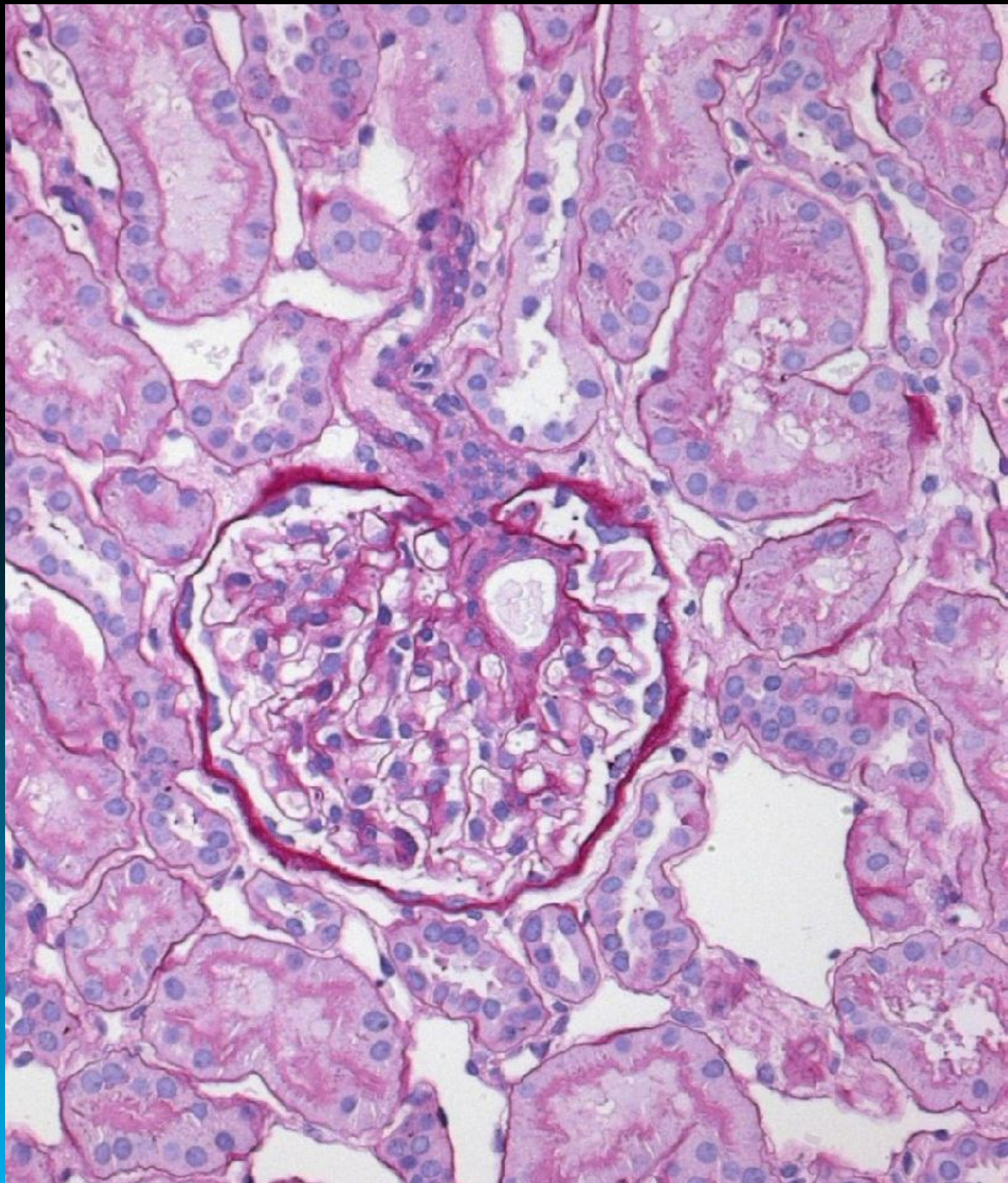


**V.I. Vernadsky Crimean Federal University
Medical Academy named after S.I. Geogievsky**

DISEASES OF KIDNEY

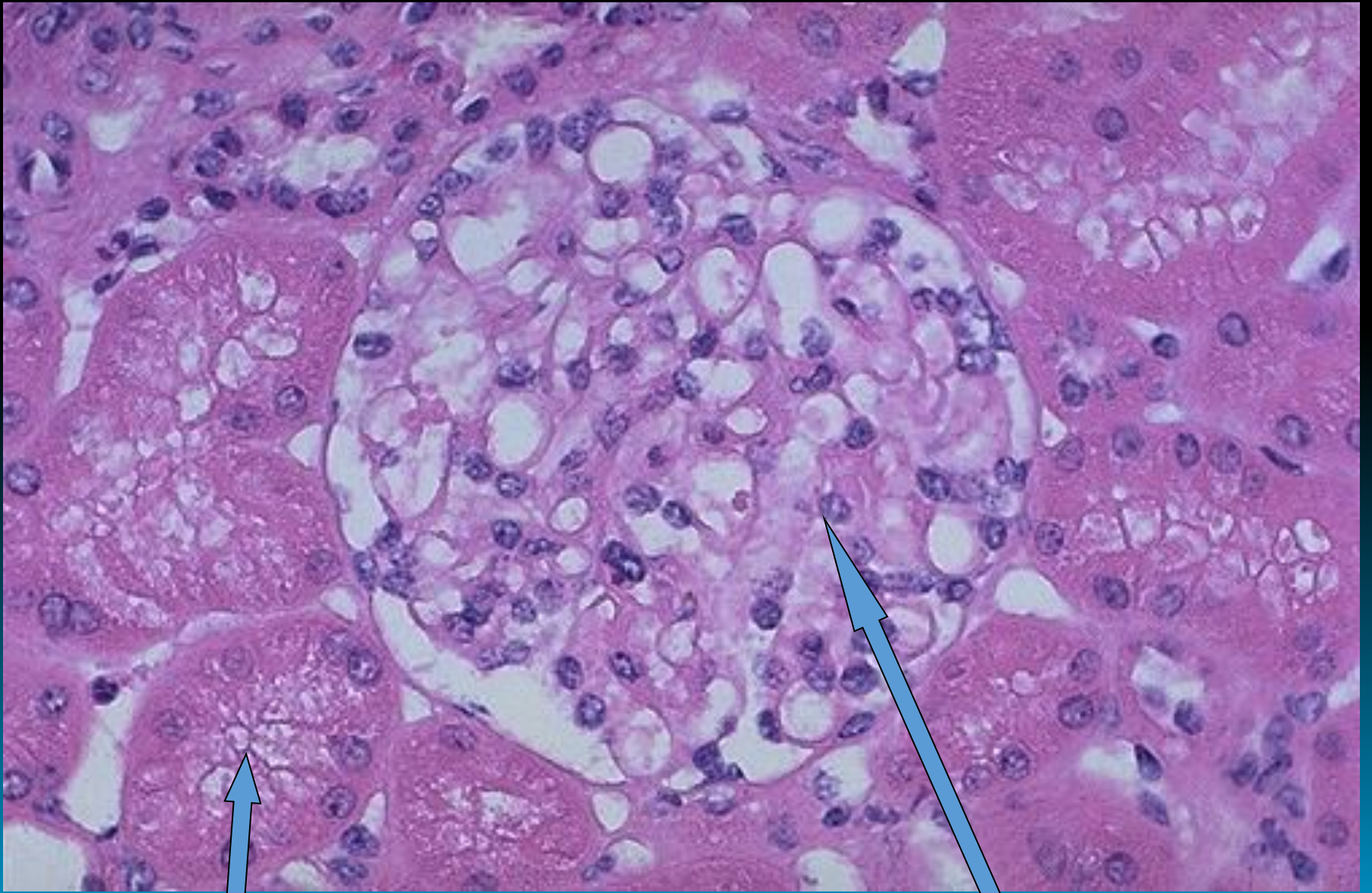
**Department of Pathological Anatomy
with Sectional Course**

Lecturer: Beketov A.A.



Diseases of Kidney

- Glomerulopathy**
- Tubulopathy**
- Interstitial diseases**
- Tumors**
- Congenital anomalies**



Tubulopathy

Glomerulopathy

Renal and extrarenal symptoms

Renal symptoms

- Pyuria;
- Hematuria;
- Cylindruria;
- Leucocyturia;
- Bacteriuria;
- Oliguria.

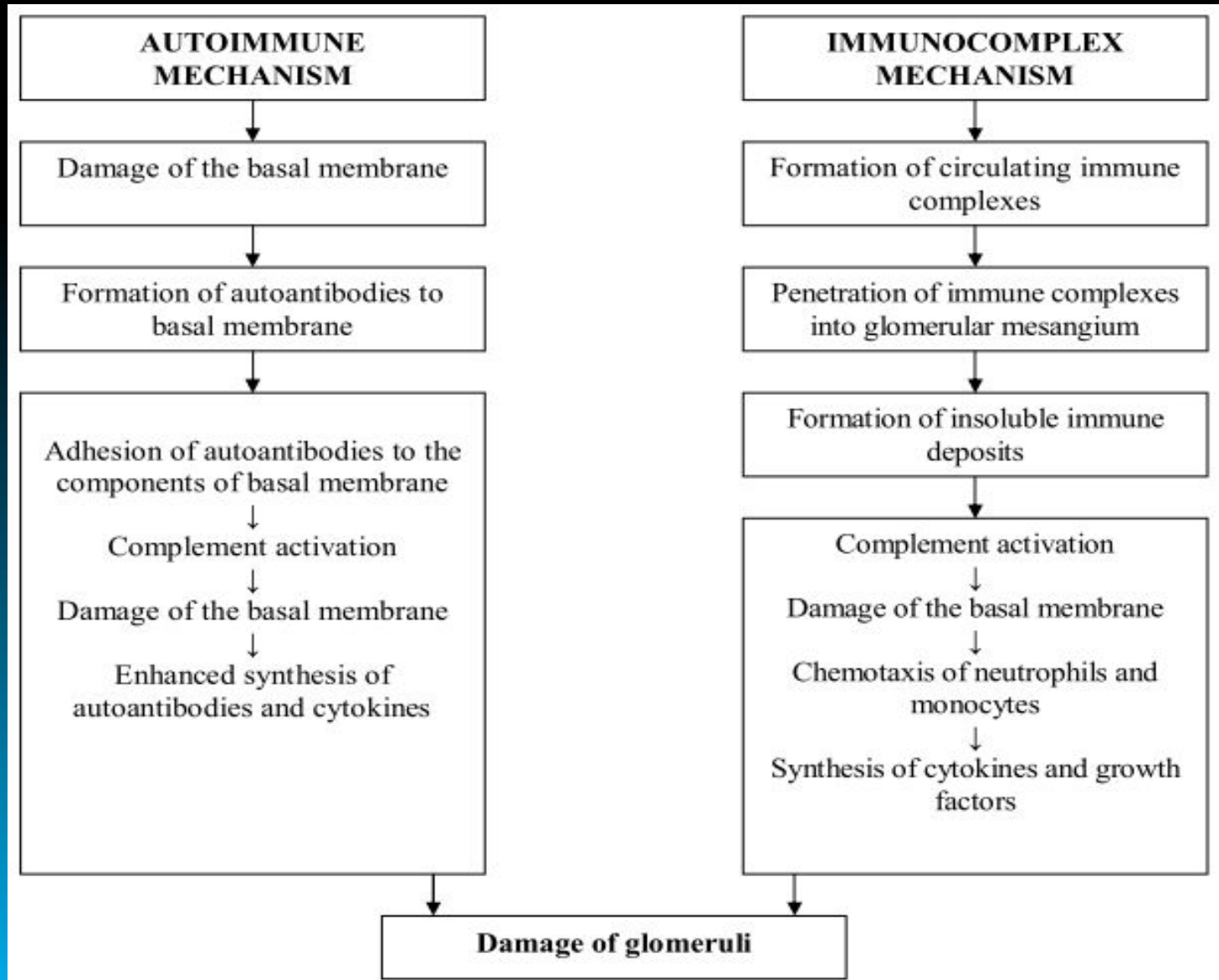
Extrarenal symptoms

- Edema;
- Hypoproteinemia and dysproteinemia;
- Hypertension;
- Hyperazotemia;
- Anemia.

Glomerulonephritis

Glomerulonephritis is an infectious and allergic disease or disease of unknown nature, which is based on bilateral diffuse or focal non-purulent inflammation of the renal glomeruli with the presence of renal and extrarenal manifestations.

Pathogenesis



MAIN CLINICAL SYNDROMES

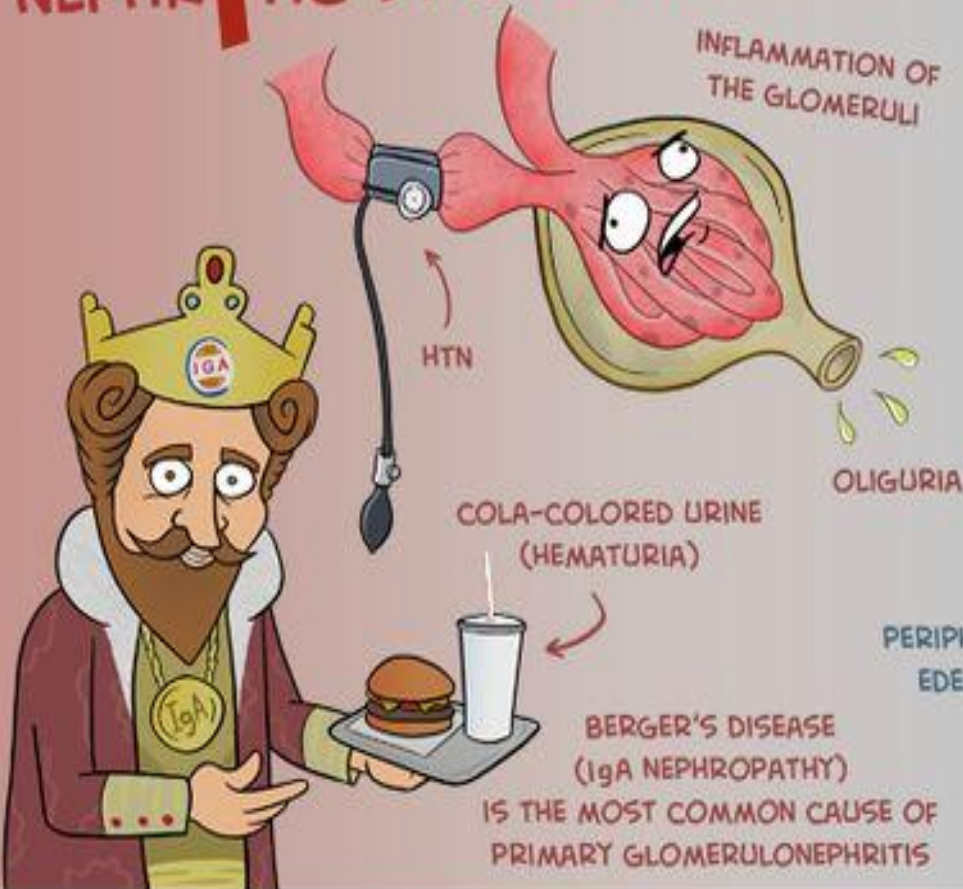
1) NEPHROTIC

2) NEPHRITIC

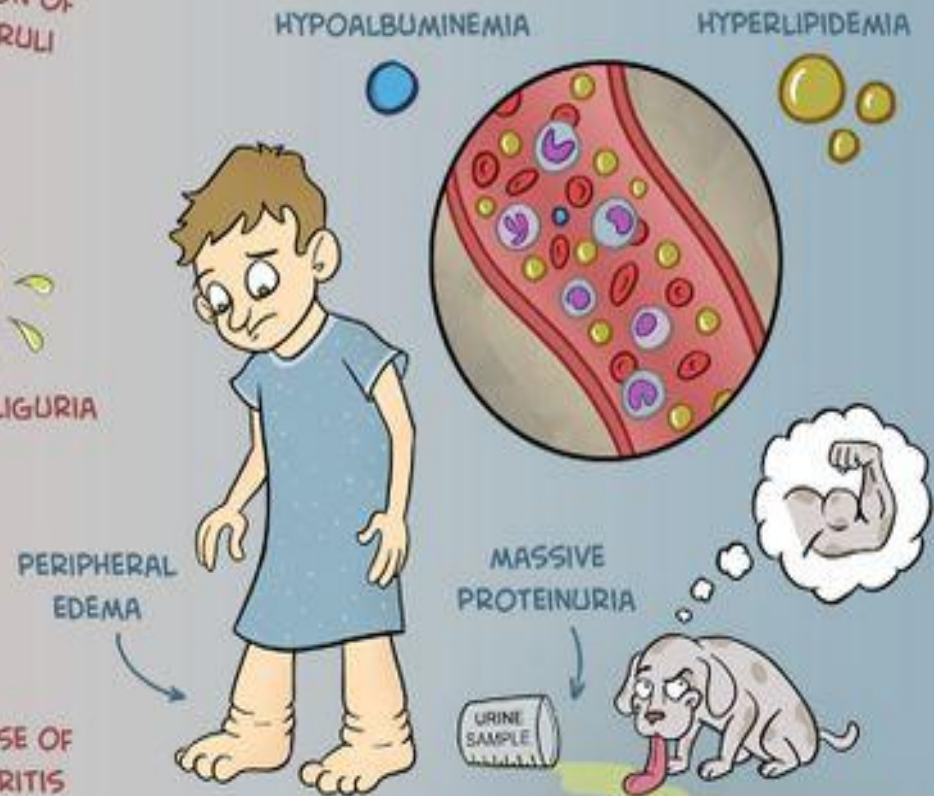
3) SLOWLY PROGRESSIVE UREMIA

NEPHRITIC VS. NEPHROTIC SYNDROMES

NEPHRITIC SYNDROME



NEPHROTIC SYNDROME





Palpebral edema



Anasarca

Principal classifications of glomerulonephritis:

1. Primary, secondary, hereditary.
2. Acute, subacute, chronic.
3. Intracapillary, extracapillary.
4. Exudative, proliferative, mixed.
7. Diffuse, focal.

According to the etiological factors:

Primary glomerulonephritis:

- Acute diffuse proliferative glomerulonephritis;
- Rapidly progressive glomerulonephritis;
- Membranous glomerulonephritis;
- Lipoid nephrosis;
- Focal segmental glomerulosclerosis;
- Membranous-proliferative glomerulonephritis;
- Berger's disease (IgA-nephropathy);
- Chronic glomerulonephritis;

Secondary glomerulonephritis:

- Systemic lupus erythematosus;
- Diabetes mellitus;
- Amyloidosis;
- Goodpasture's syndrome;
- Periarteritis nodosa;
- Wegener's granulomatosis;

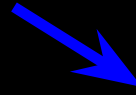
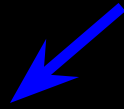
Hereditary glomerulonephritis:

- Alport syndrome;
- Fabry disease;

MORPHOLOGICAL CLASSIFICATION OF GLOMERULONEPHRITIS

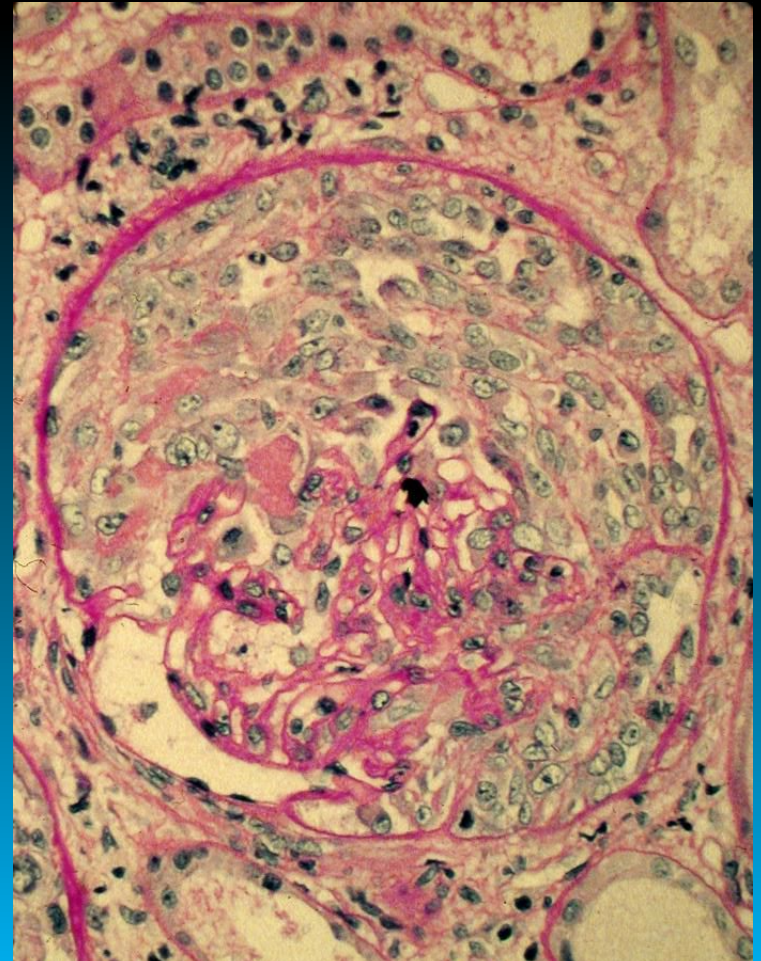
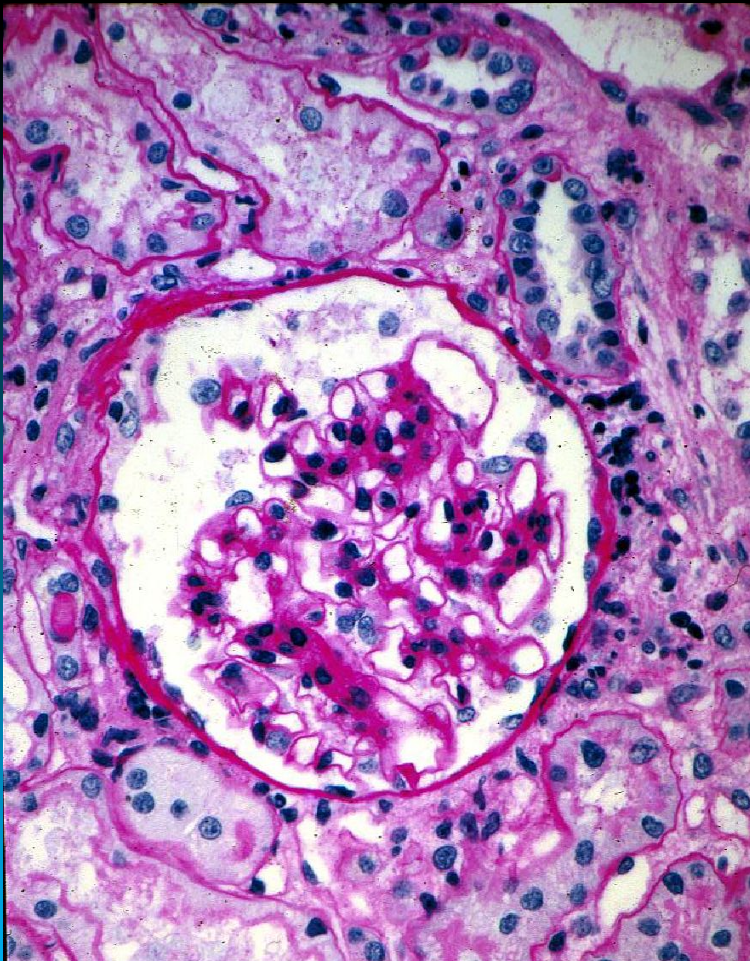
- 1. Diffuse intracapillary glomerulonephritis (acute glomerulonephritis).**
- 2. Extracapillary glomerulonephritis with crescents (rapidly progressive glomerulonephritis).**
- 3. Morphological variants of chronic glomerulonephritis:**
 - Glomerulonephritis with minimal changes;
 - Membranous nephropathy;
 - Mesangioproliferative glomerulonephritis;
 - Mesangiocapillary or membranoproliferative glomerulonephritis;
 - Focal segmental glomerulosclerosis;
 - Fibroplastic glomerulonephritis.

Glomerulonephritis

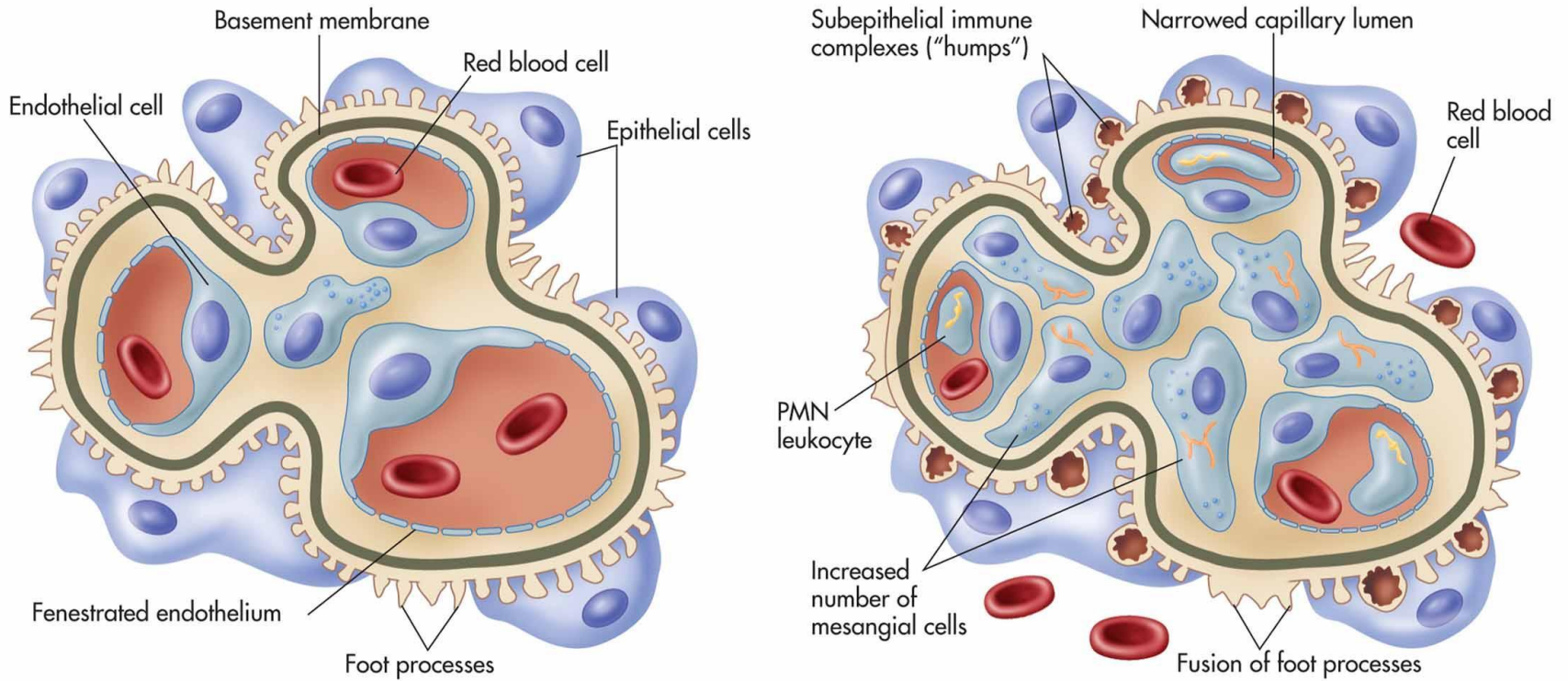


Intracapillary

Extracapillary



ACUTE GLOMERULONEPHRITIS



CLINICAL VARIANTS OF ACUTE GLOMERULONEPHRITIS

WITH NEPHRITIC SYNDROME

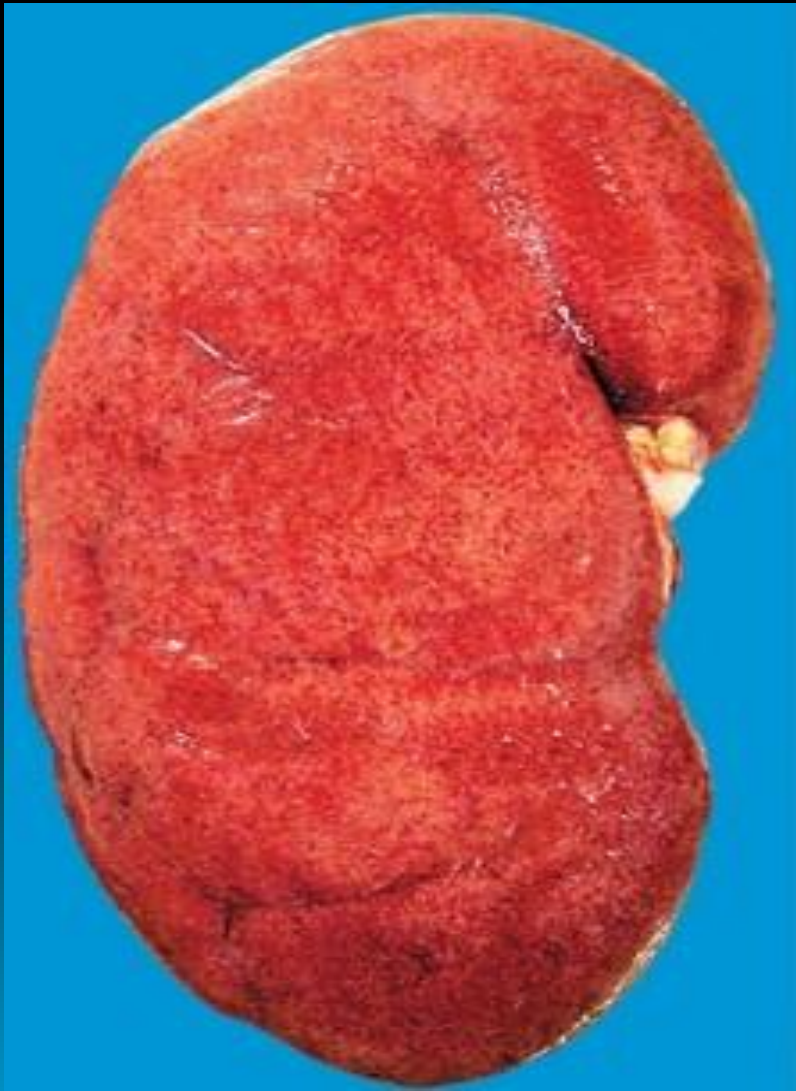
- Edema, shortness of breath, headache, nausea, vomiting, weakness;
- Arterial hypertension;
- Hematuria;
- Diuresis ↓;
- Glomerular filtration ↓;
- Azotemia ↑ (in severe cases).

WITH ISOLATED URINARY SYNDROME

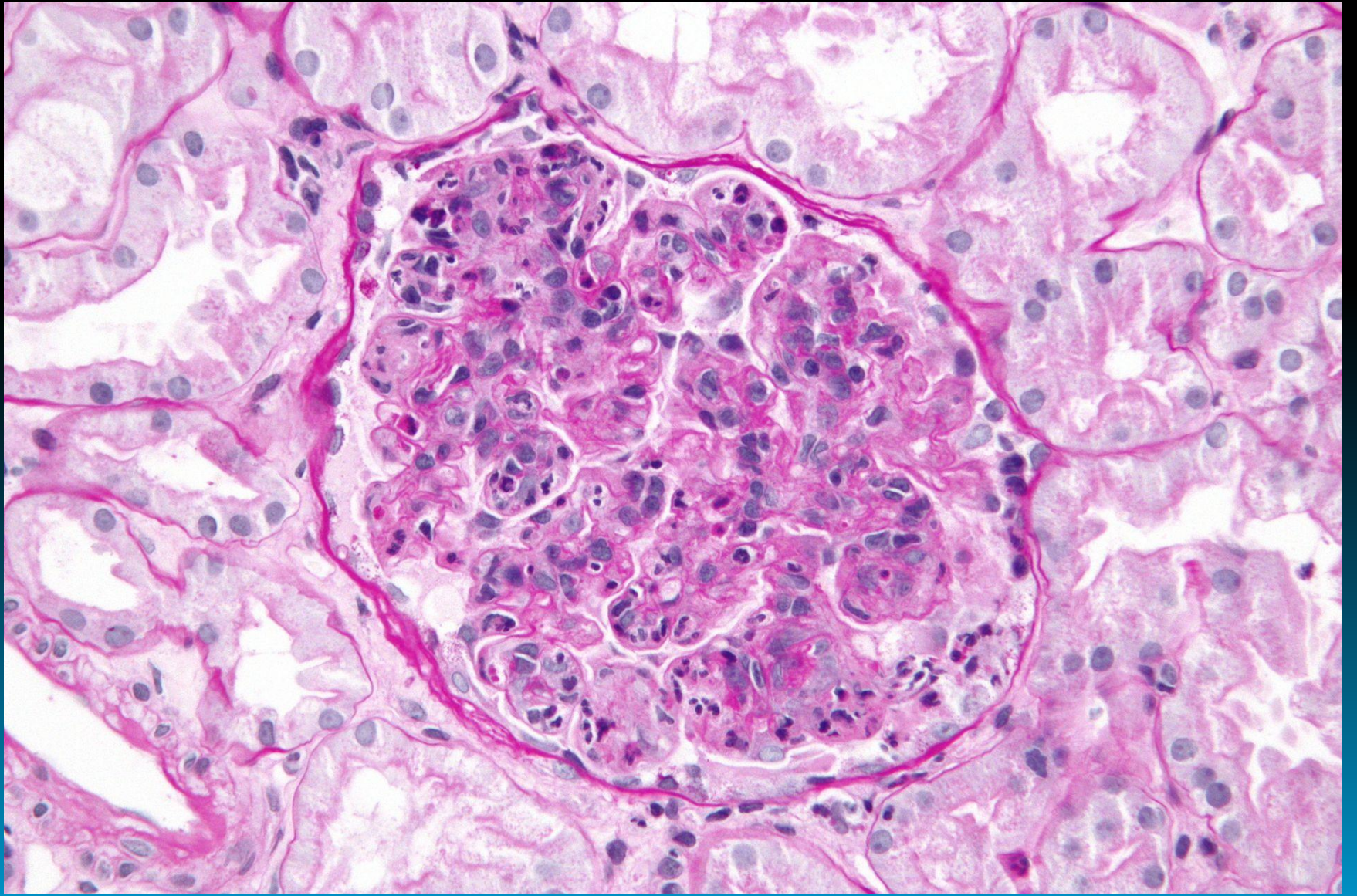
- Recurrent painless hematuria;
- Oliguria;
- Proteinuria;
- Leucocyturia;
- Cylindruria.

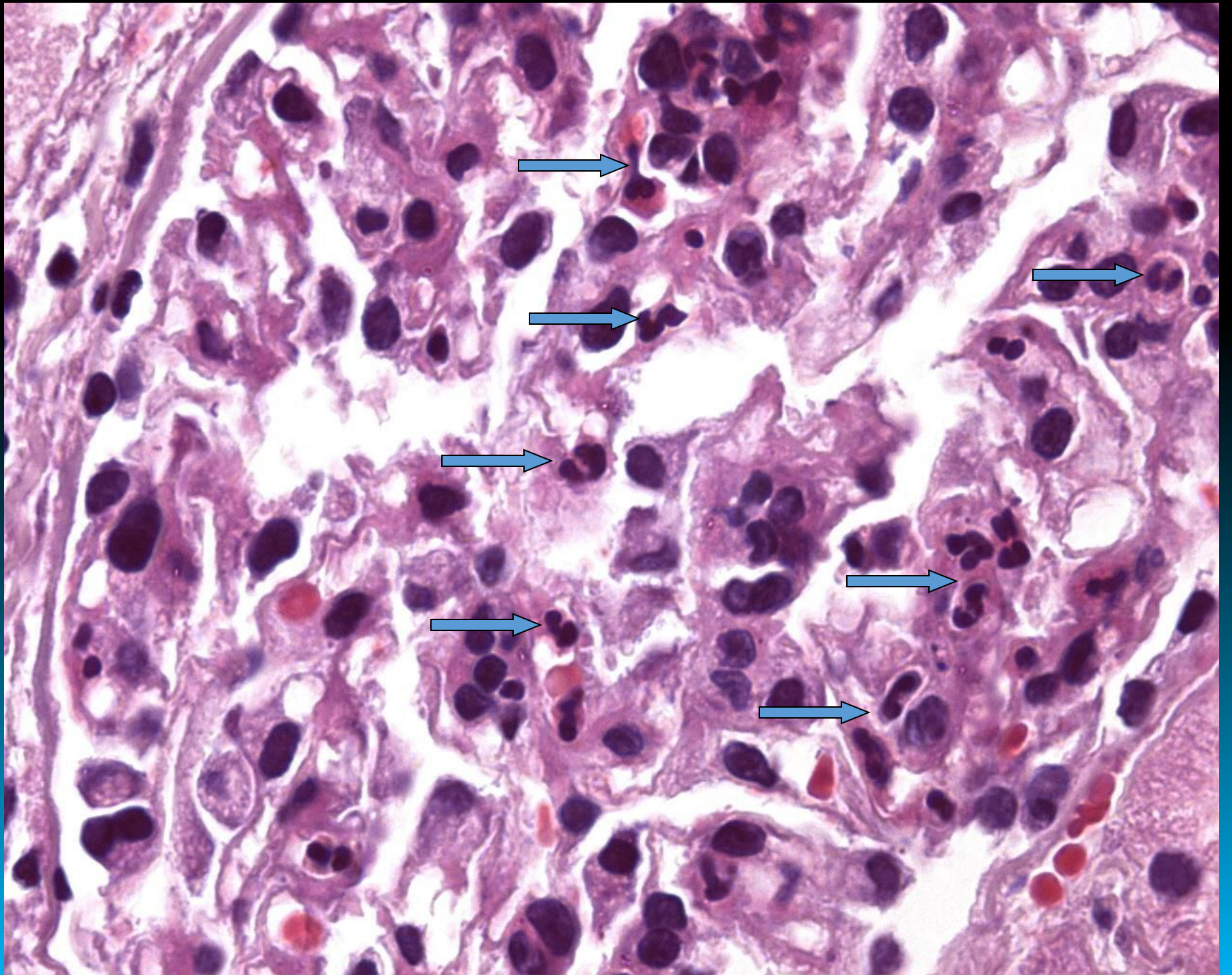
WITH NEPHROTIC SYNDROME (RARE)

- Hyperlipidemia;
- Severe proteinuria;
- Hypoproteinemia;
- Pronounced edema.



**“MOTTLED”
KIDNEYS**

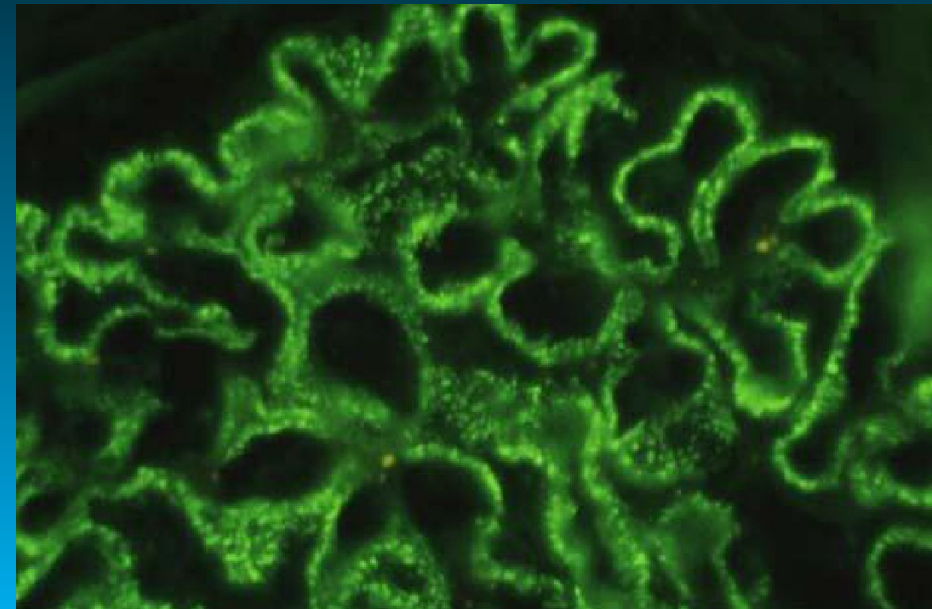
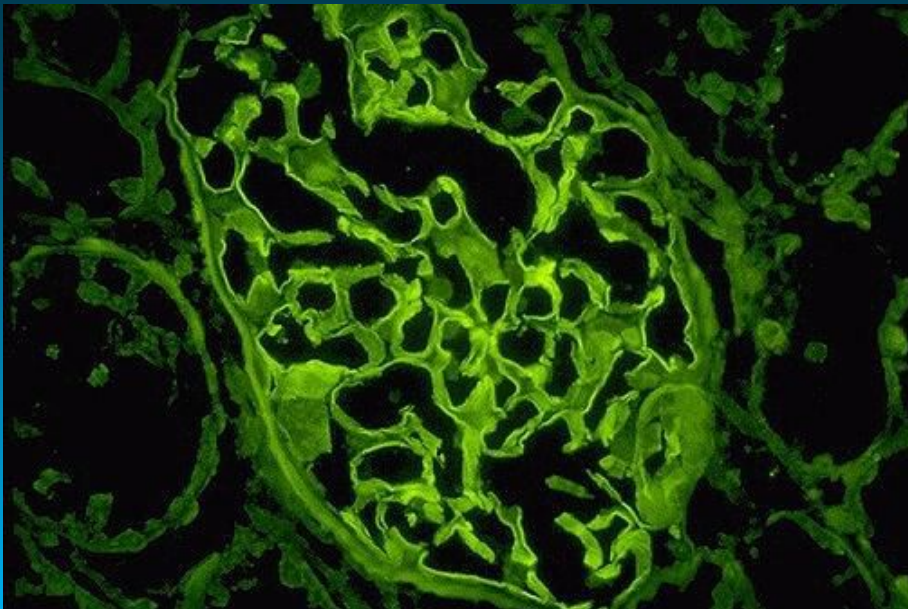
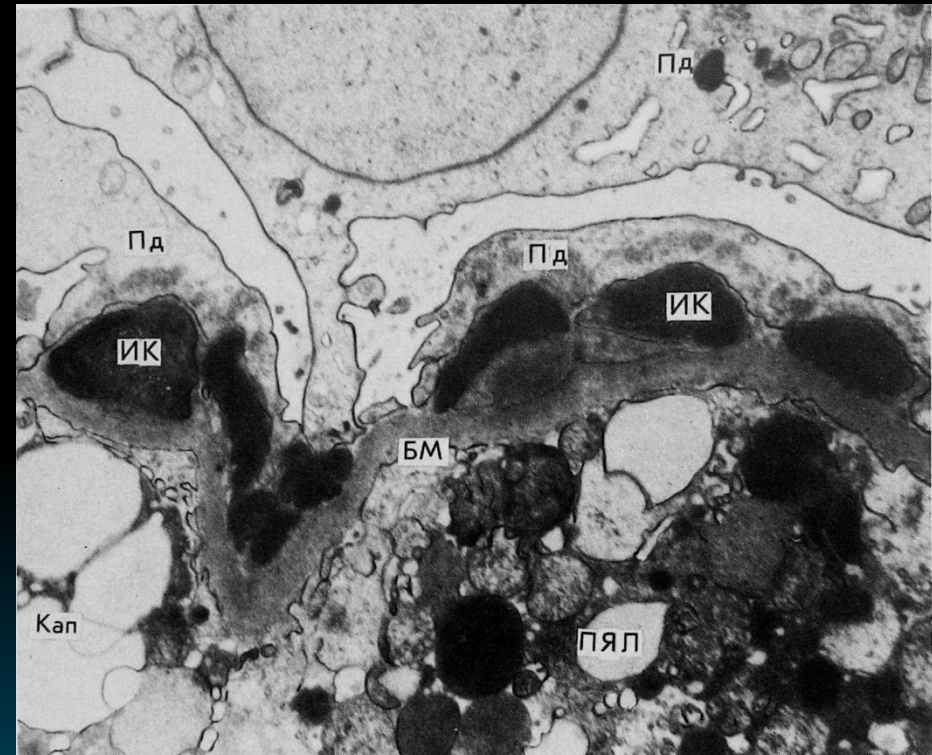




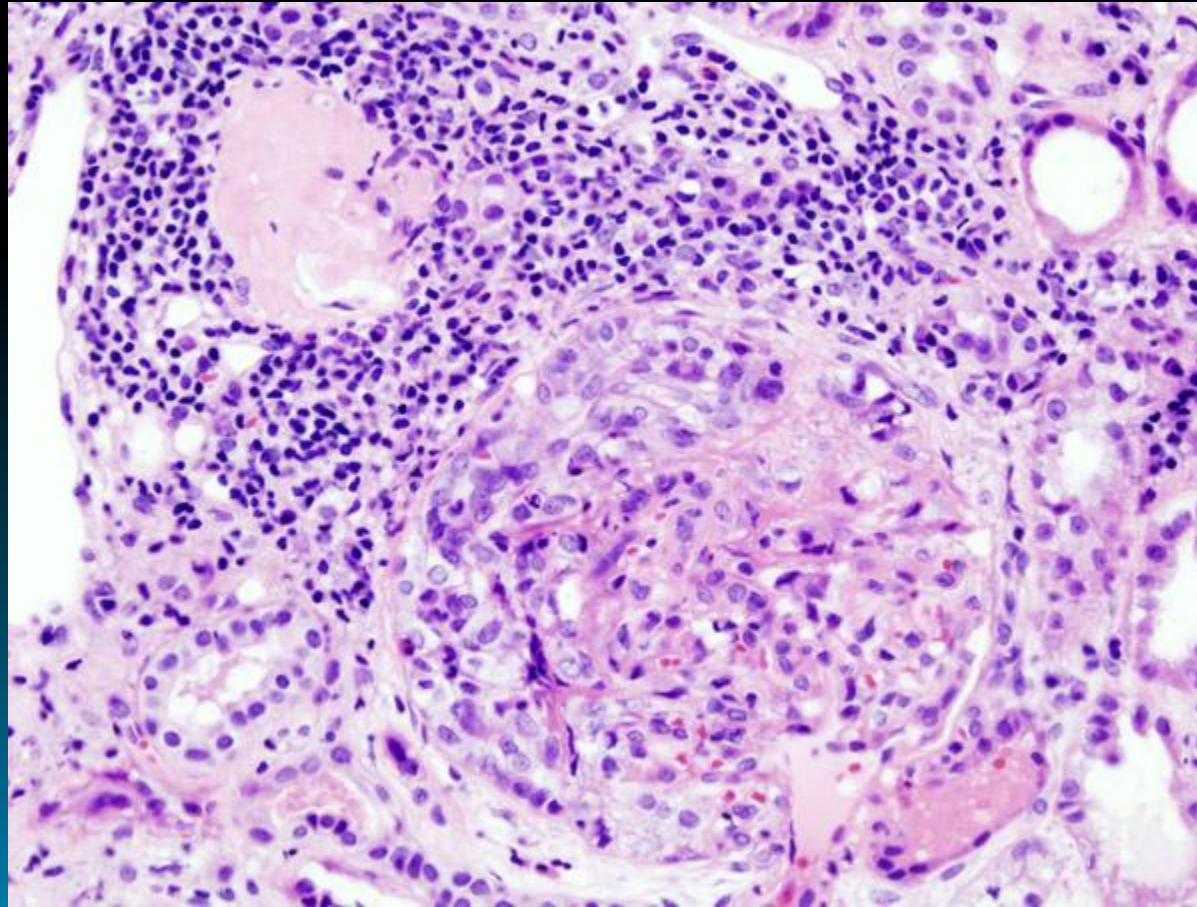
**Immune complexes on basal
membrane and/or mesangial
cells**

+

**Deposits of IgG, IgM and C3
along capillaries and on
mesangial cells**



SUBACUTE RAPIDLY PROGRESSIVE GLOMERULONEPHRITIS



MAIN FEATURE IS RAPID DEVELOPMENT AND PROGRESSION OF
CHRONIC RENAL FAILURE

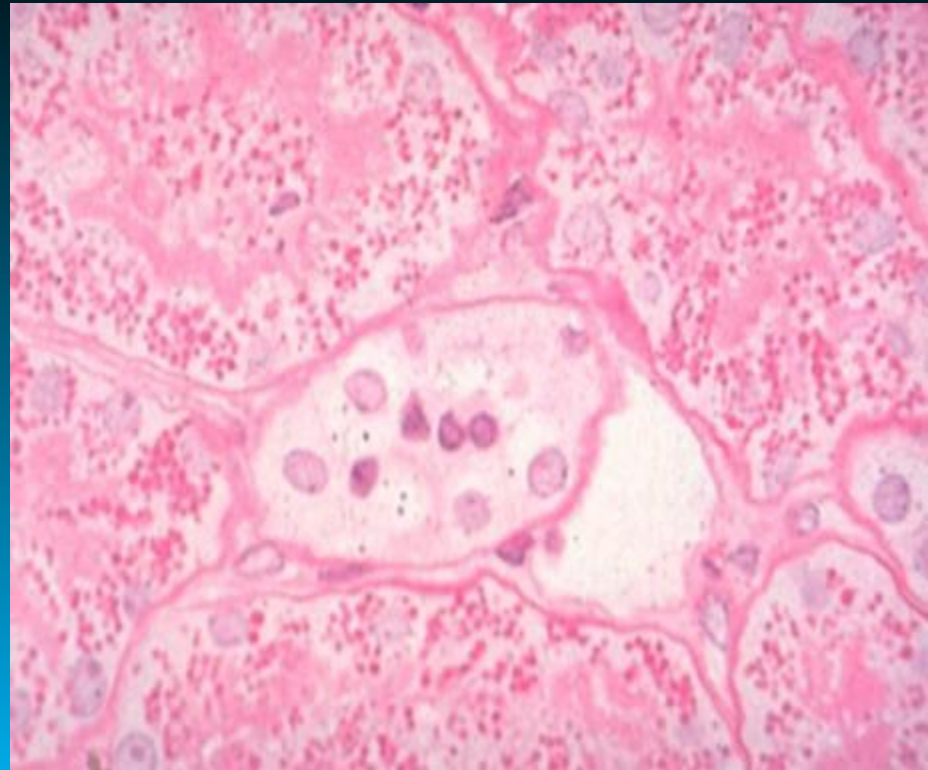
CHRONIC GLOMERULONEPHRITIS

- LATENT
- WITH HYPERTENSIVE SYNDROME
- WITH HEMATURIA
- WITH NEPHROTIC SYNDROME
- MIXED

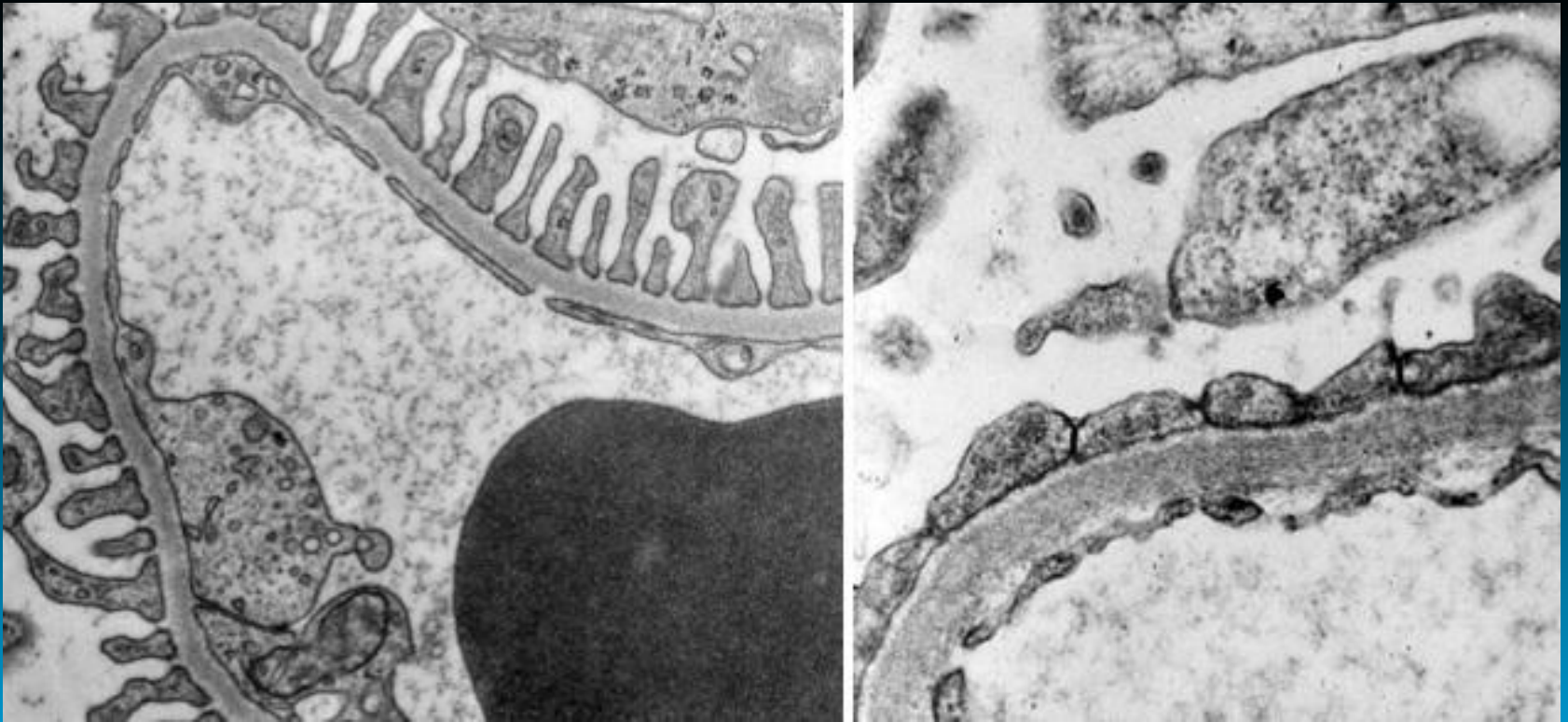
GLOMERULONEPHRITIS WITH MINIMAL CHANGES (LIPOID NEPHROSIS)

**“LARGE WHITE
KIDNEY”**

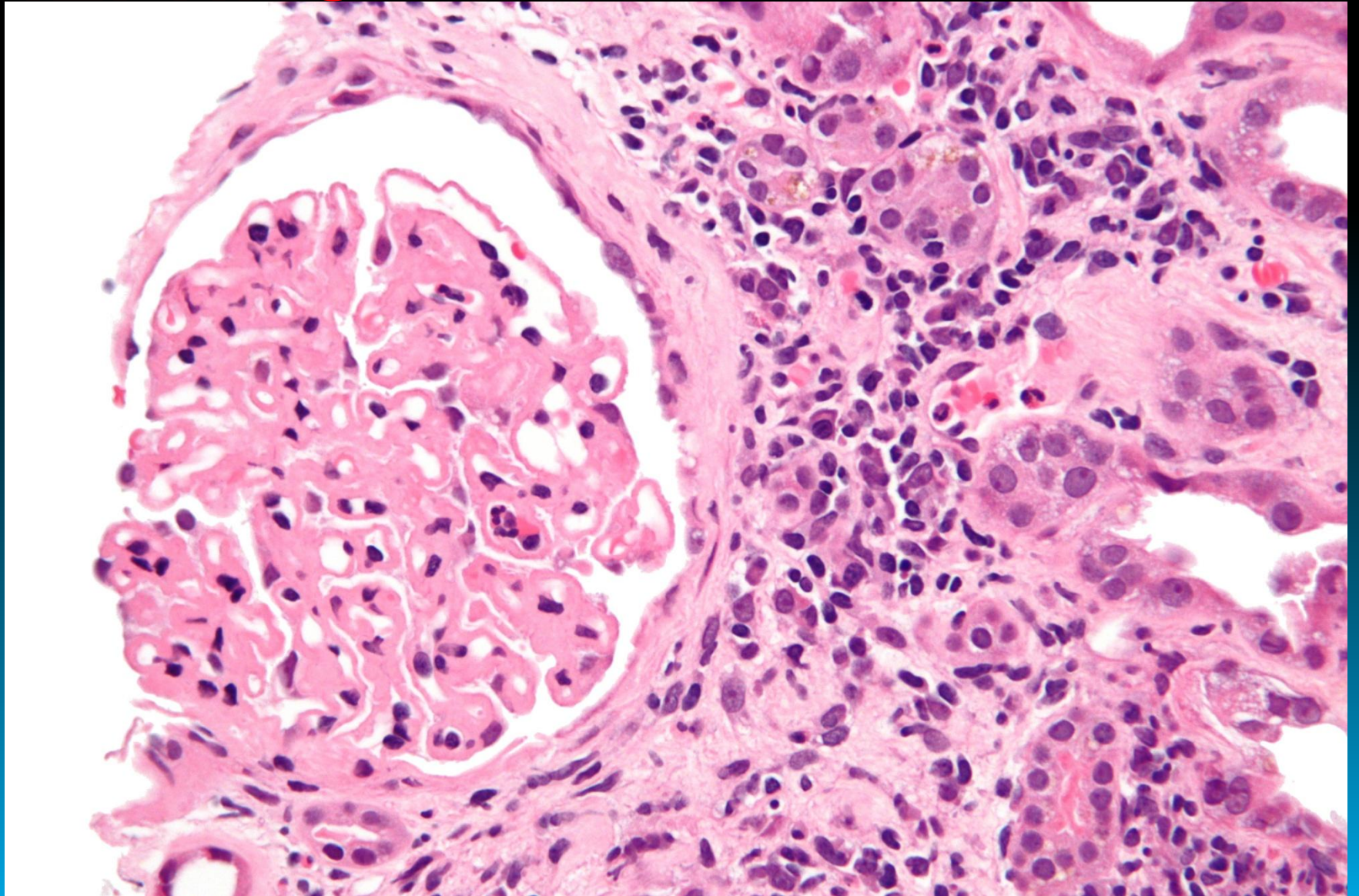
**Accumulation of lipids
in proximal tubules**



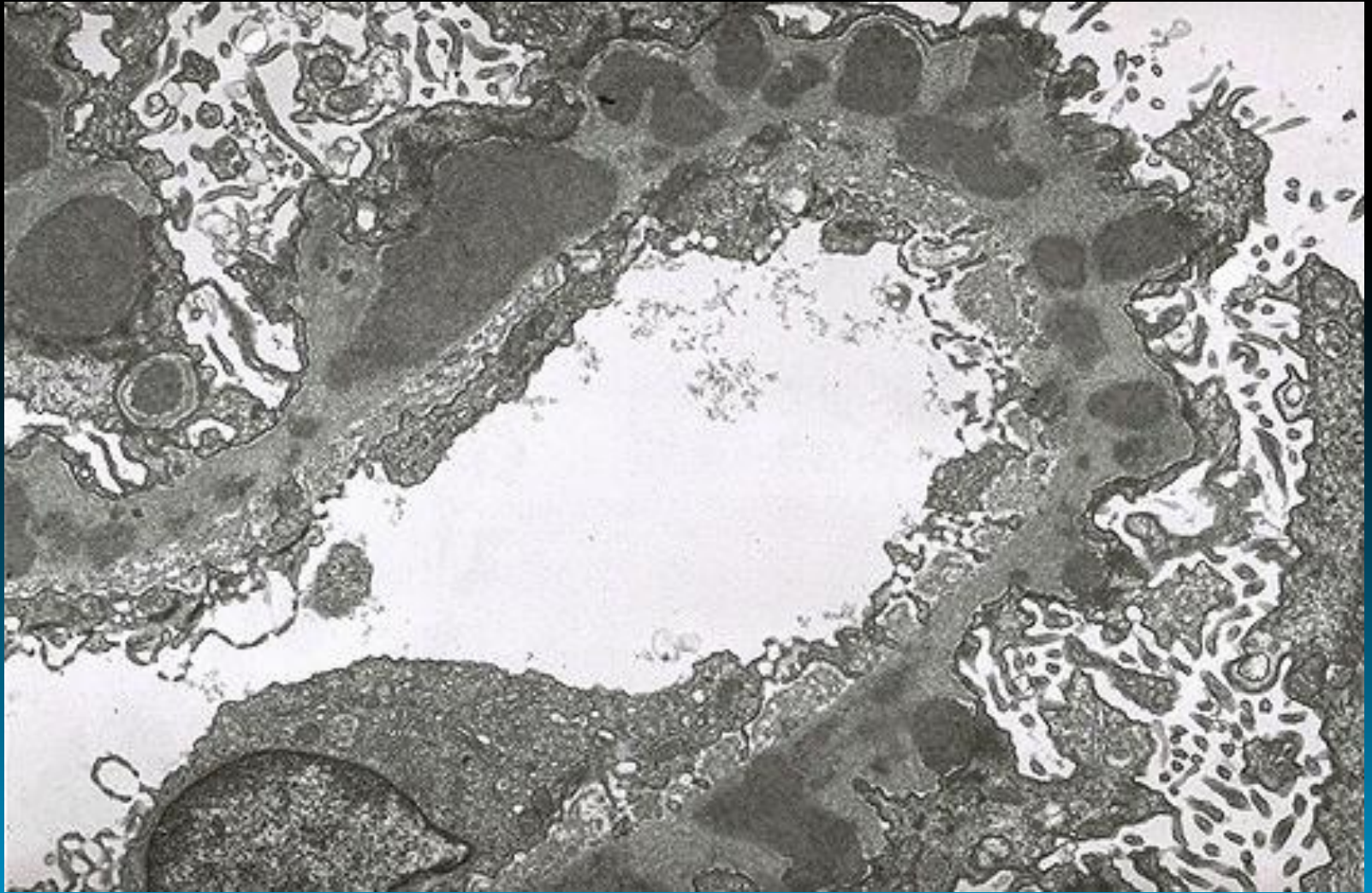
GLOMERULONEPHRITIS WITH MINIMAL CHANGES (LIPOID NEPHROSIS)



MEMBRANOUS NEPHROPATHY

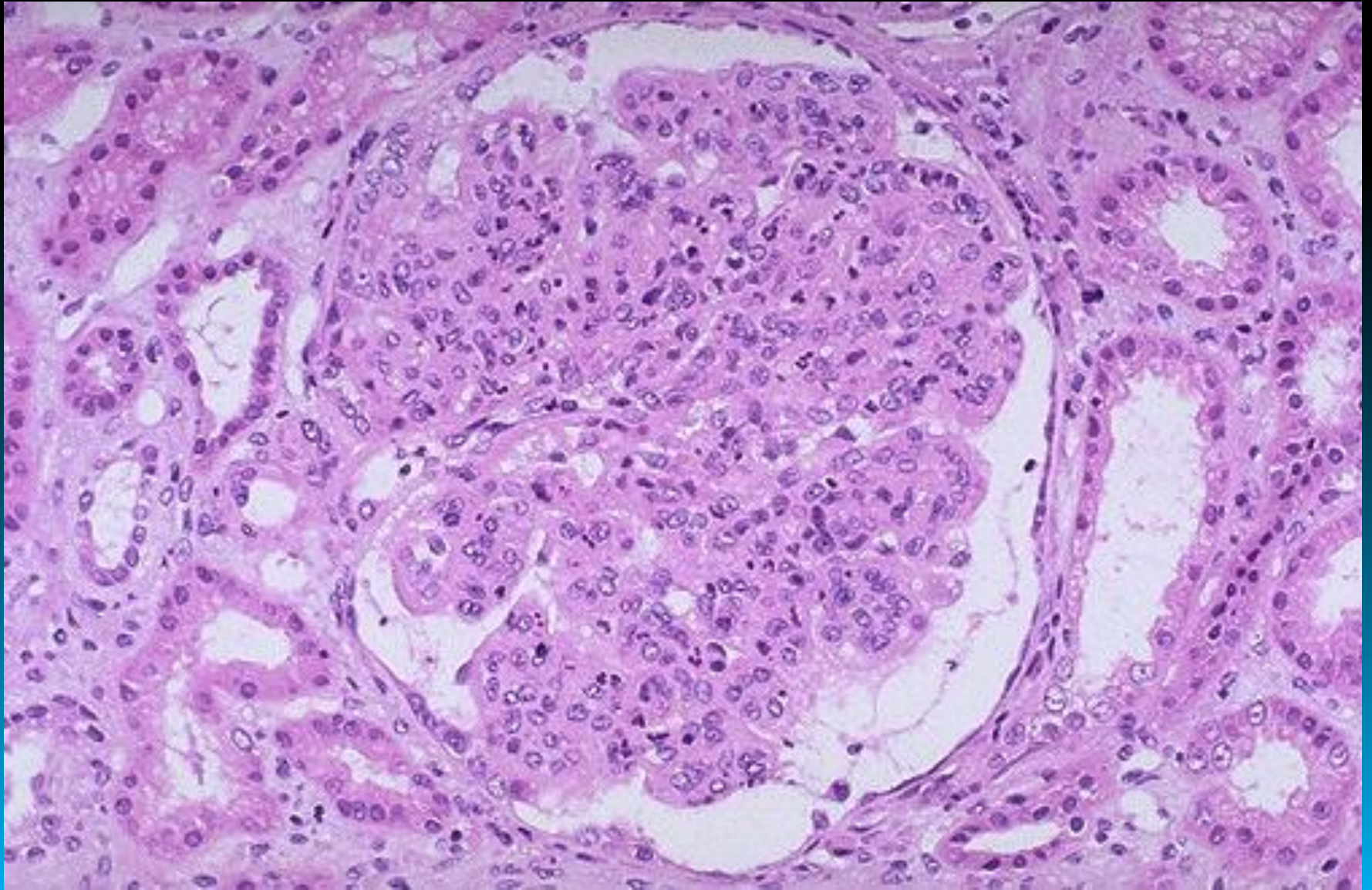


MEMBRANOUS NEPHROPATHY

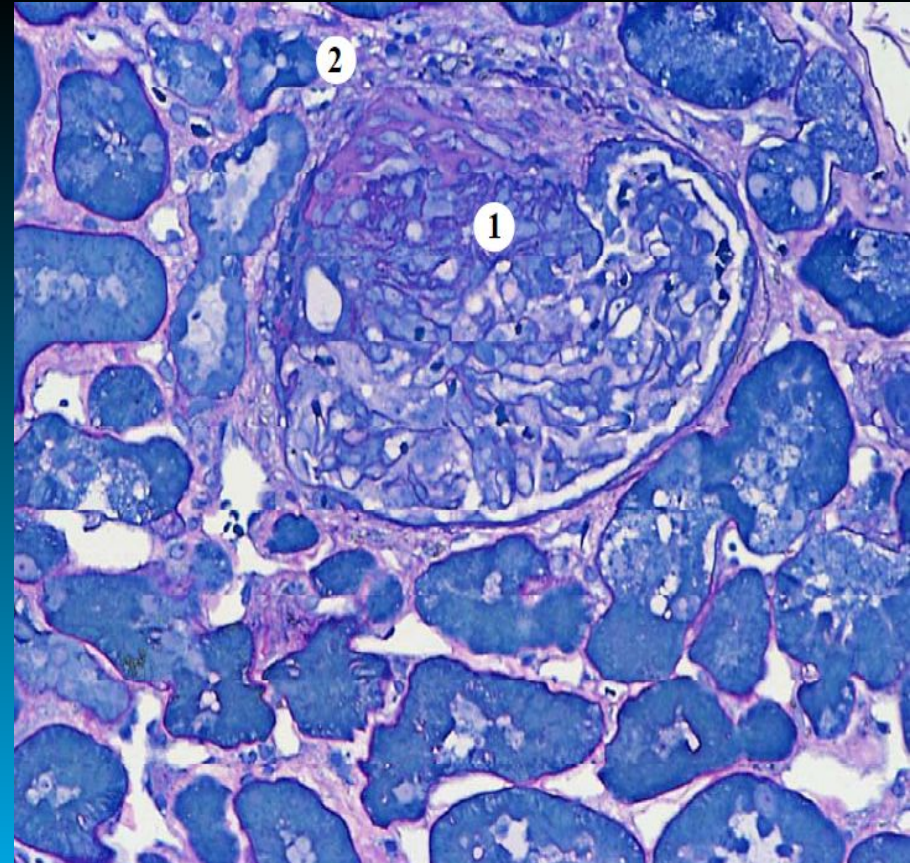
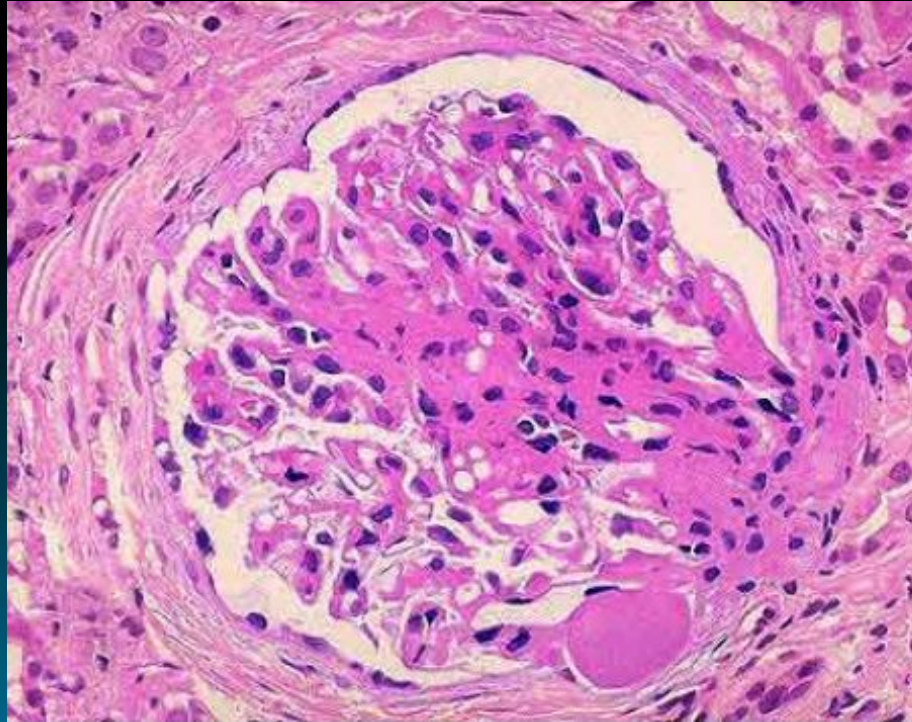


“SPIKES AND DOMES” ON BASAL MEMBRANE

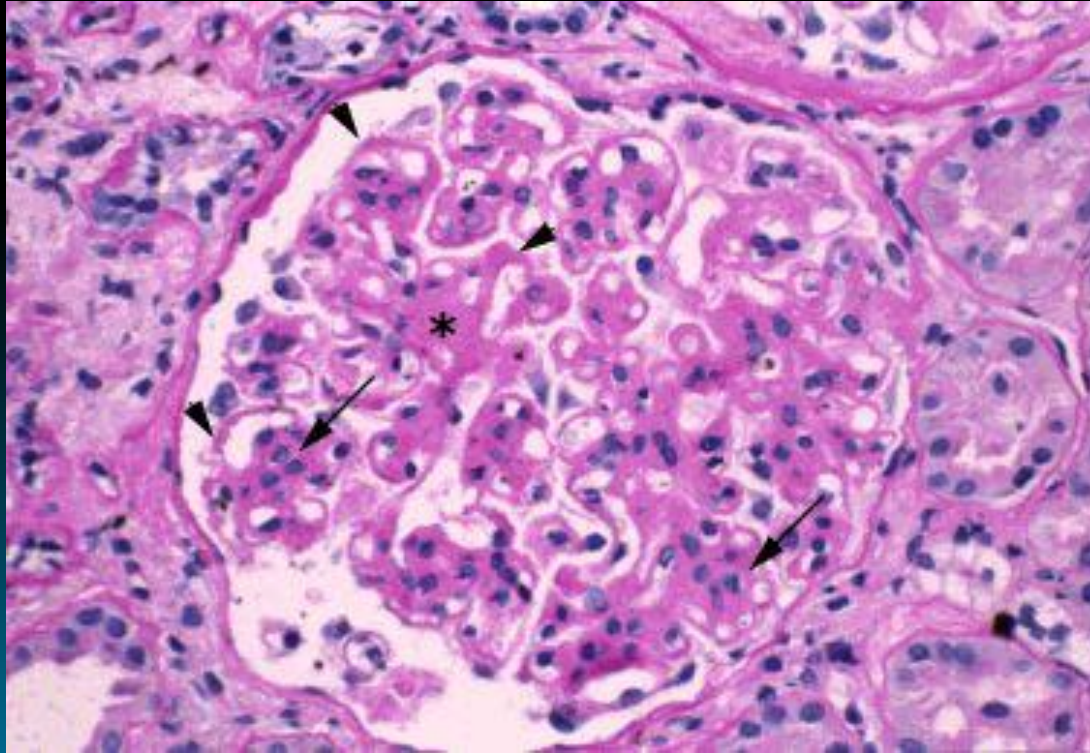
MESANGIAL PROLIFERATIVE GLOMERULONEPHRITIS



FOCAL SEGMENTAL GLOMERULOSCLEROSIS



MEMBRANOPROLIFERATIVE GLOMERULONEPHRITIS



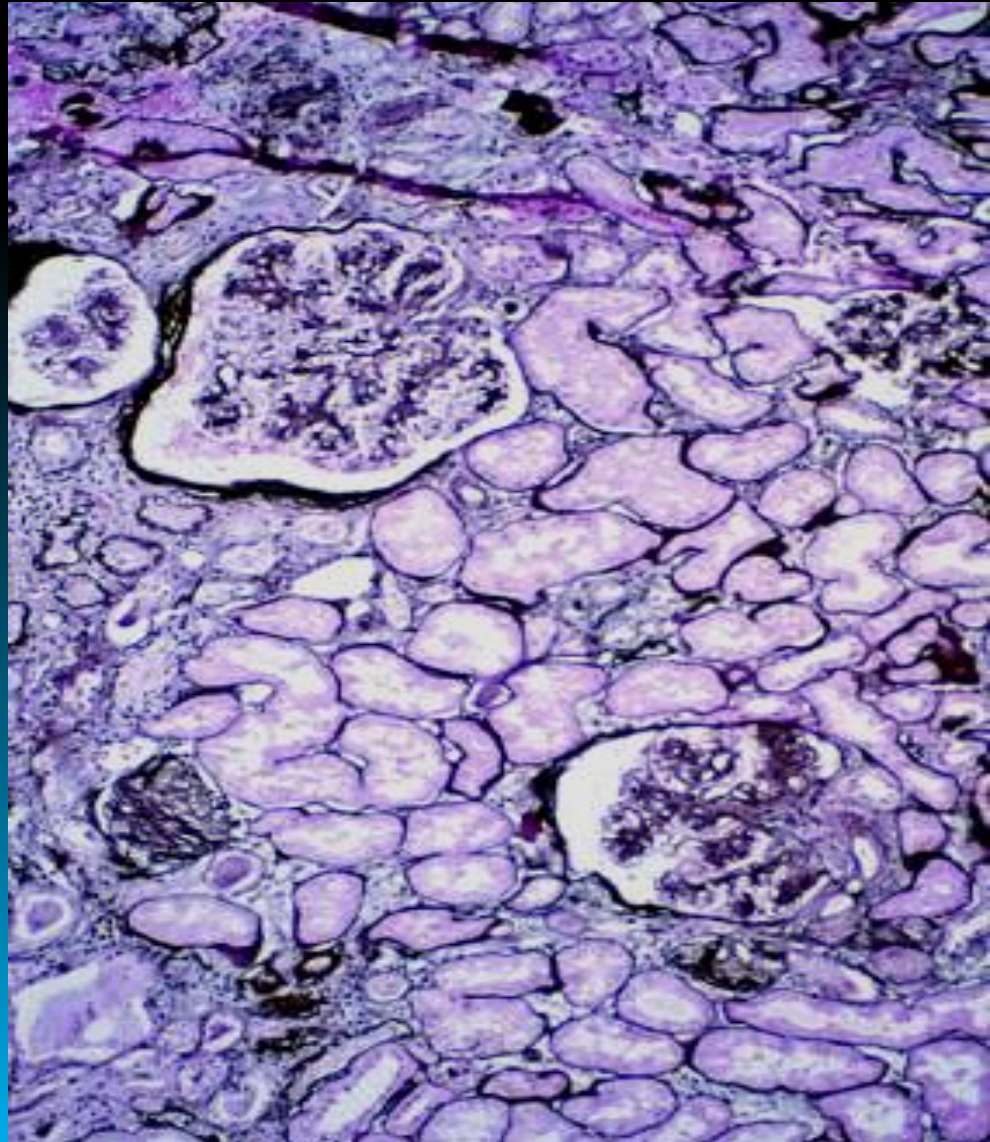
Light micrograph in membranoproliferative glomerulonephritis showing a lobular appearance of the glomerular tuft with focal areas of increased glomerular cellularity (large arrows), mesangial expansion (*), narrowing of the capillary lumens, and diffuse thickening of the glomerular capillary walls (small arrows).

FIBROPLASTIC GLOMERULONEPHRITIS

**It is an outcome of any above
mentioned
glomerulonephritis**

Morphologically:

- Glomerular sclerosis**
- Interstitial sclerosis**
- Perivascular sclerosis**



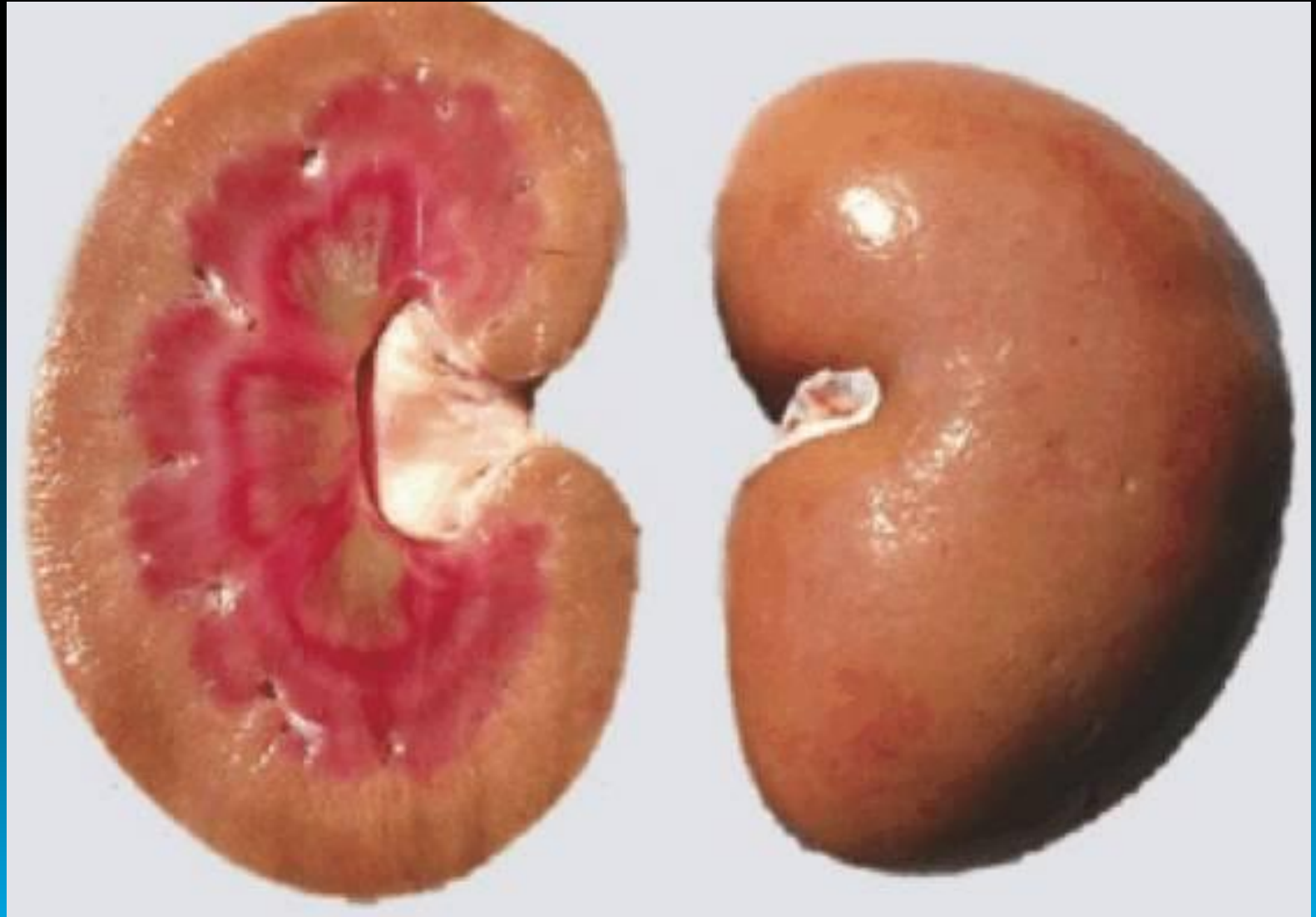
AMYLOIDOSIS OF KIDNEYS

The most common causes are:

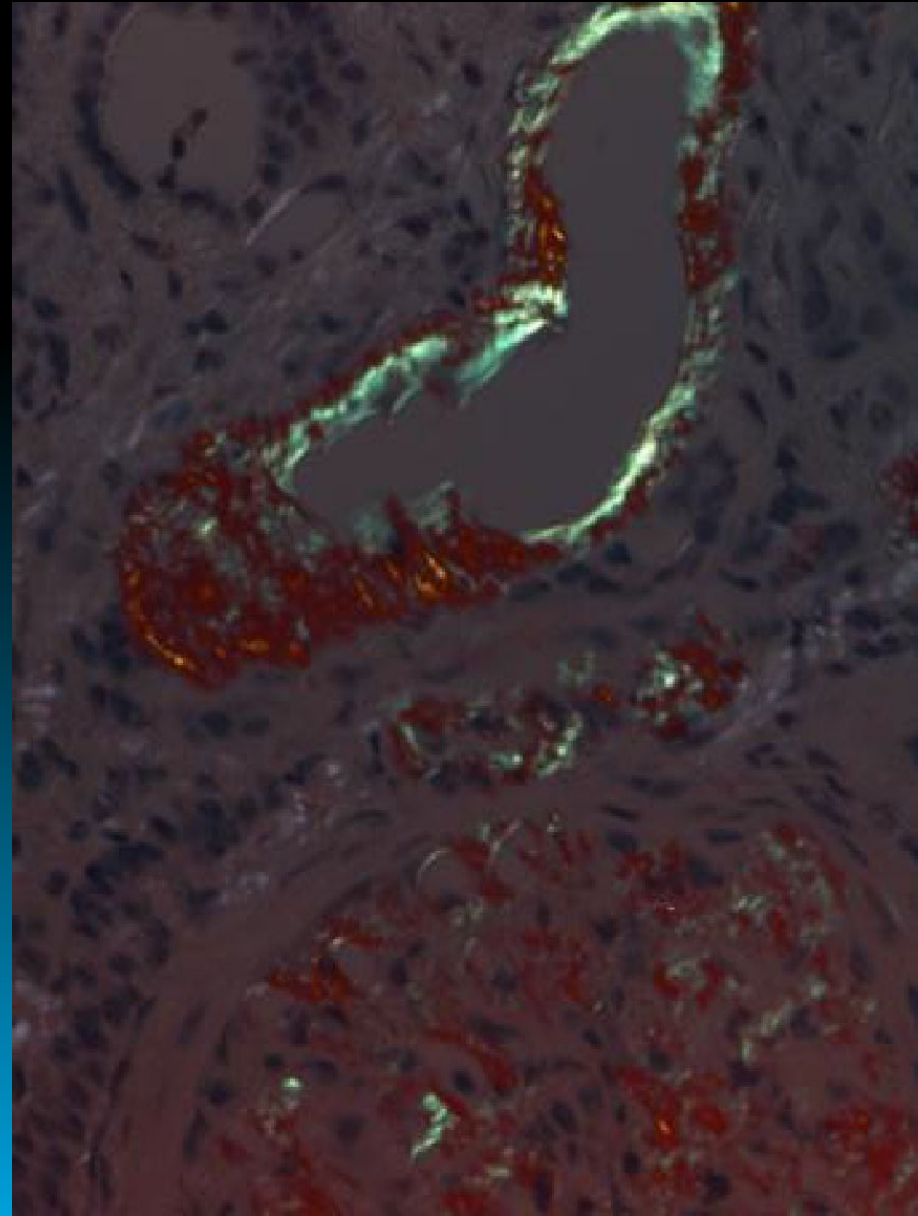
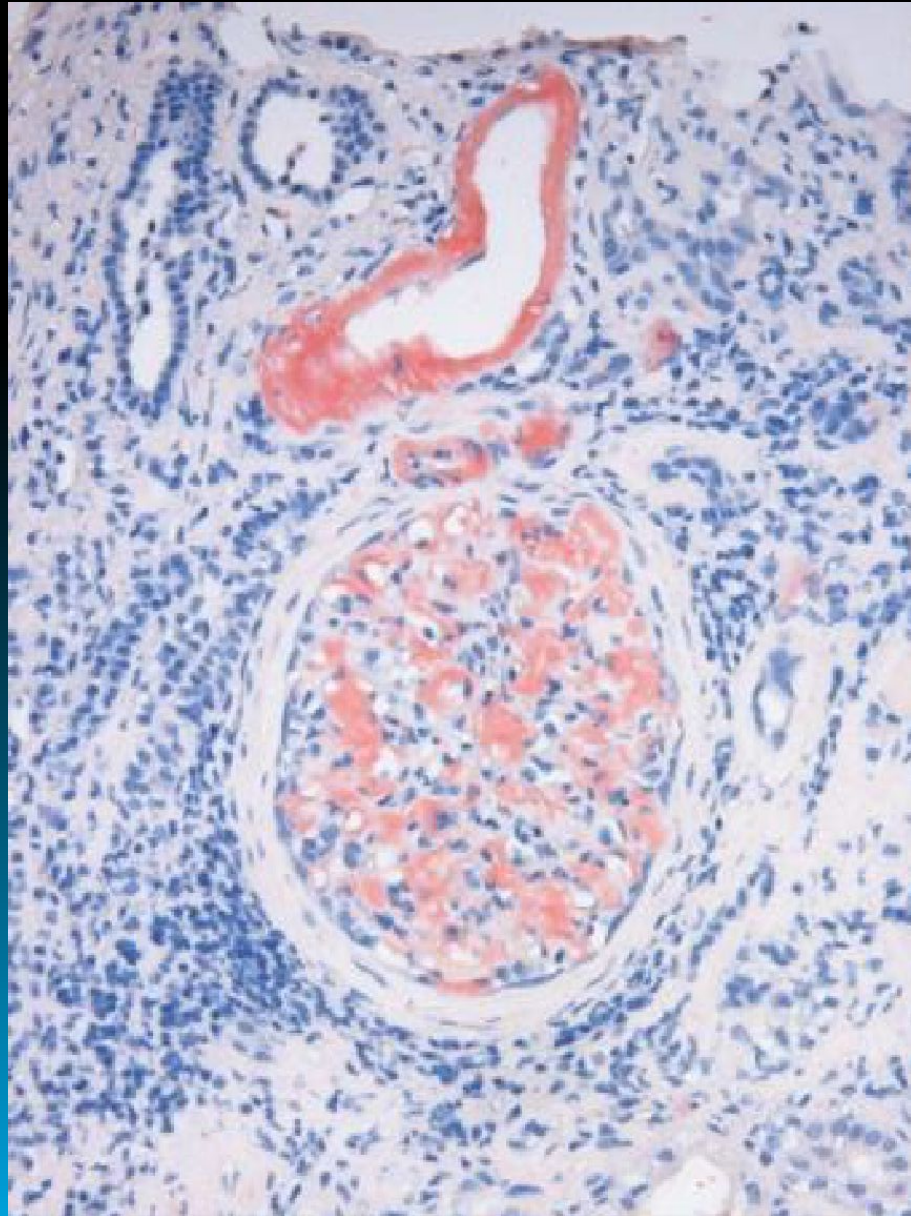
- Tuberculosis;
- Chronic diseases of lungs and bronchi;
- Chronic osteomyelitis and rheumatoid arthritis;
- Hodgkin's disease;
- Myeloma.

STAGES:

- Pre-clinical;
- Proteinuria;
- Nephrotic syndrome;
- Uremia.



CONGO RED STAINING

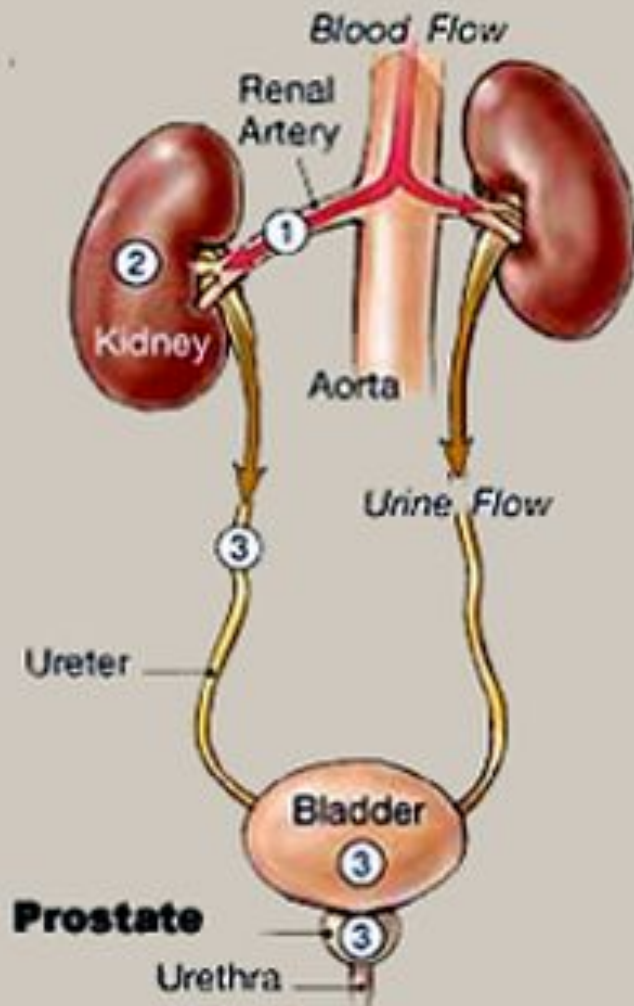


ELECTRON MICROSCOPY

Amyloid (A) can be seen as fibrillar masses under the basal membrane (BM).



ACUTE RENAL FAILURE



① Prerenal
Sudden and severe drop in blood pressure (shock) or interruption of blood flow to the kidneys from severe injury or illness

② Intrarenal
Direct damage to the kidneys by inflammation, toxins, drugs, infection, or reduced blood supply

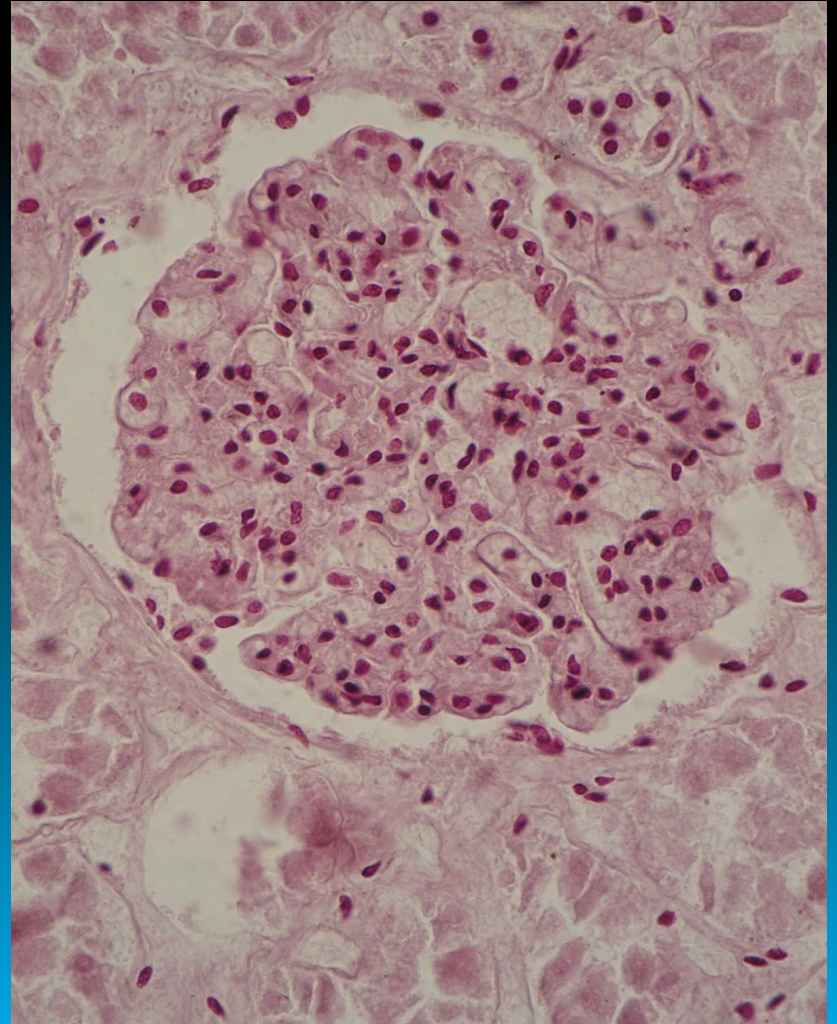
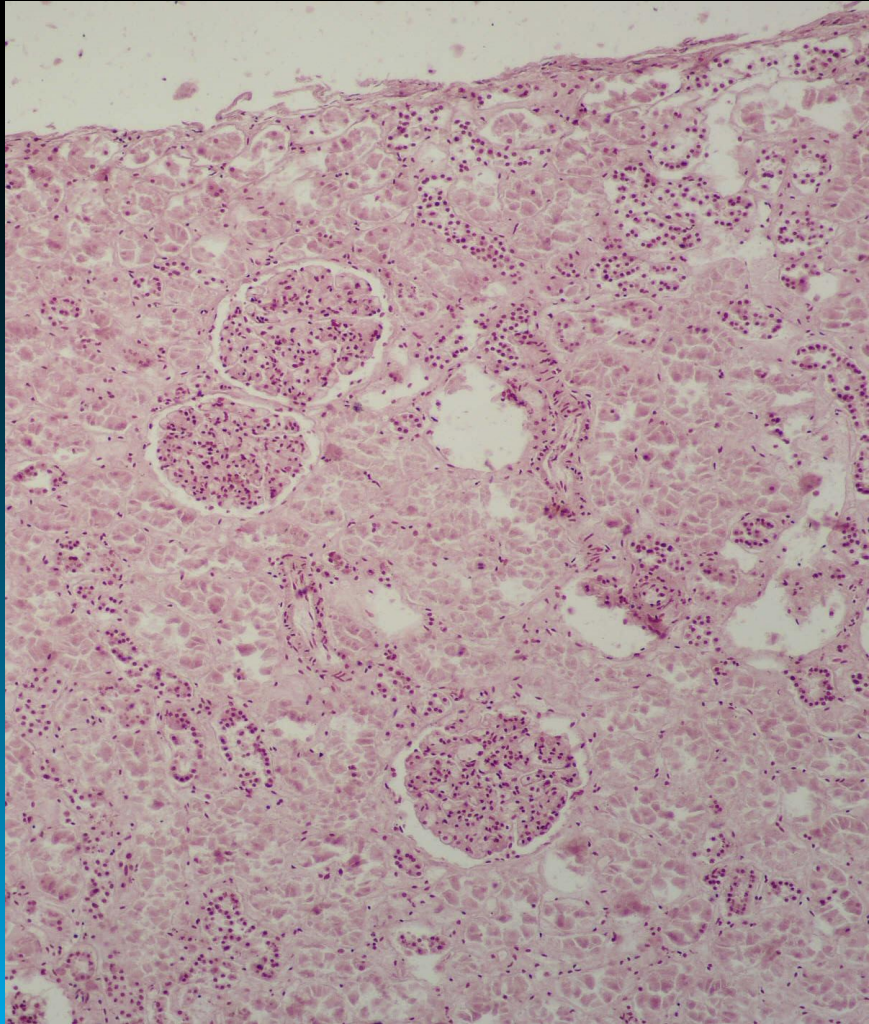
③ Postrenal
Sudden obstruction of urine flow due to enlarged prostate, kidney stones, bladder tumor, or injury



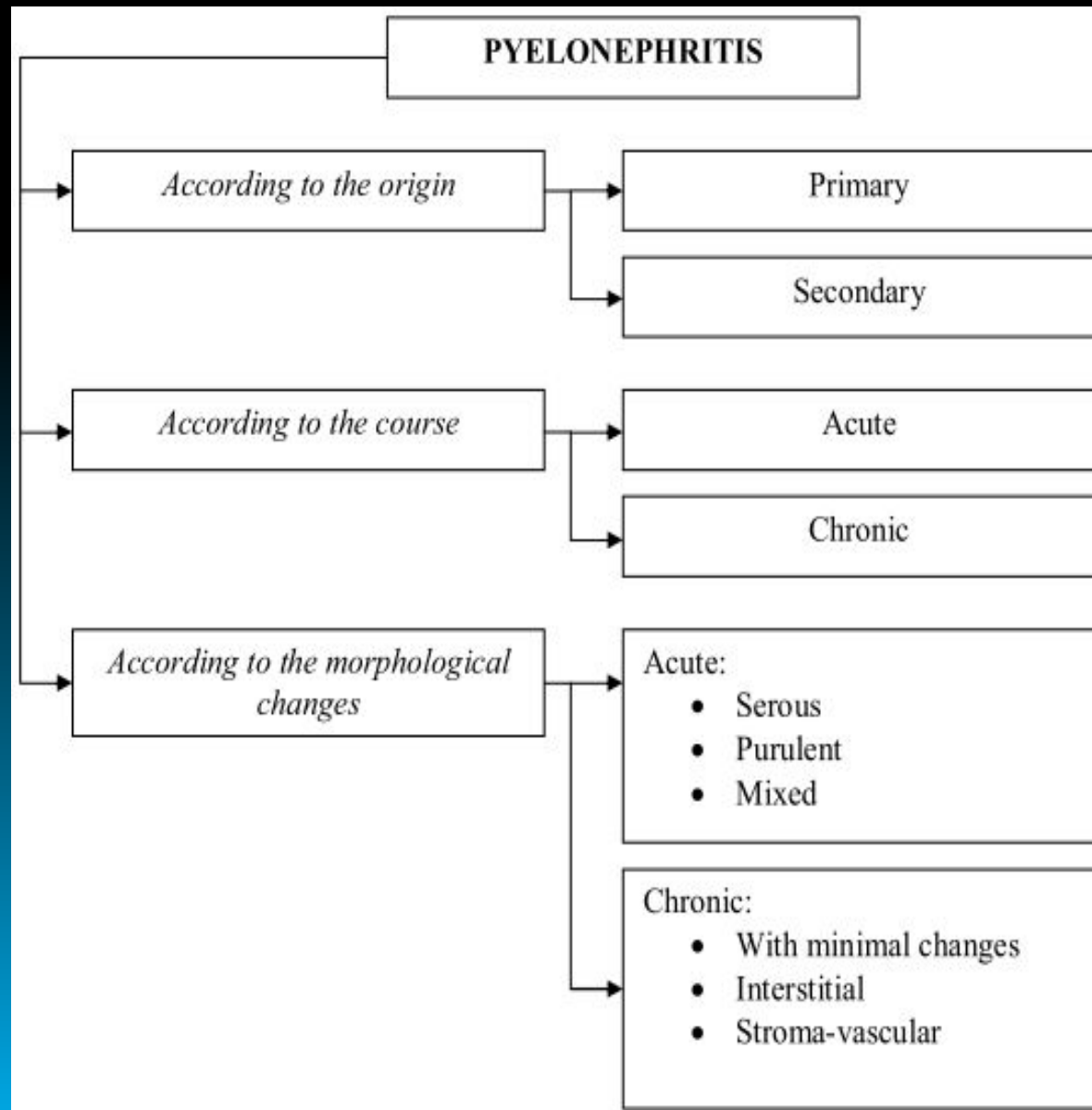
**NECROTIC
NEPHROSIS**

**ACUTE
TUBULAR
NECROSIS**

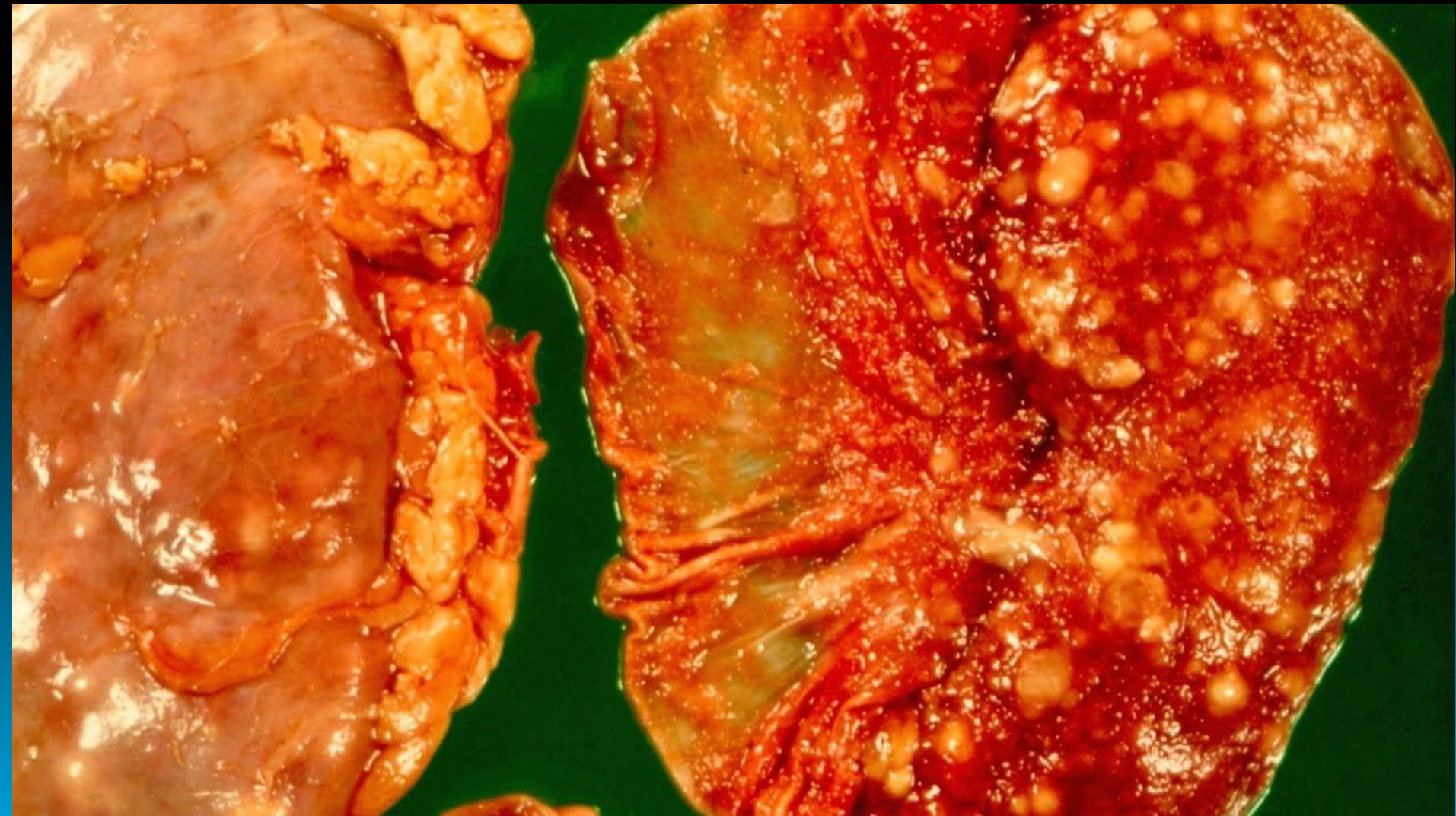
NECROTIC NEPHROSIS



PYELONEPHRITIS



ACUTE PYELONEPHRITIS



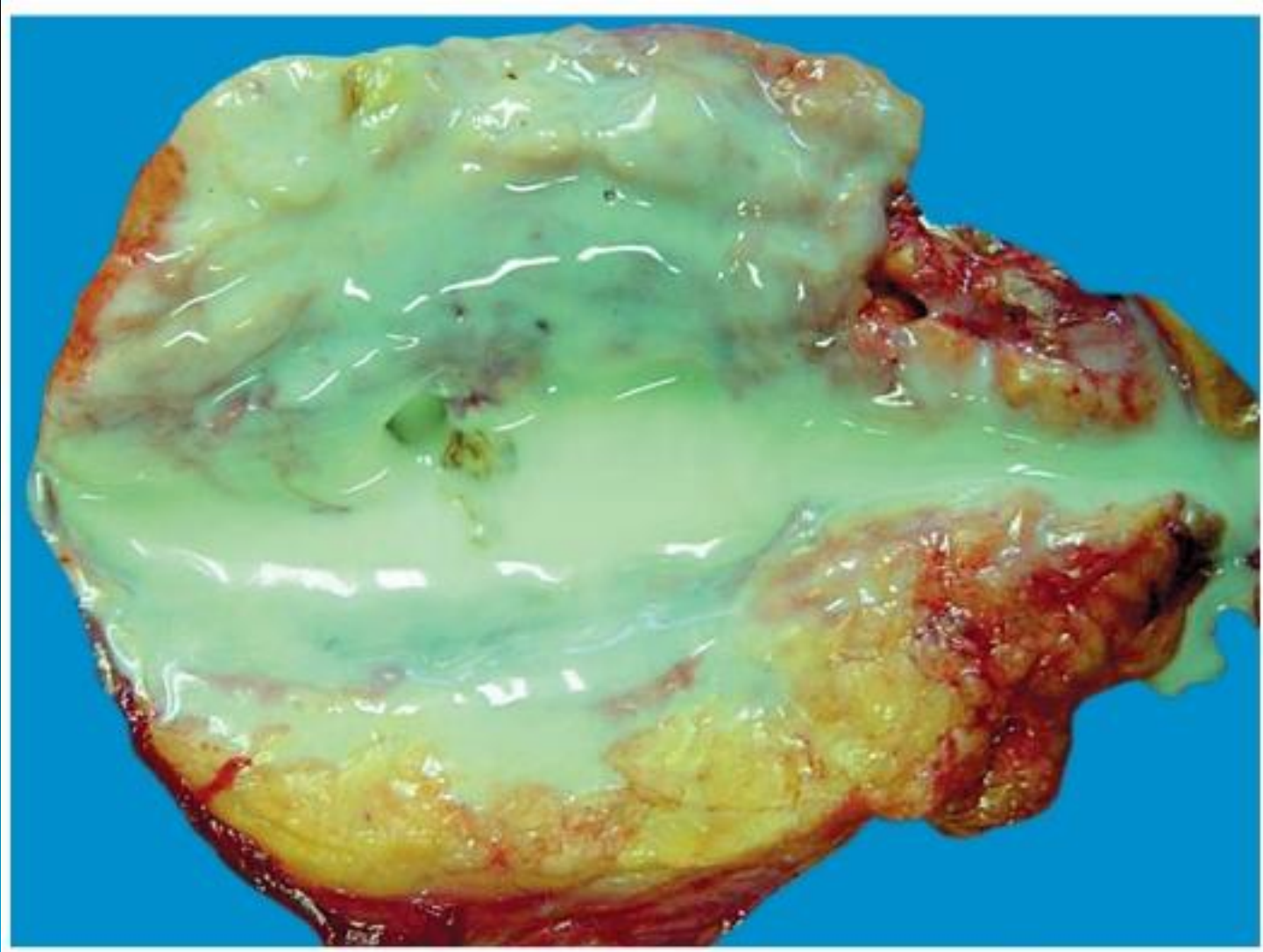
COMPLICATIONS OF ACUTE PYELONEPHRITIS

- **Necrosis of the renal papillae (papillonecrosis)** – necrotic papillae can be rejected into the lumen of the pelvis.
- **Apostematous pyelonephritis** – there are multiple small abscesses.
- **Kidney carbuncle.**
- **Pyonephrosis** – it is more likely developed in case of high ureteral obstruction (on the border with the kidney) or breakthrough of carbuncle.
- **Sepsis.**
- **Paranephritis** - inflammation of the perinephric adipose capsule.
- **Perinephritis** - inflammation of the fibrous capsule.
- **Kidney abscess.**

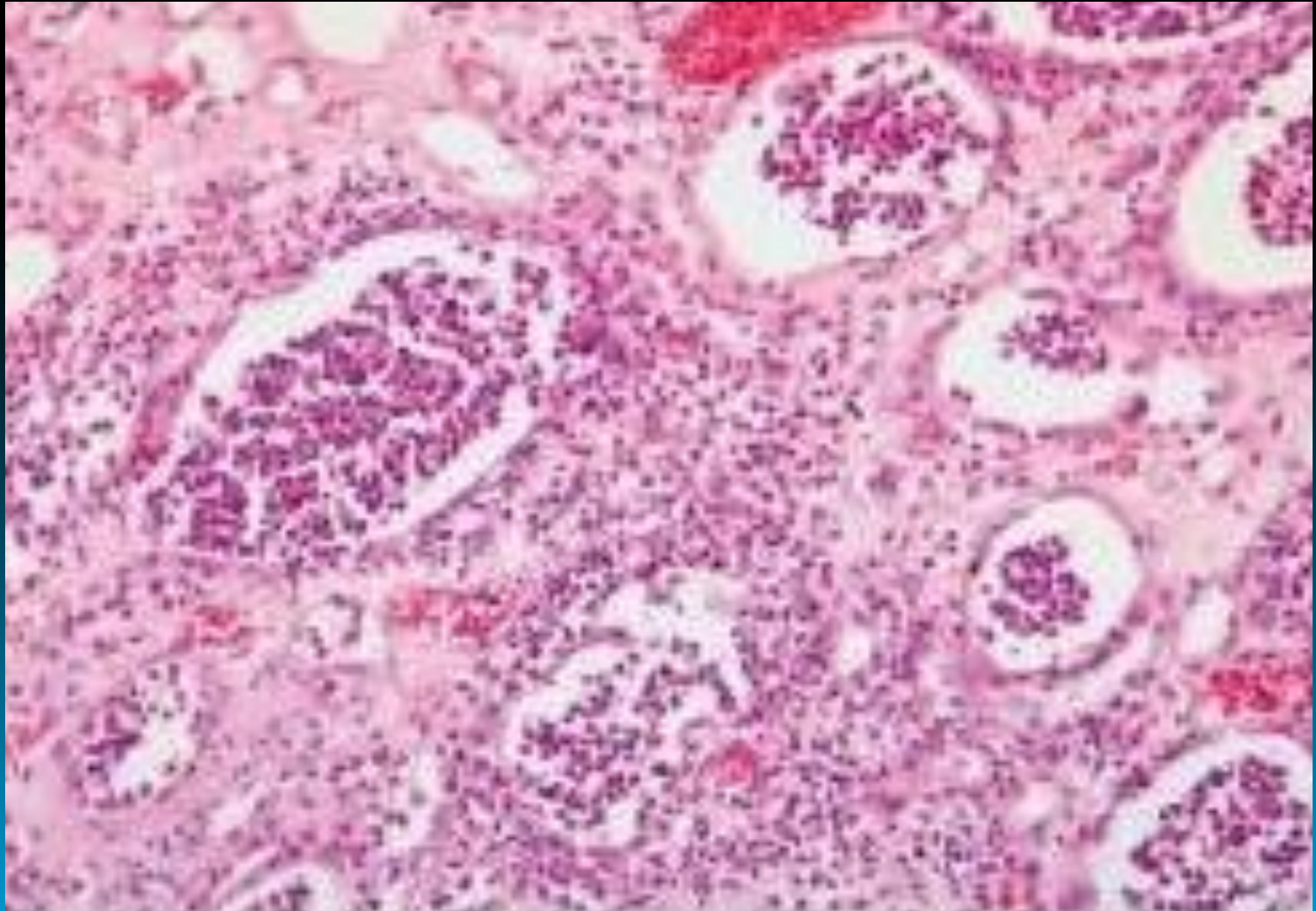
**MOSTLY, PURULENT
(SUPPURATION)
COMPLICATIONS**



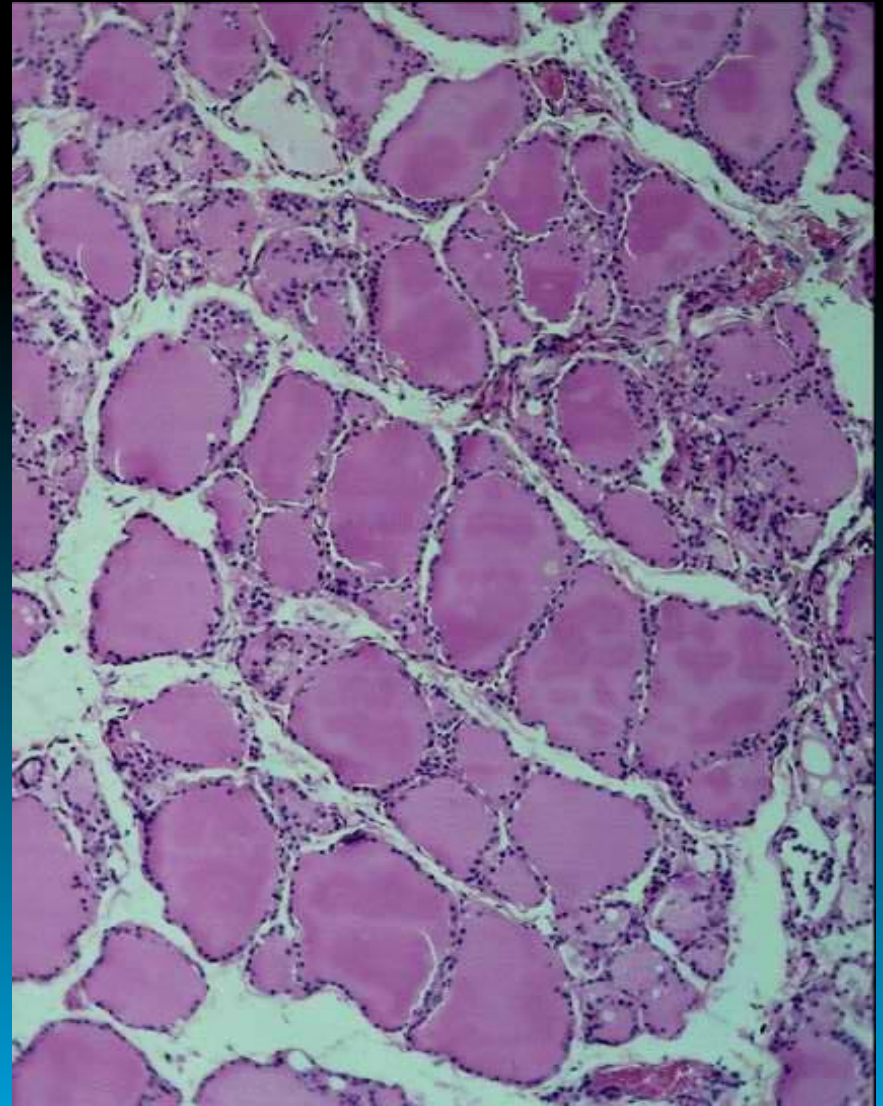
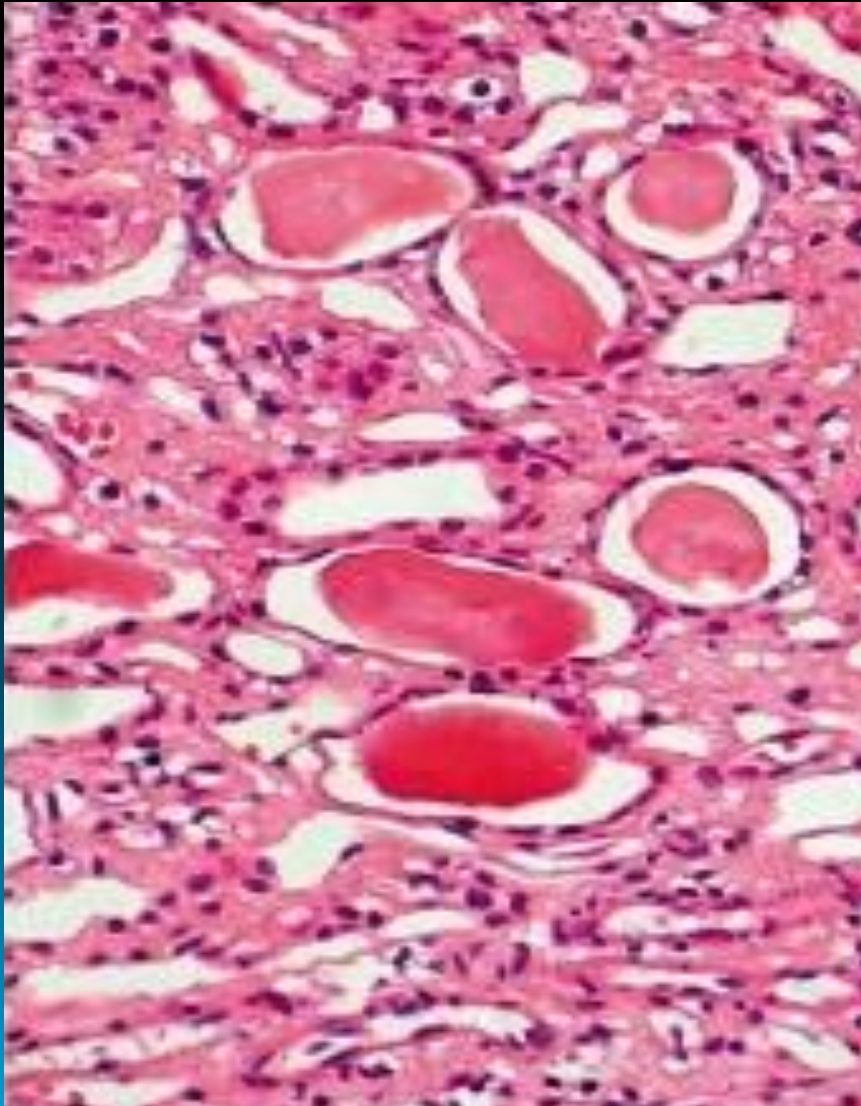
PYONEPHROSIS



CHRONIC PYELONEPHRITIS



“THYROID KIDNEY”



CHRONIC RENAL FAILURE

Causes of chronic renal failure

- Chronic glomerulonephritis
- Chronic infections
- Renal obstruction (prolonged)
- Exposure to toxic chemicals, toxins or drugs (aminoglycoside antibiotics and nephrotoxicity)
- Diabetes
- Hypertension
- Nephrosclerosis (atherosclerosis of the renal artery)
- Diabetic nephropathy
- Alport syndrome (inherited disorder causes deafness, progressive kidney damage and eye defects)
- Polycystic kidney disease
- Interstitial nephritis or pyelonephritis

CHRONIC RENAL FAILURE

Manifestations of chronic renal failure

– Renal failure is a multisystem disease

System	Effect	Cause
Body fluids	Polyuria	Metabolic acidosis
	Metabolic acidosis	Reduced H ⁺ excretion
	Abnormal levels of Na ⁺ , K ⁺ , Ca ²⁺ , PO ₄ ⁻	Loss of tubular function
Hematologic	Anemia, excess bleeding	Impaired erythropoietin
Cardiovascular	Hypertension, edema	Activation of renin–angiotensin system
Gastrointestinal tract	Anorexia, nausea	Accumulation of metabolic wastes
Neurologic	Uremic encephalopathy	Accumulation of ammonia and nitrogenous waste
Musculoskeletal	Muscle and bone weakness (“Renal Osteodystrophy”)	Loss of calcium and minerals

THANK
YOU
FOR
ATTENTIO
N!