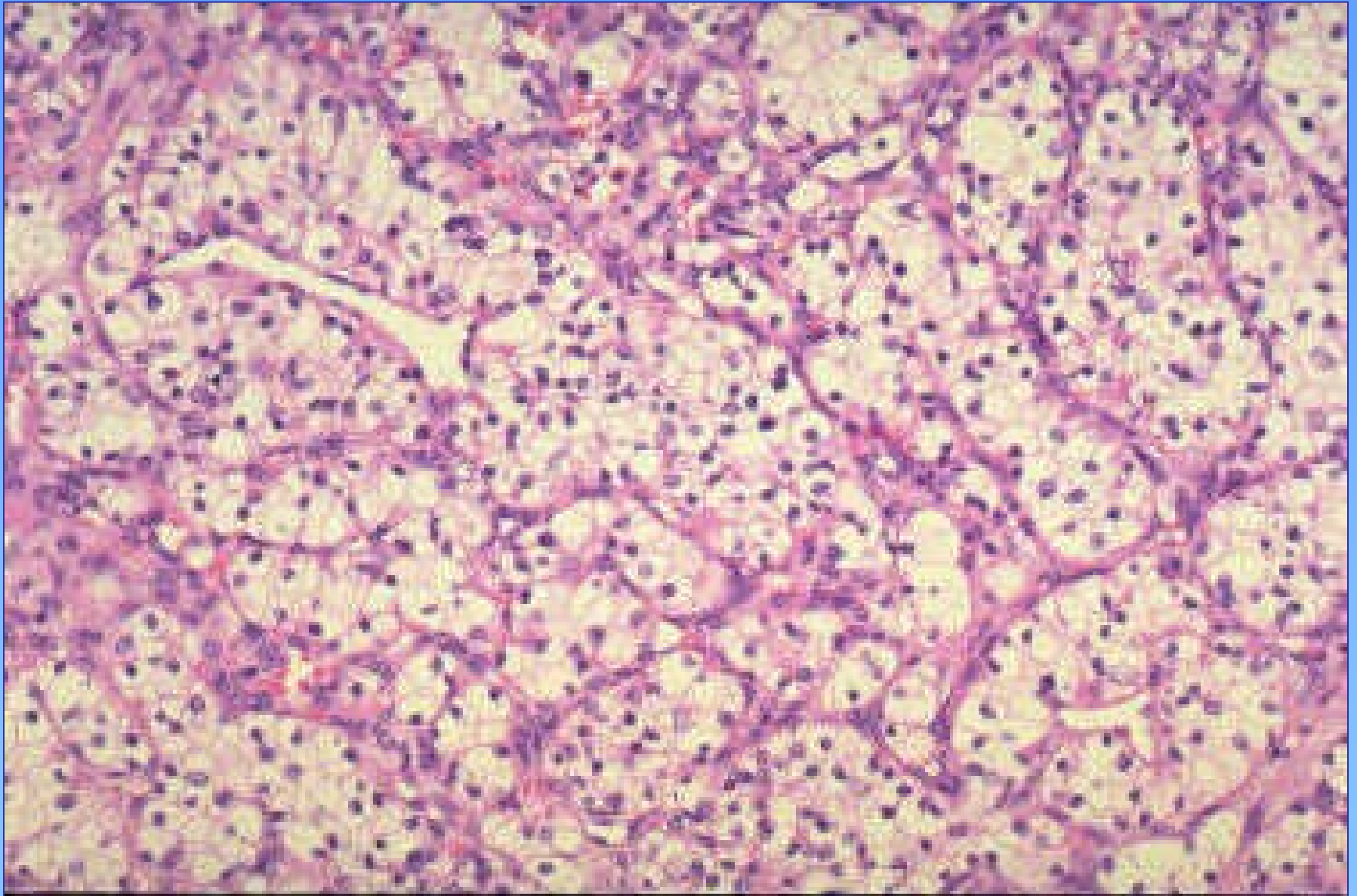


## Human renal papillary carcinoma

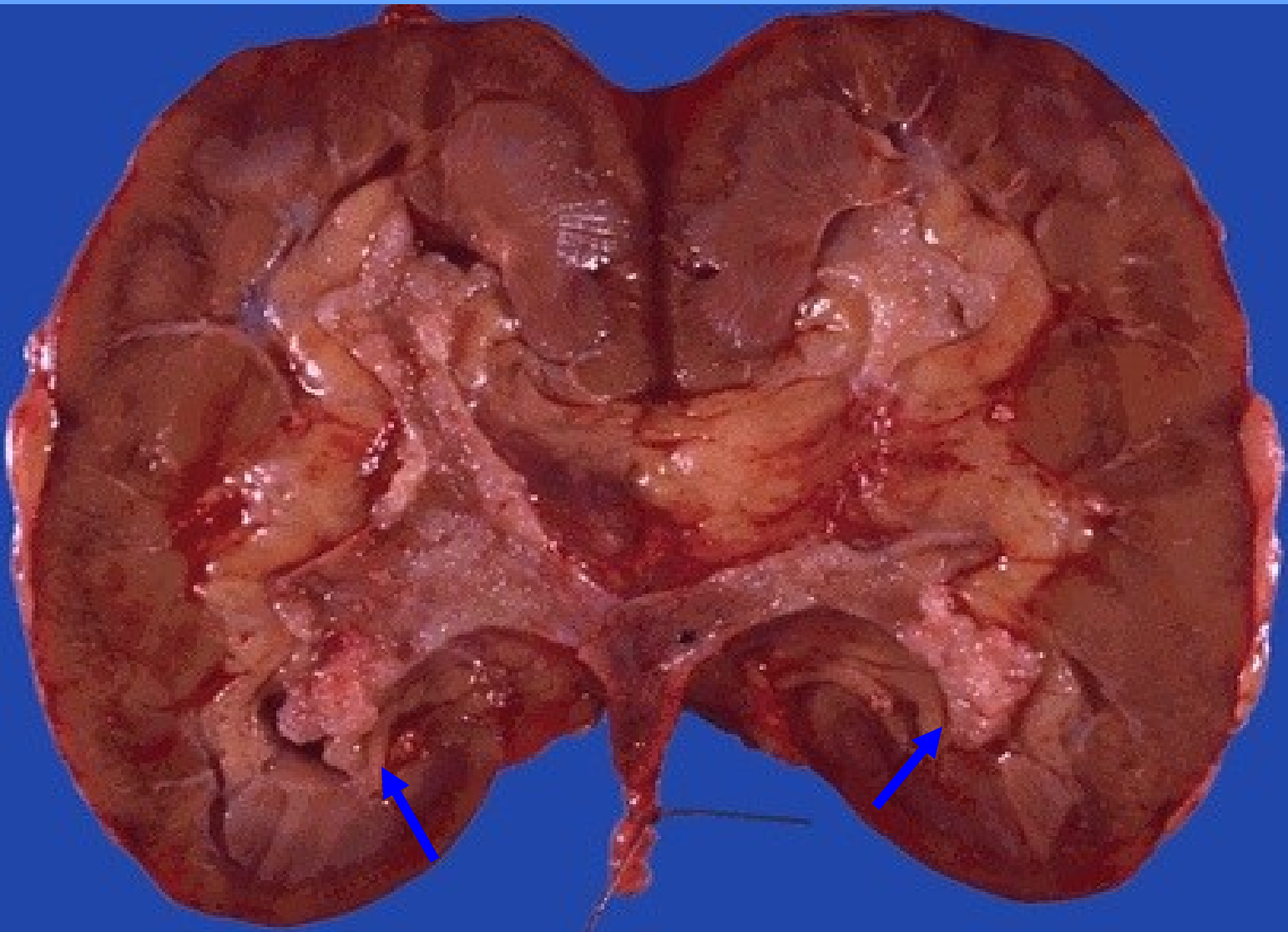




## Human renal clear cell carcinoma

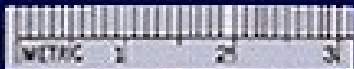


The cut surfaces of the kidney removed surgically here demonstrate normal cortex and medulla, but the calyces show focal papillary tumor masses of transitional cell carcinoma.



Transitional cell carcinoma that is more aggressive and is invading into the renal parenchyma.

Hematuria is a frequent presenting symptom.





# Wilm's tumor of the kidney

This small kidney from a 4 year old child contains a lobulated tan-white mass.

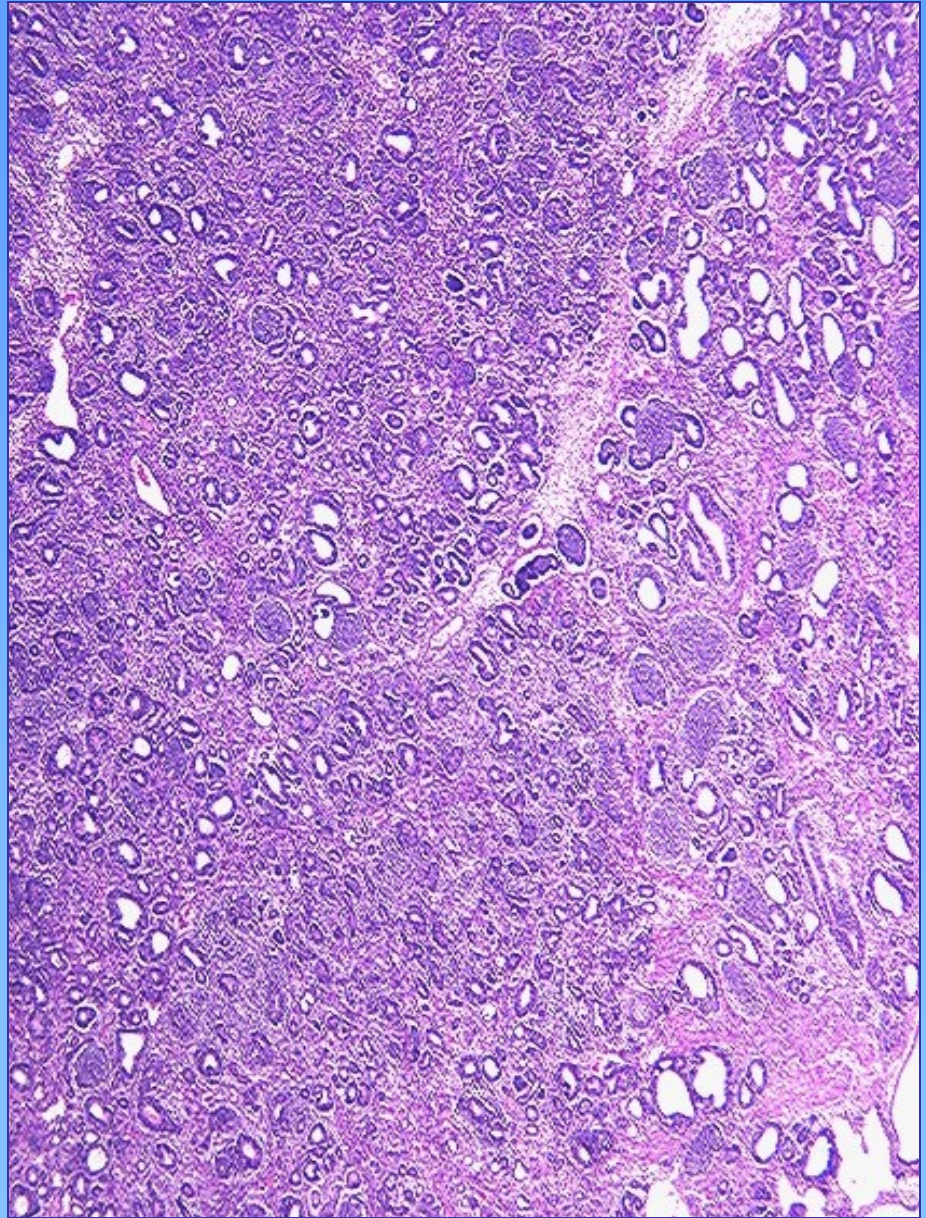
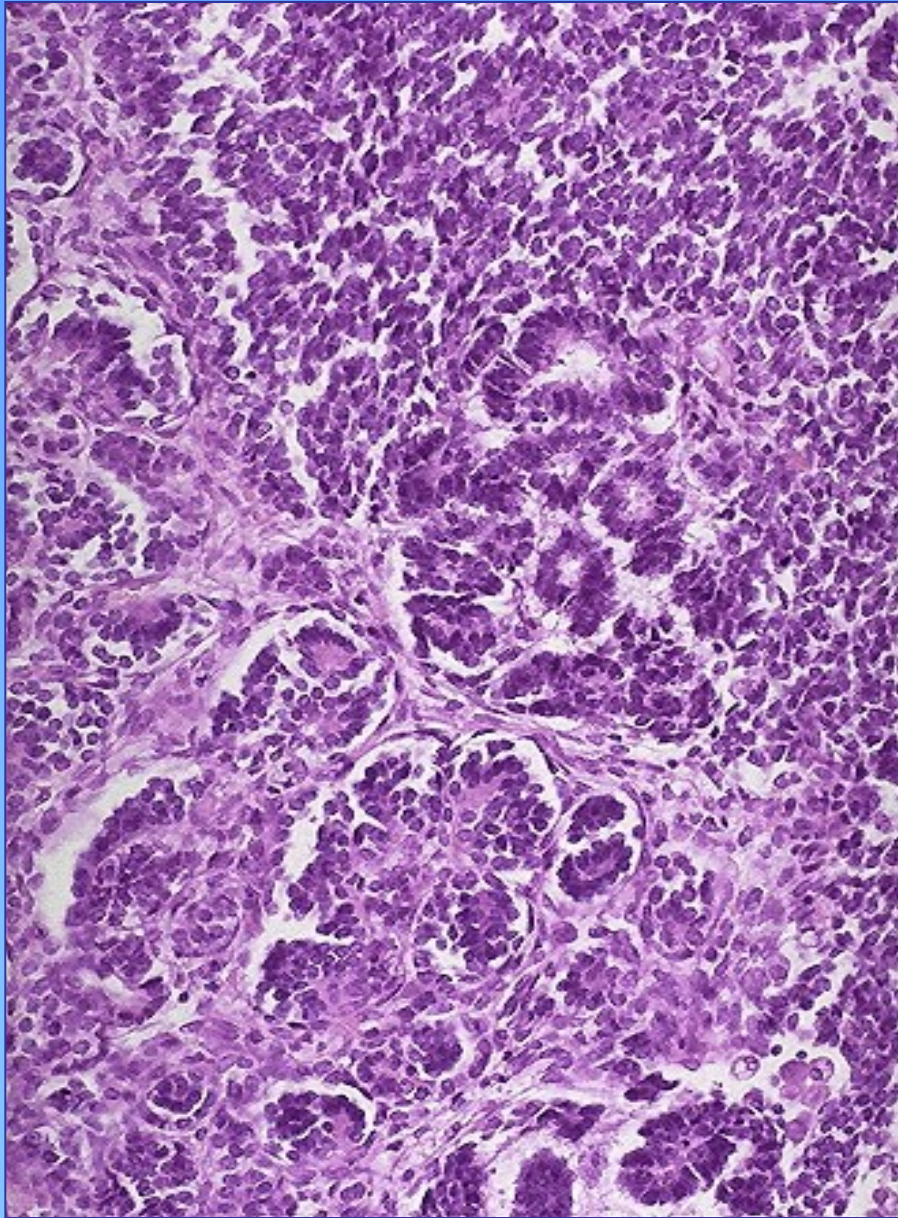
Many are now known to be associated with genetic defects on chromosome 11.

The children with Wilm's tumor usually present with abdominal enlargement from the mass effect. Nowadays, treatment gives a better than 90% 5 year survival.



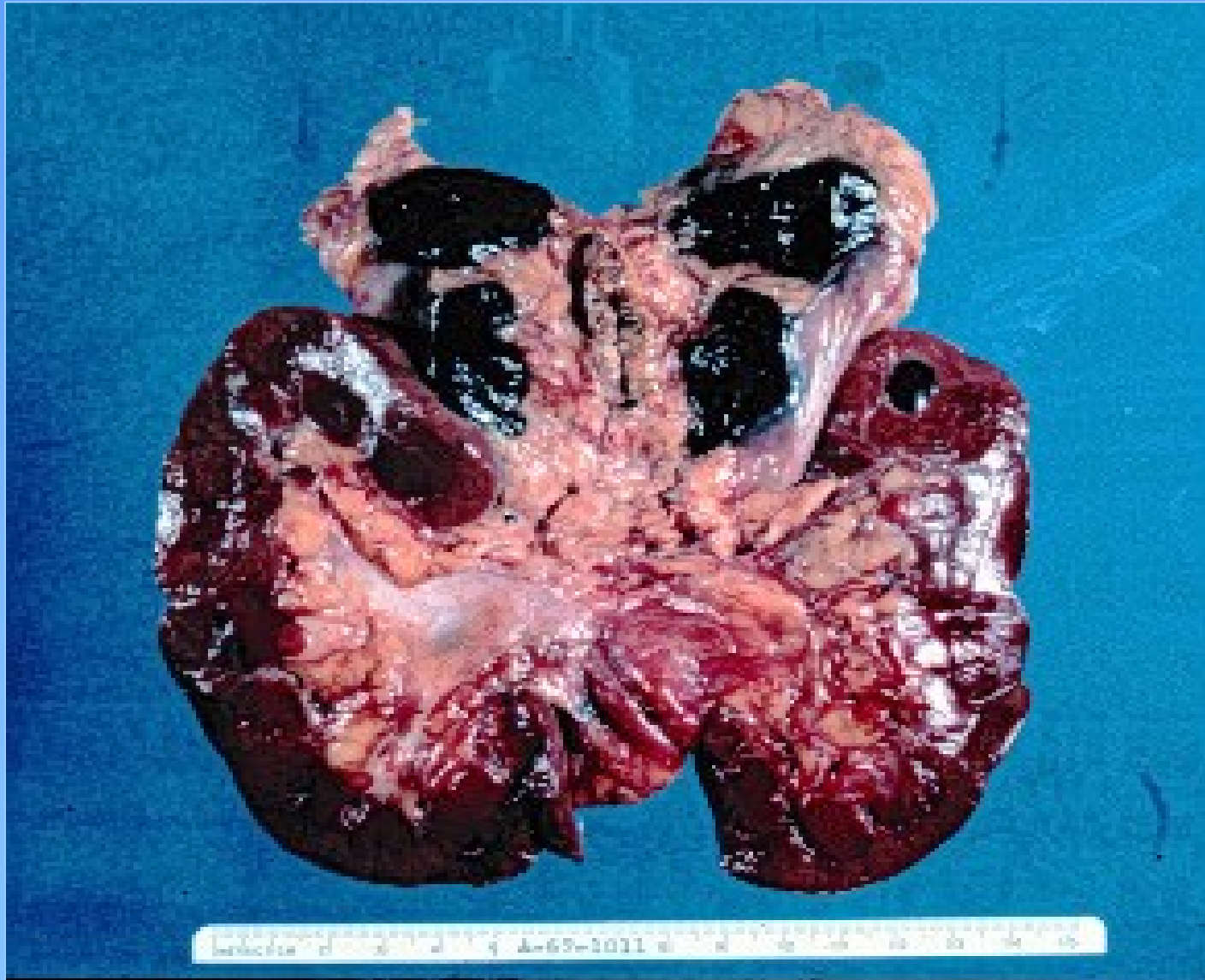


## Nephroblastoma – Wilms tumor

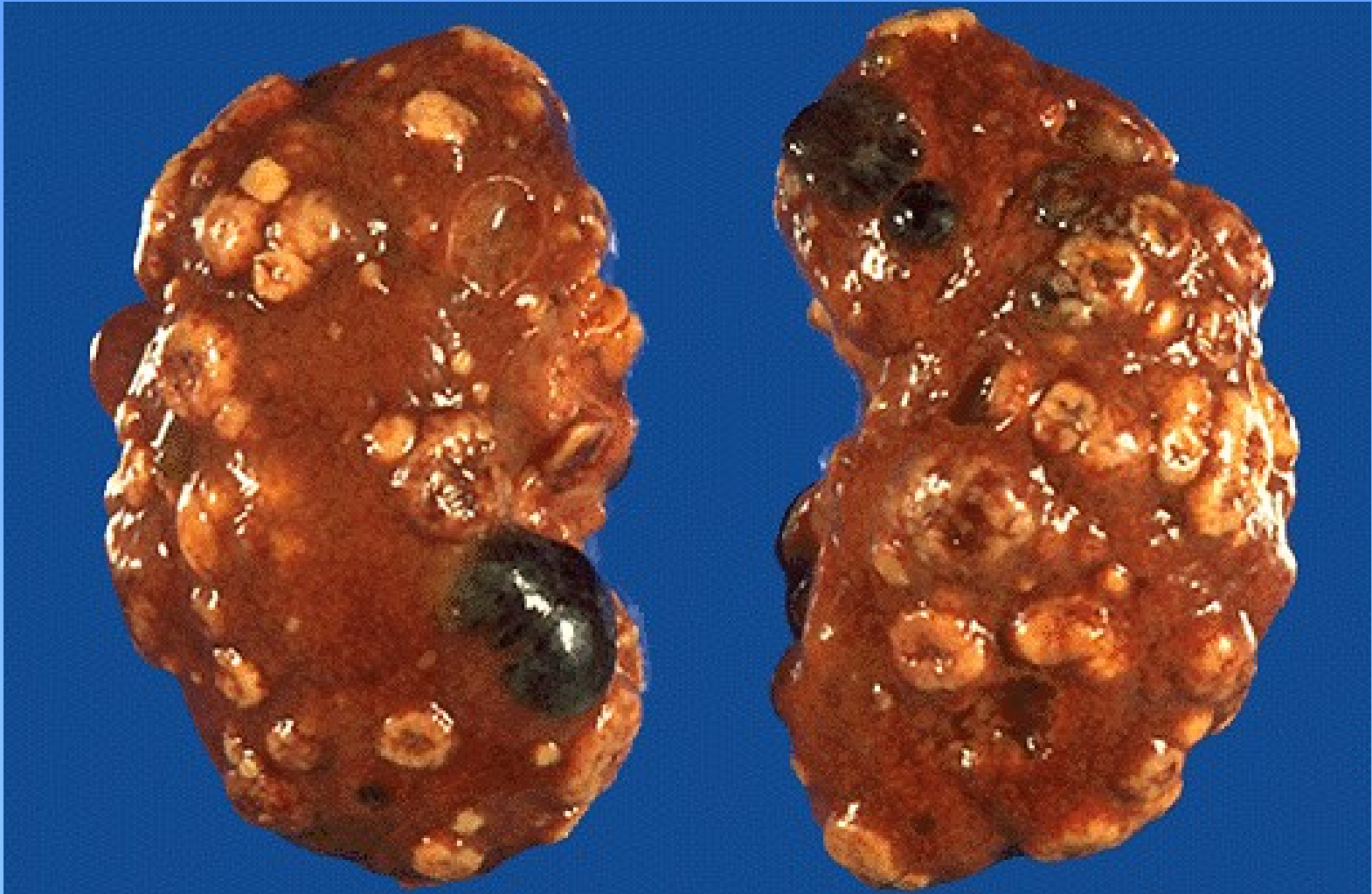




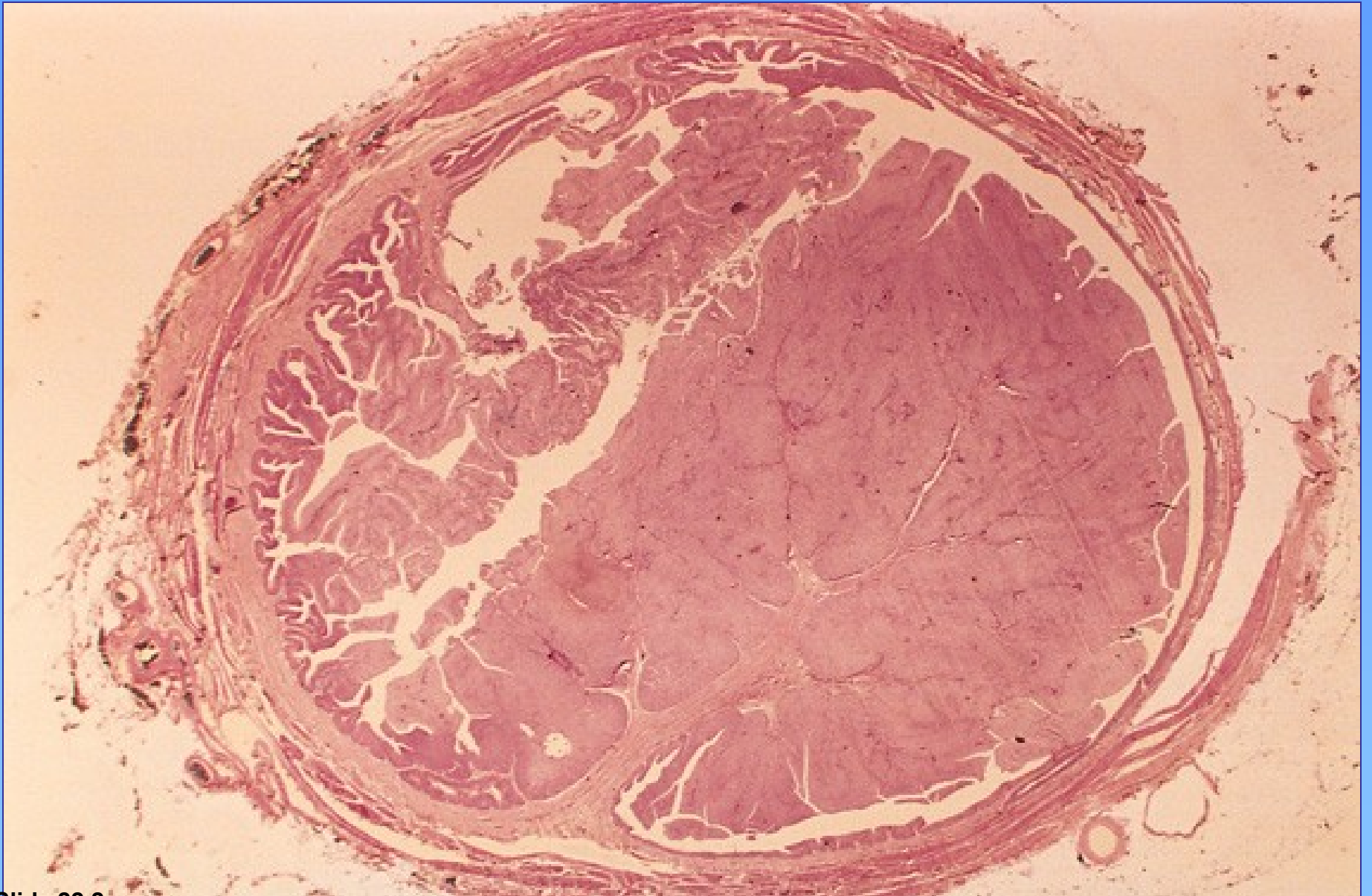
Metastatic neoplasm involving the kidney and adrenal gland. This black neoplasm could only be a metastatic melanoma.

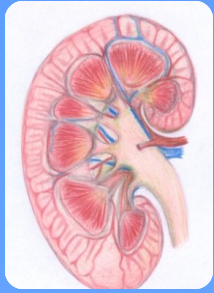


**The multiple irregular bilateral masses (many of which show central indentations, or "umbilications", from necrosis) here represent metastases of carcinoma to the kidneys. Kidney is not a usual site for metastases.**



## Tumor masses of transitional cell carcinoma arising in ureter



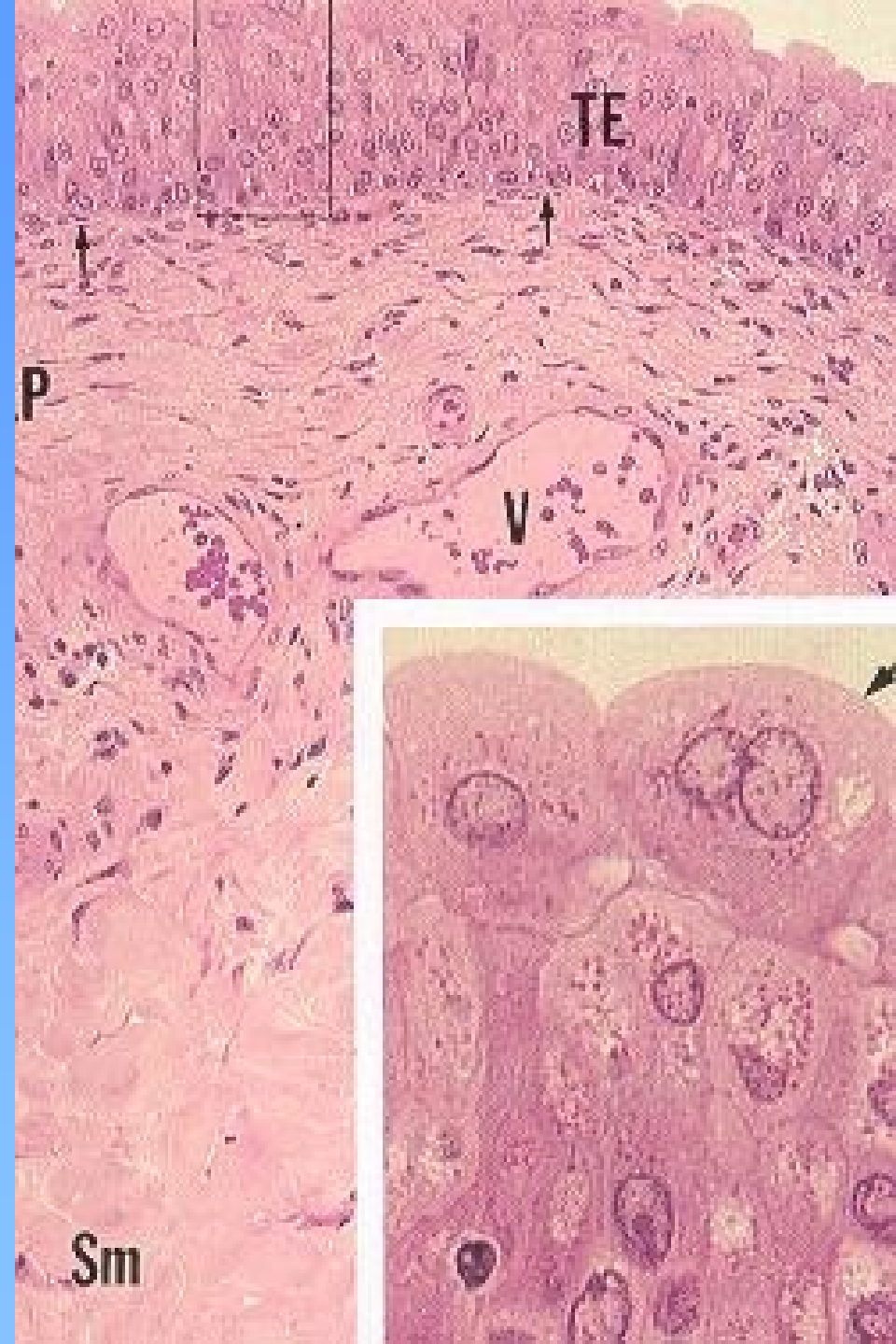


# Urinary bladder



# Bladder

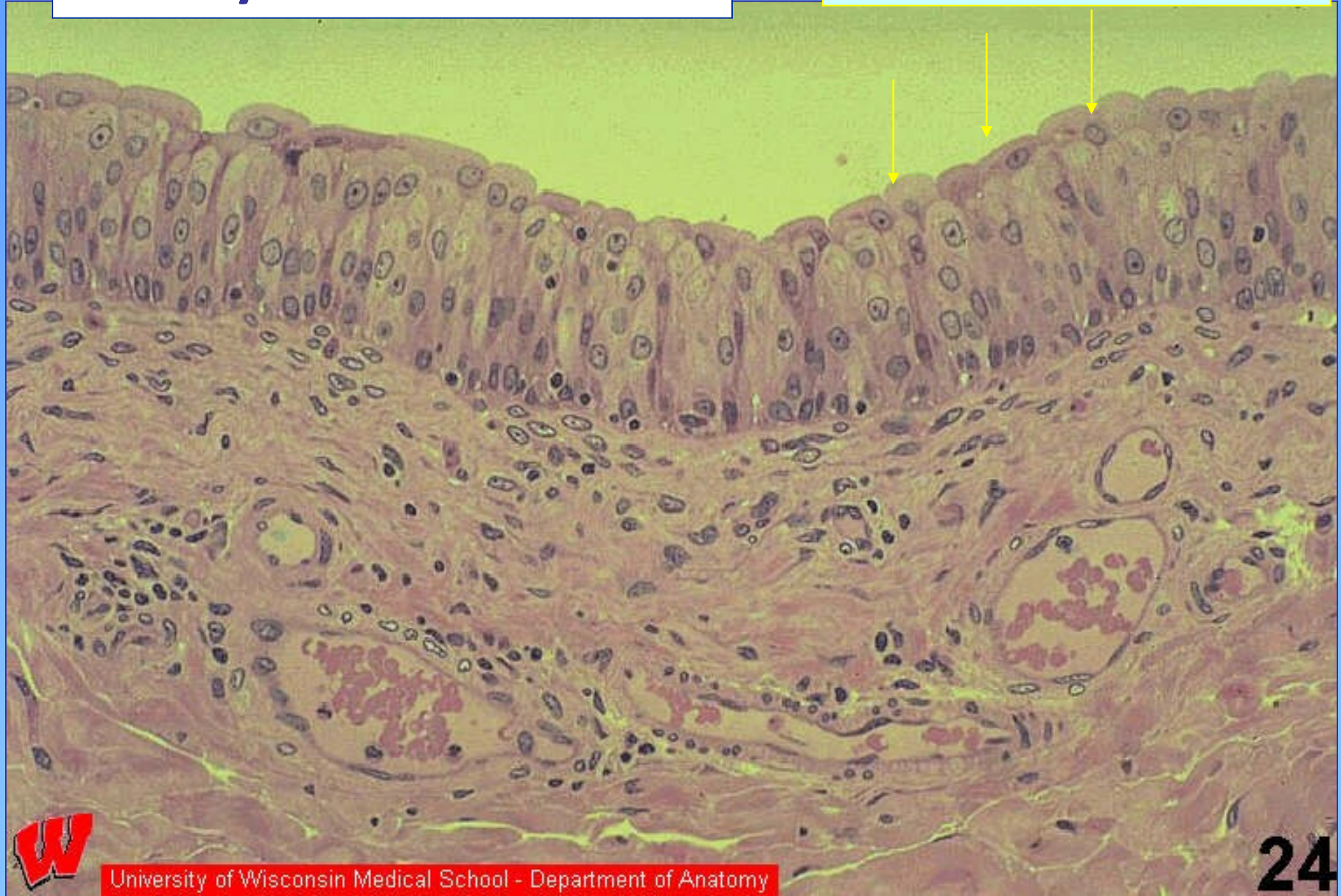
- Transitional epithelium: some cells binucleated, thickened membrane to protect tissues from urine
- Smooth muscle runs in random directions except at neck where 3 layers may be detected: inner longitudinal, middle circular and outer longitudinal layers
- Outer adventitia
- Urethra covered in reproductive system lectures





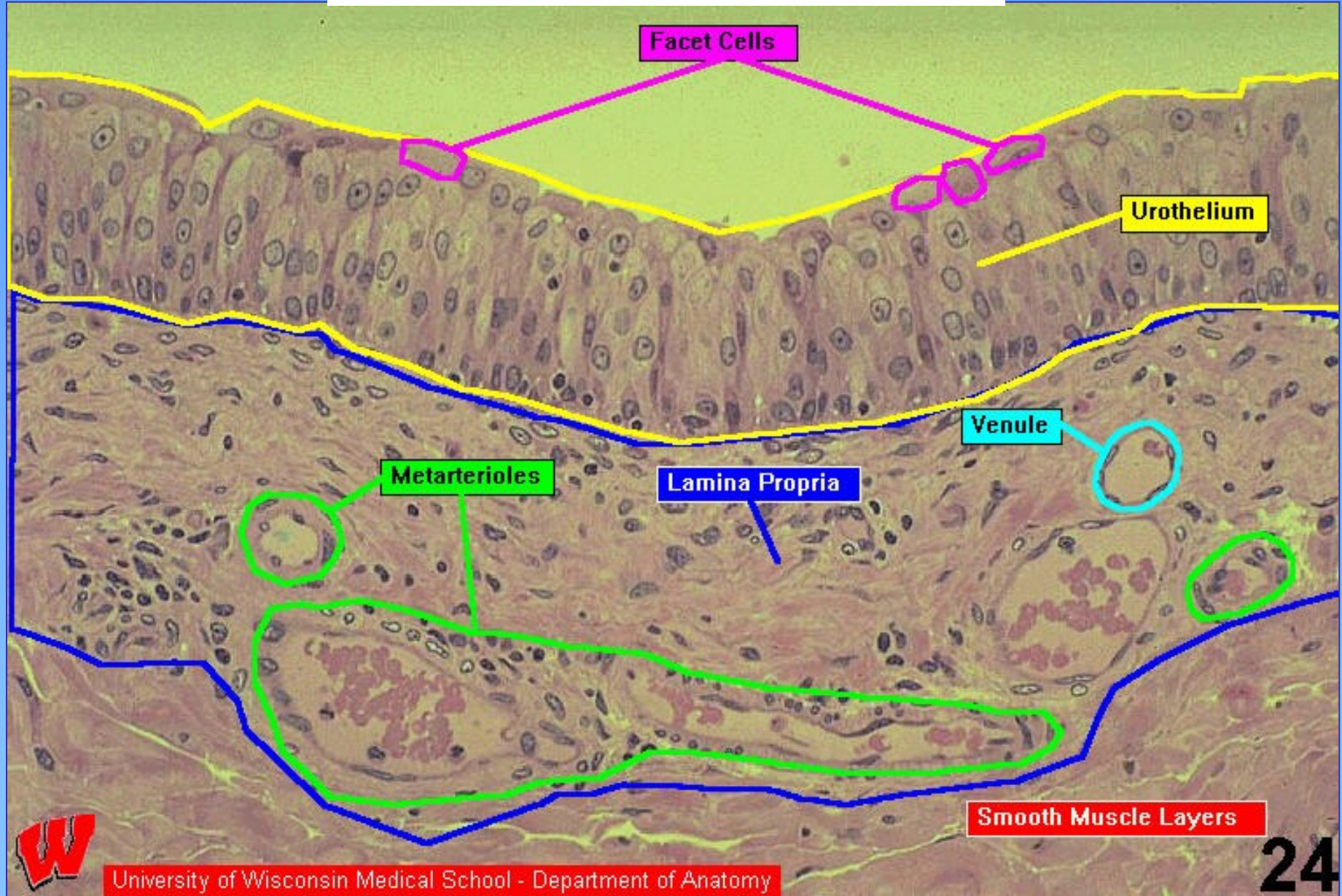
# Urinary bladder musosa

Facet (umbrella) cells contain membrane protein - uroplakin



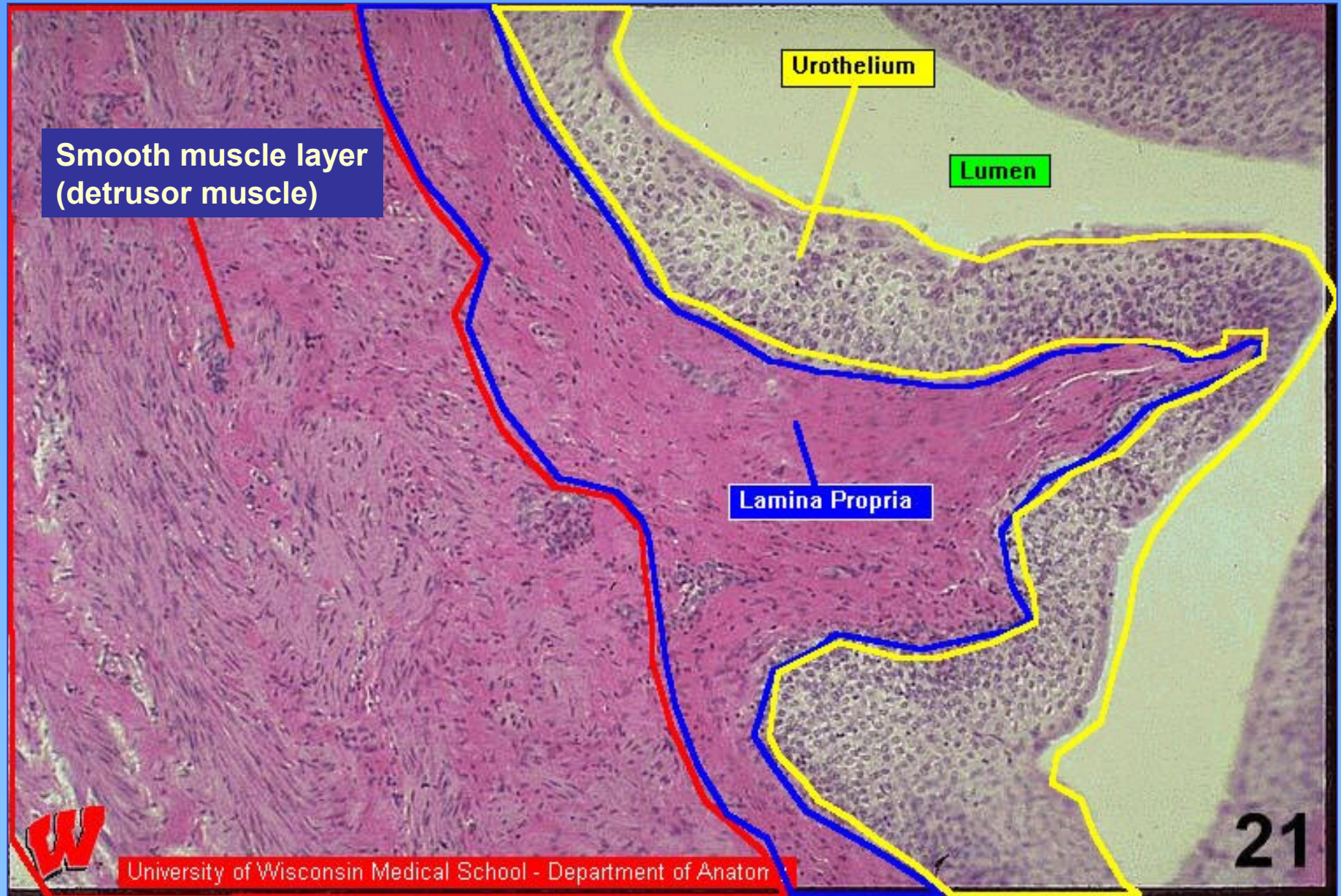


# Urinary bladder musosa



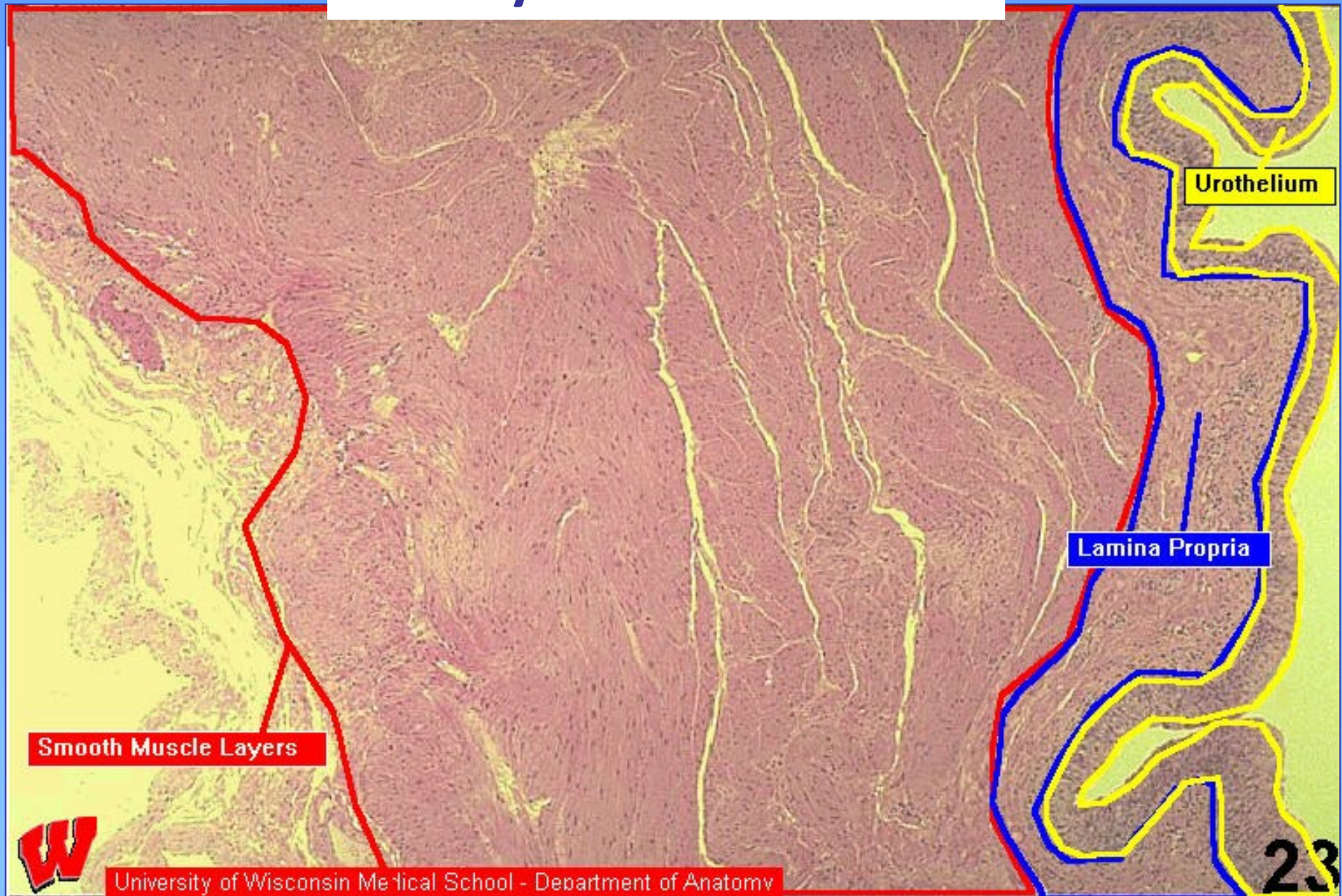


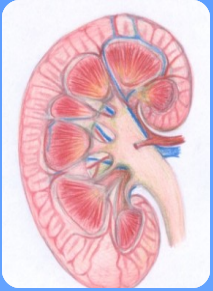
# Urinary bladder musosa





# Urinary bladder musosa





# Urinary bladder

## Major clinical problems:

### Inflammations

- *Interstitial*
- *Malakoplakia*
- *Cystitis glandularis*

### Neoplasms

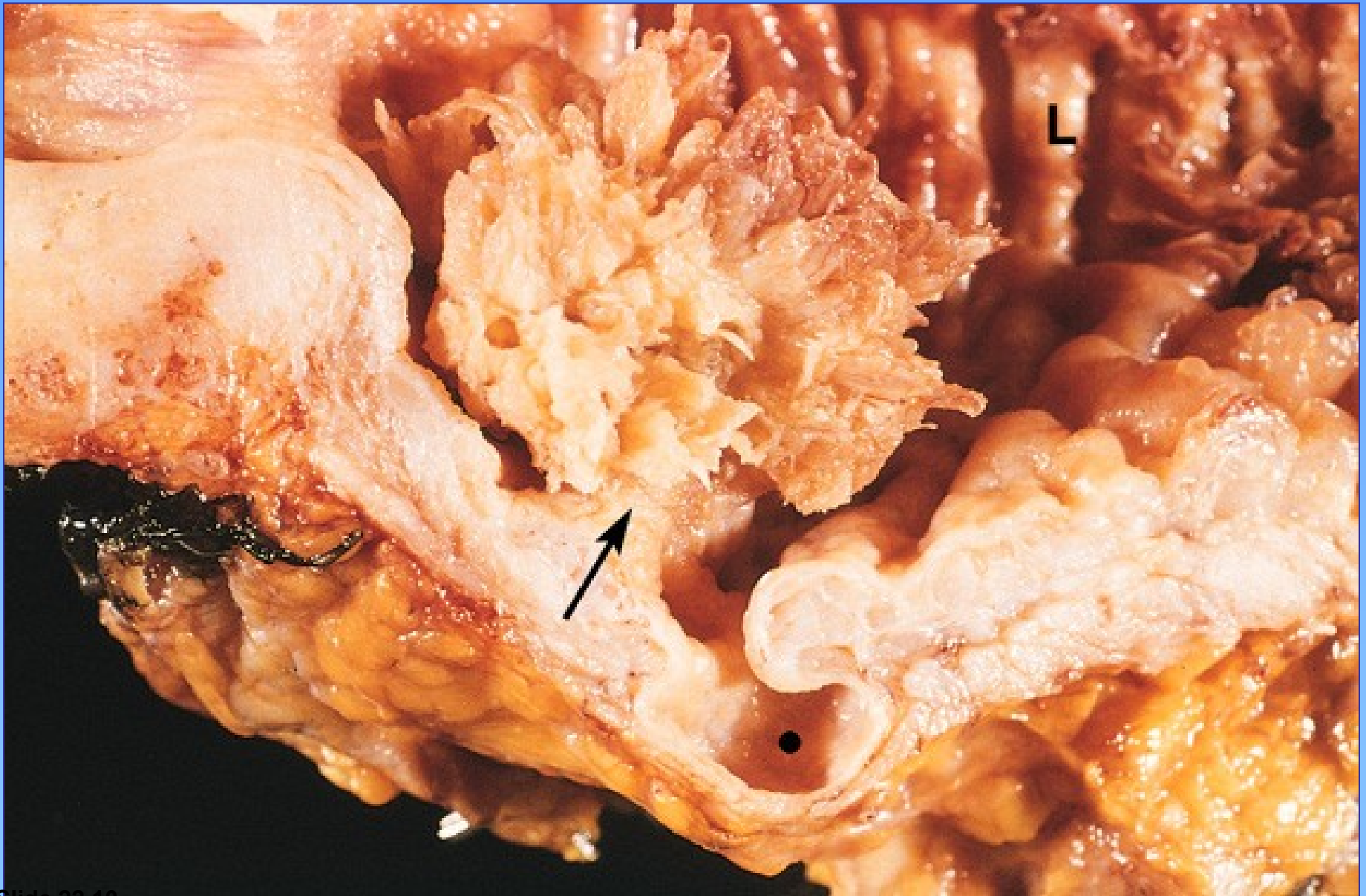
- Transitional cell carcinoma
- Squamous cell carcinoma
- Adenocarcinoma (urachal)

Bladder was removed from a male who had presented with hematuria. The opened bladder reveals masses of a neoplasm that histologically transitional cell carcinoma (TCC). TCC can arise anywhere in the urothelium, most common in bladder. TCC is often multifocal and has a tendency to recur.





## Transitional cell carcinoma (TCC).

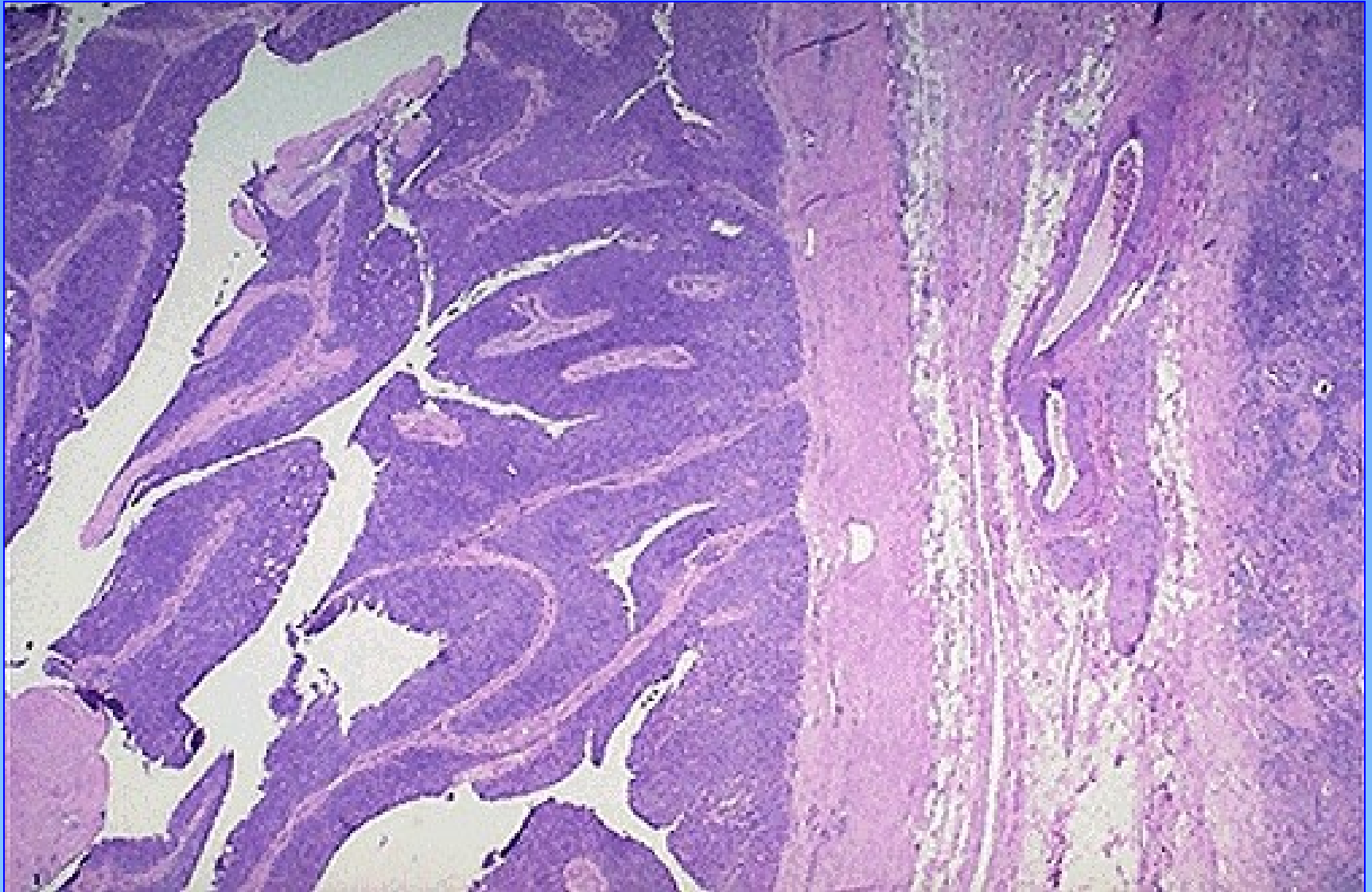




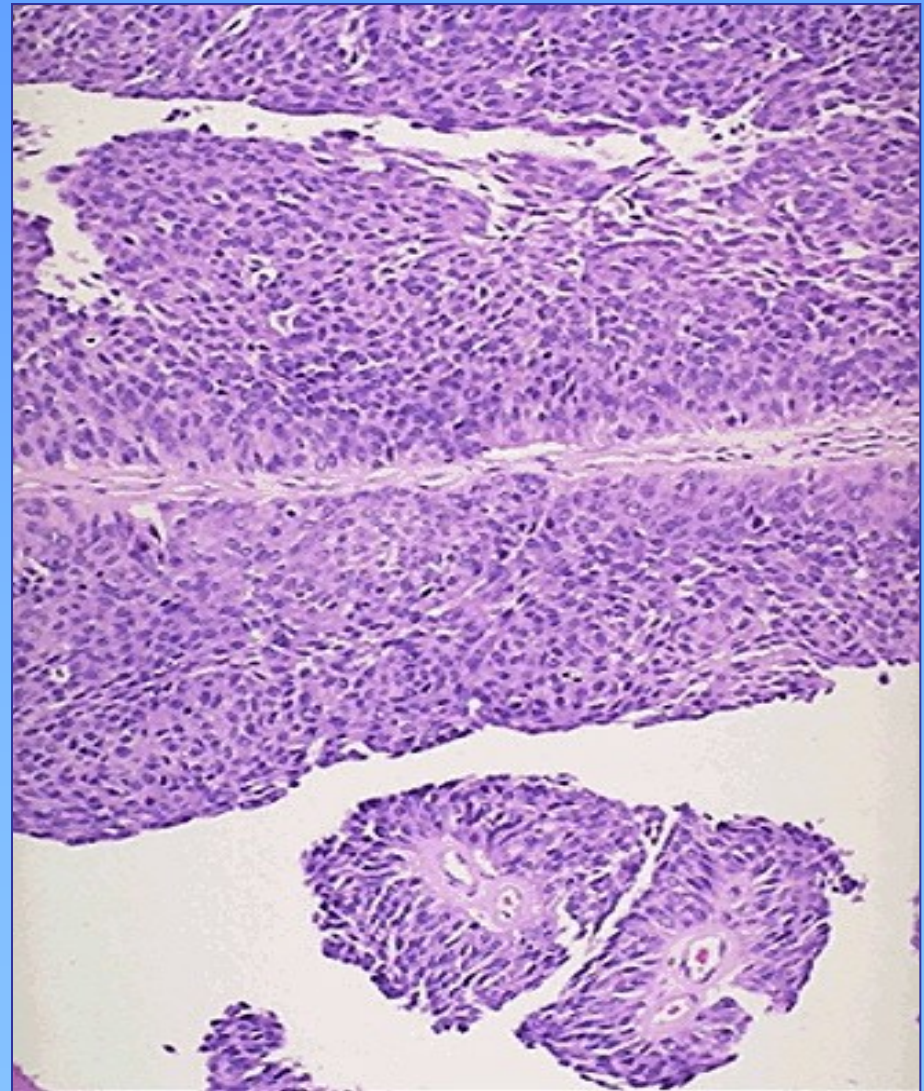
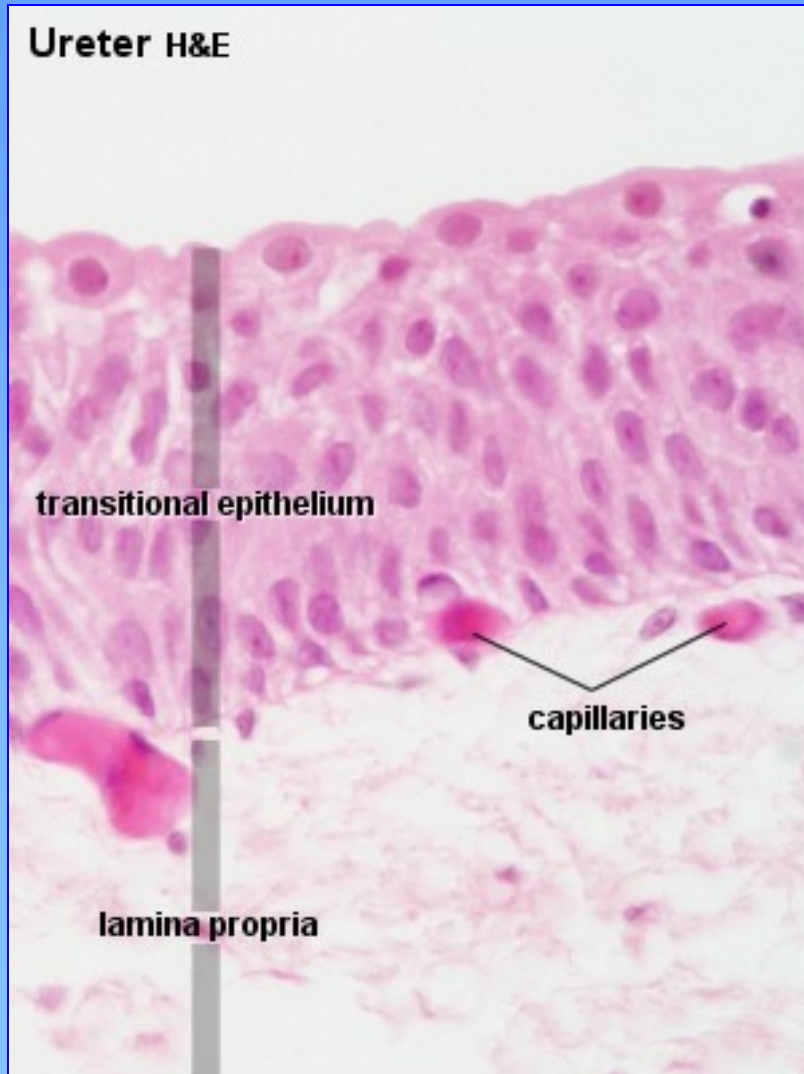
Papillomatous growth of transitional cell carcinoma (TCC).



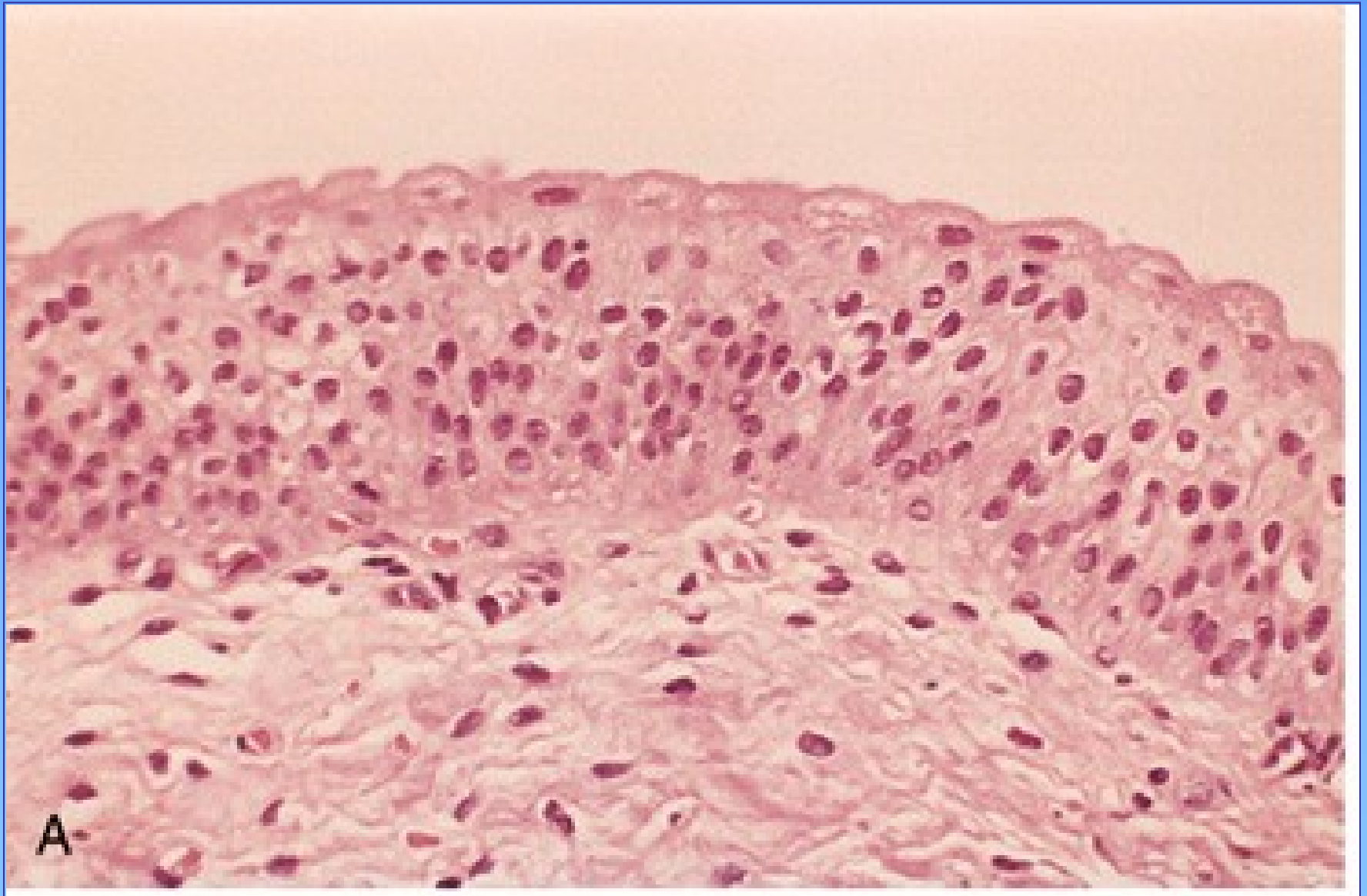
## Transitional cell carcinoma of the urothelium



The transitional cell carcinoma does resemble urothelium, but the thickness is much greater than normal and the cells show more pleomorphism.

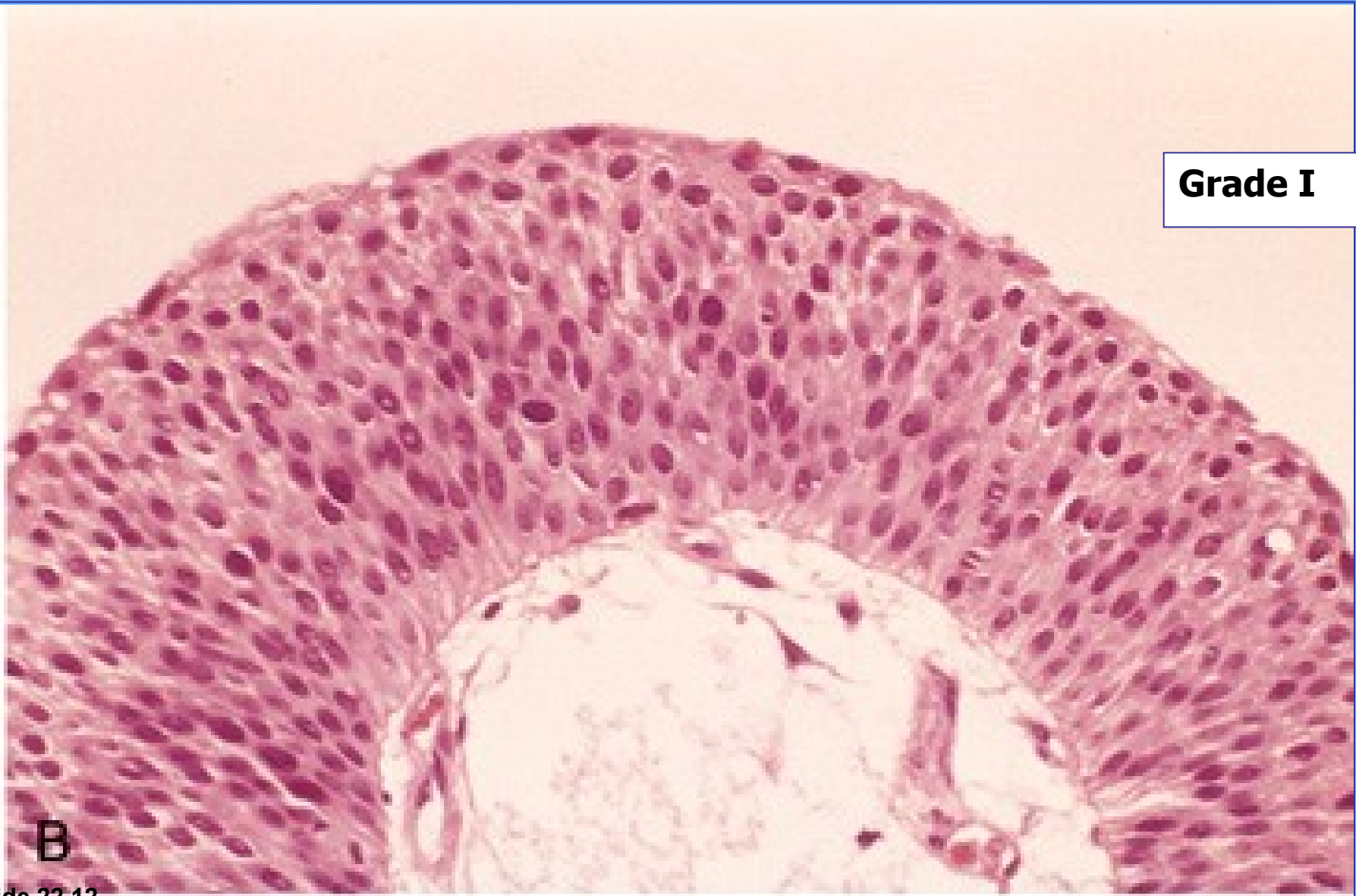


## Urinary bladder – normal urothelial lining





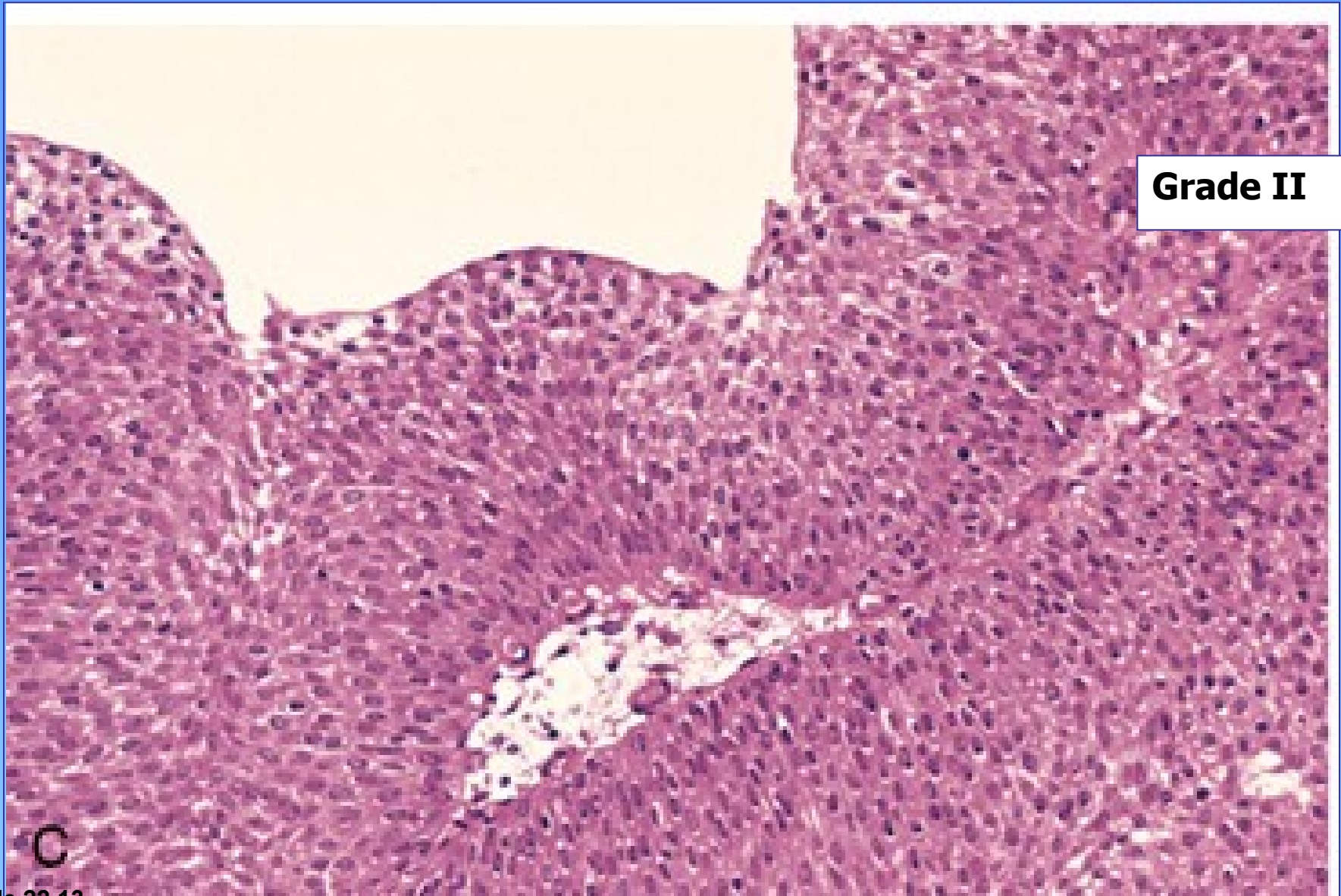
The transitional cell carcinoma does resemble urothelium, but the thickness is much greater than normal and the cells show more pleomorphism.



**Grade I**

**B**

The transitional cell carcinoma does resemble urothelium, but the thickness is much greater than normal and the cells show more pleomorphism.



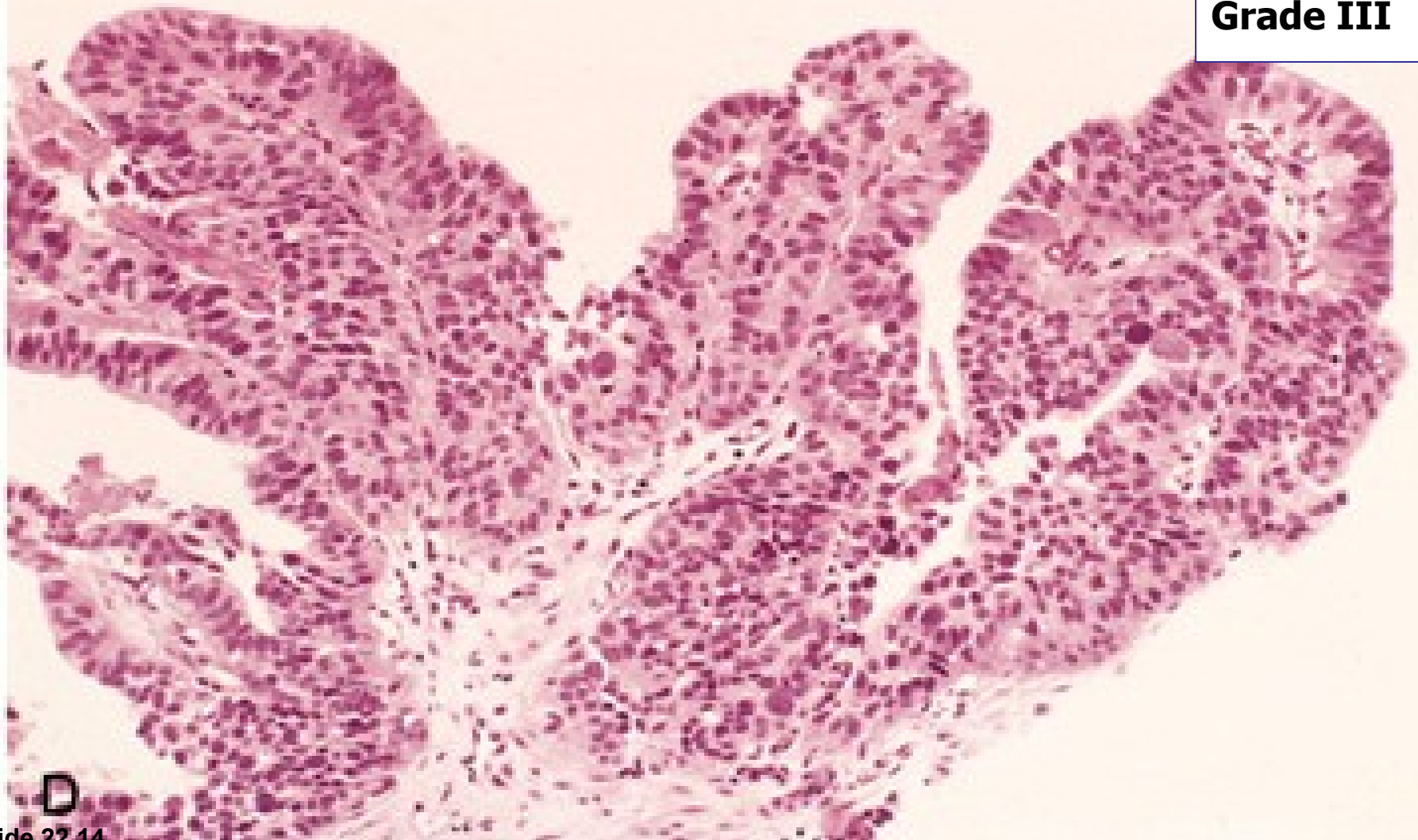
**Grade II**

C



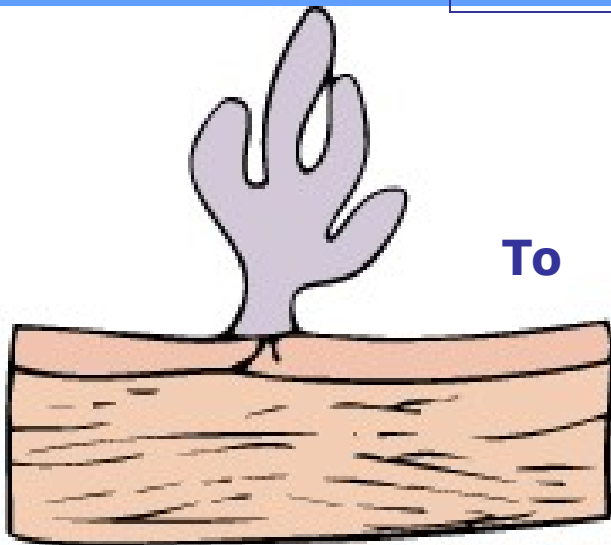
The transitional cell carcinoma does resemble urothelium, but the thickness is much greater than normal and the cells show more pleomorphism.

**Grade III**



D

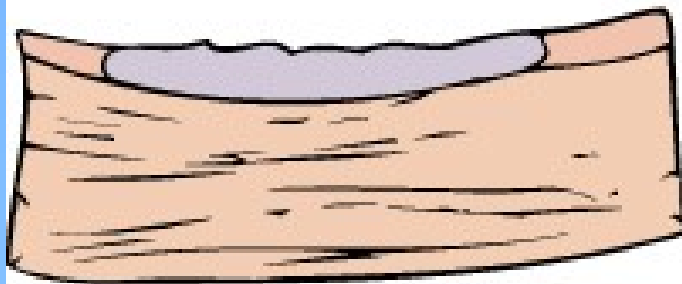
## The transitional cell carcinoma



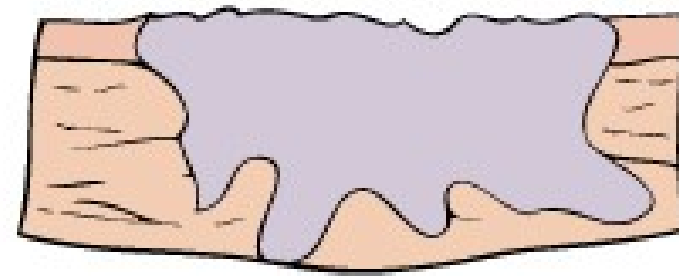
Papilloma—  
papillary carcinoma



Invasive  
papillary carcinoma

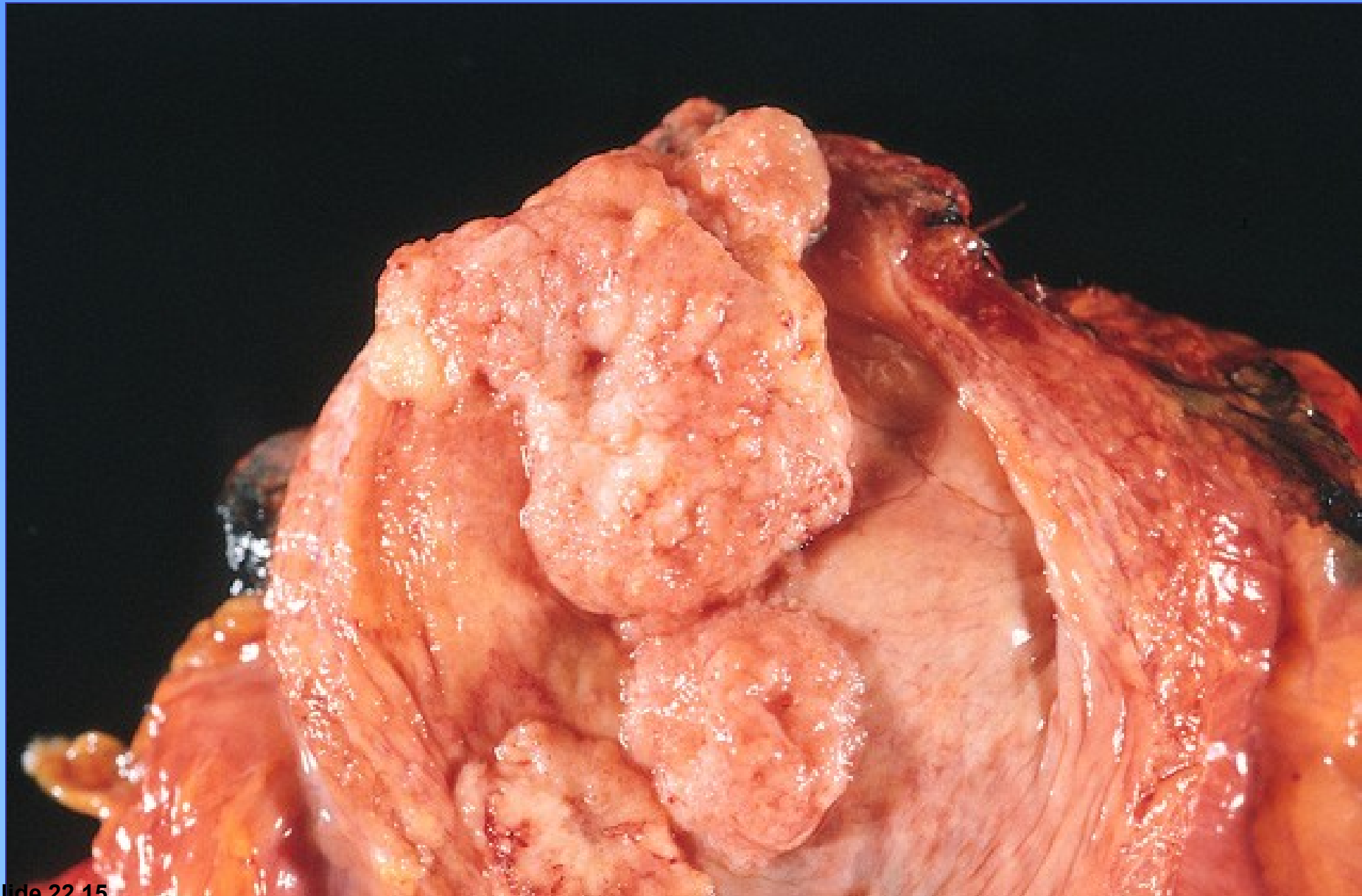


Flat noninvasive  
carcinoma

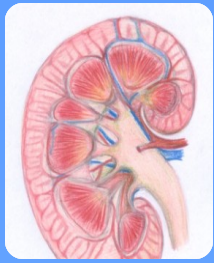


Flat invasive  
carcinoma

## The transitional cell carcinoma – high grade invasive







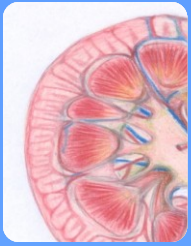
# Urinary bladder

## Major clinical problems:

### Neoplasms

### Pathogenesis links:

- Industrial exposure to arylamines
- Schistosomiasis
- Cigarette smoking



# CONCLUSION