RENAL BLOCK

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OBJECTIVES

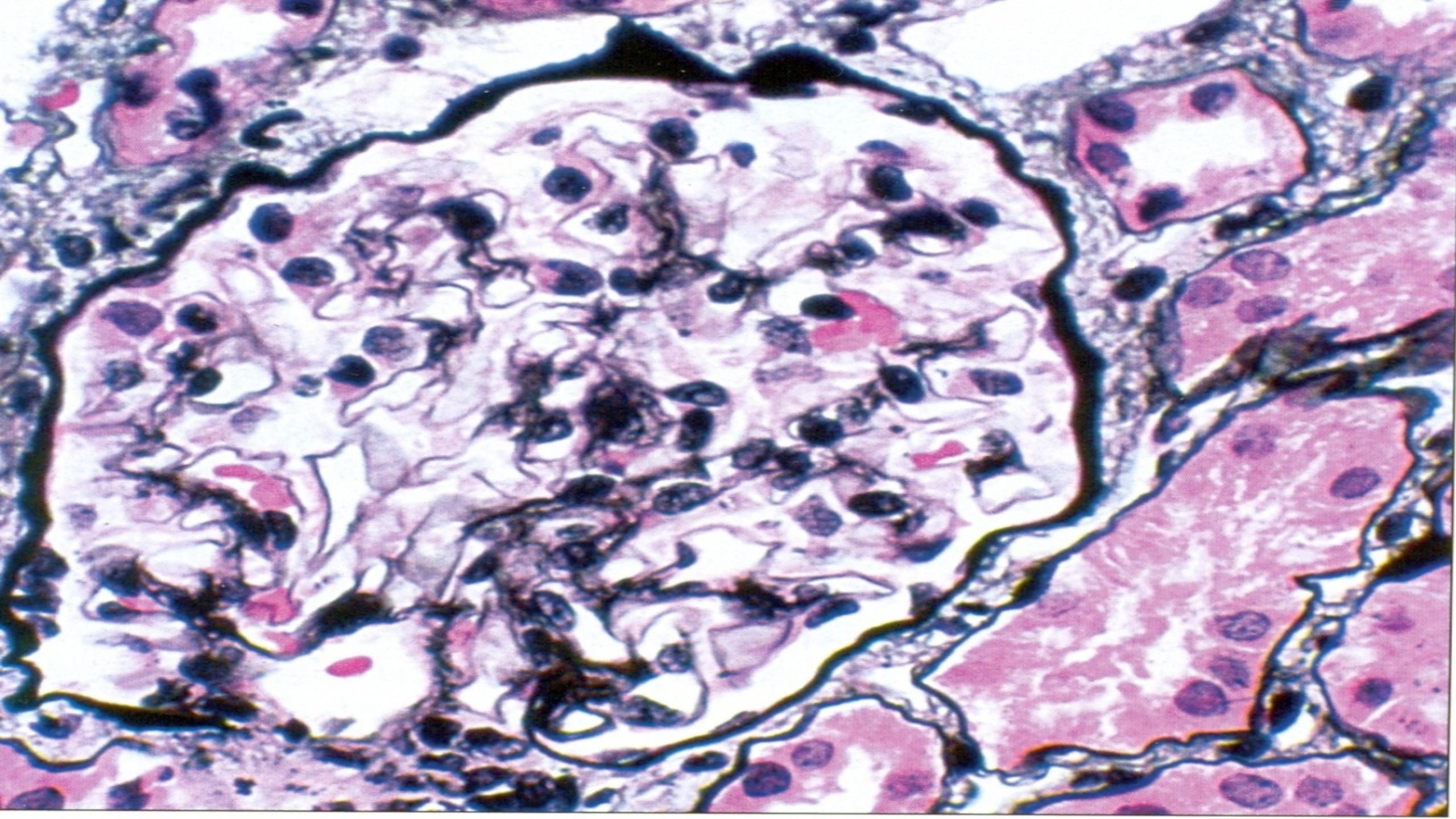
- Understand the relationship between the anatomical structures of different components of the Renal system and their functions.
- Discuss the pathology, microbiology, pathogenesis, and factors contributing to the development of most common diseases affecting the Renal system.
- Use basic sciences to explain patient's signs and symptoms, interpret investigation results, and provide justifications for their views.

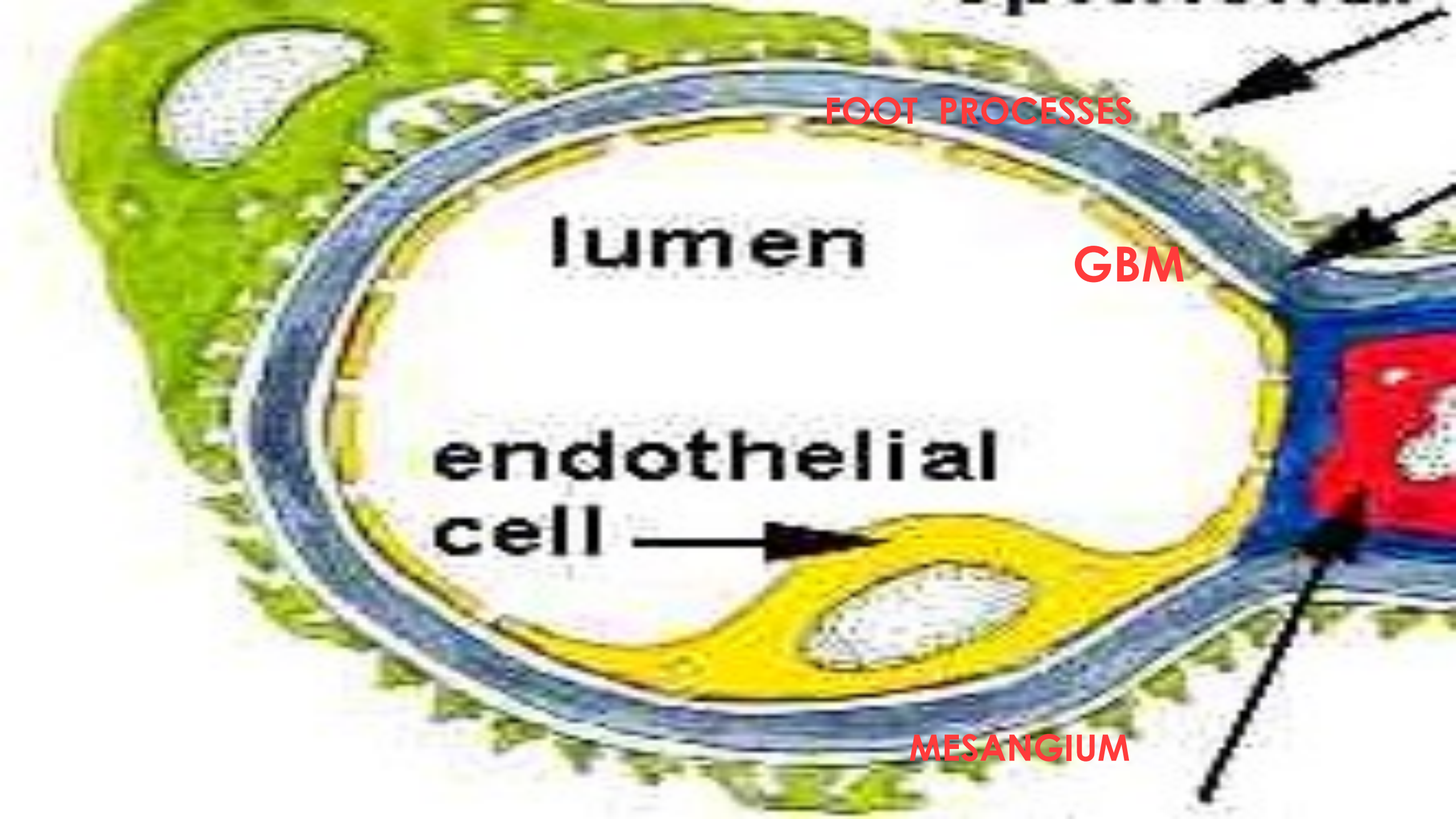
OBJECTIVES

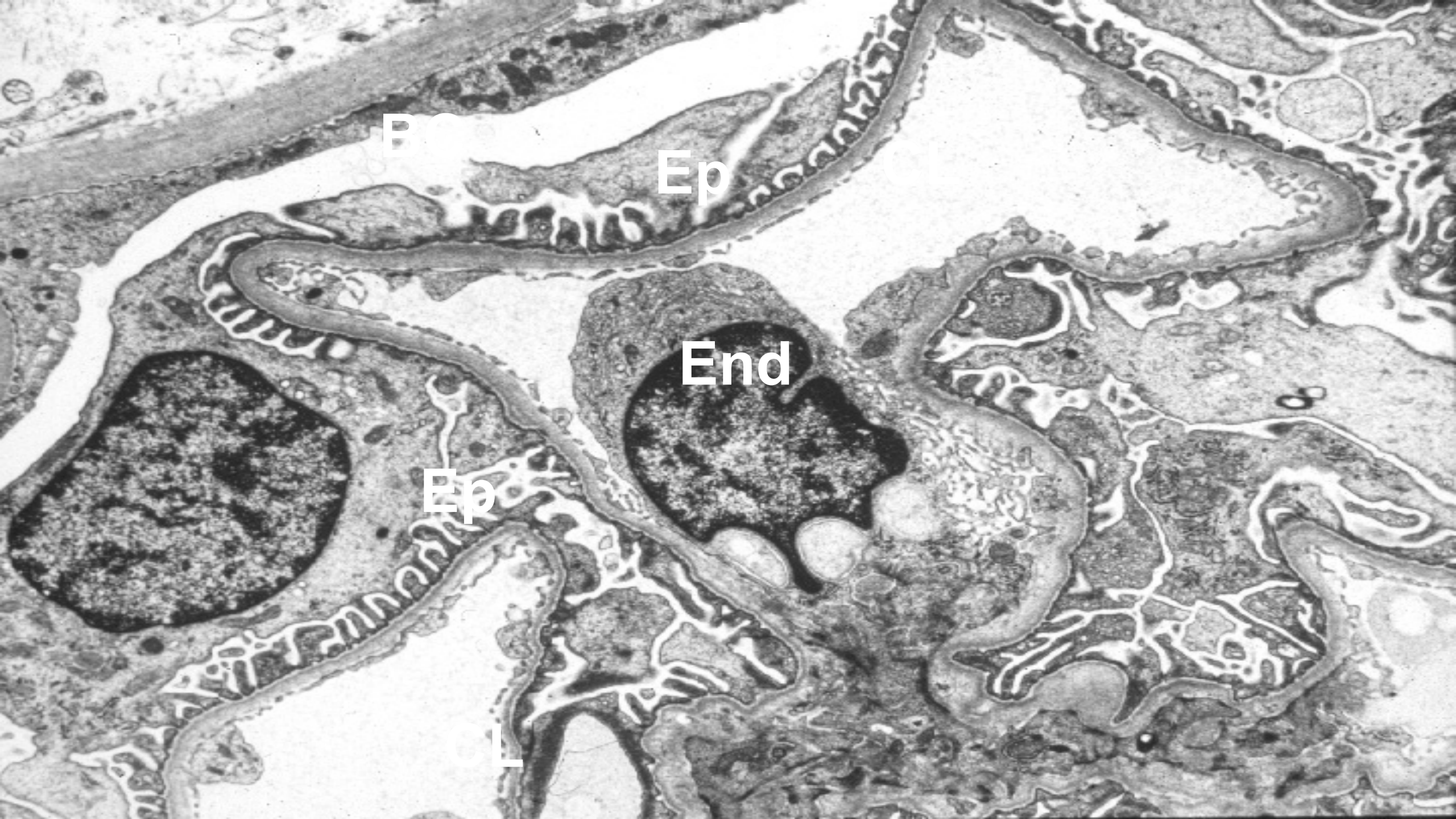
- Develop communication skills and explore psychosocial, and ethical issues in their assessment.
- Use clinical cases to apply knowledge learnt, generate hypotheses, build an enquiry plan, and use evidence to refine their hypotheses, and justify their views.
- Design a management plan, and understand the pharmacological basis of drugs used in the management of common diseases affecting the Renal system.

ACUTE KIDNEY INJURY OBJECTIVES

- Introduction to the renal pathology
- Acute Kidney Injury
- Definition, Types, Clinical Overview, Causes
- Pathological findings
- Differential Diagnosis




FOOT PROCESSES
lumen
GBM
endothelial
cell
MESANGIUM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ACUTE KIDNEY INJURY IS A SYNDROME DEFINED BY A SUDDEN LOSS OF RENAL FUNCTION OVER SEVERAL HOURS TO SEVERAL DAYS.

Mayo Clin Proc. 2001;76:67-74

WHAT CONSTITUTES THE SYNDROME OF ARF?

- Accumulation of nitrogenous waste products.
- Increased Scr.
- Derangement of extracellular fluid balance.
- Acid-base disturbance.
- Electrolyte and mineral disorders.

WHAT CONSTITUTES UREMIA?

- Renal failure
- Lethargy
- Anorexia
- Dysgeusia
- Pericarditis
- Neuropathy
- Nausea and vomiting
- Pruritis
- Dyspnea

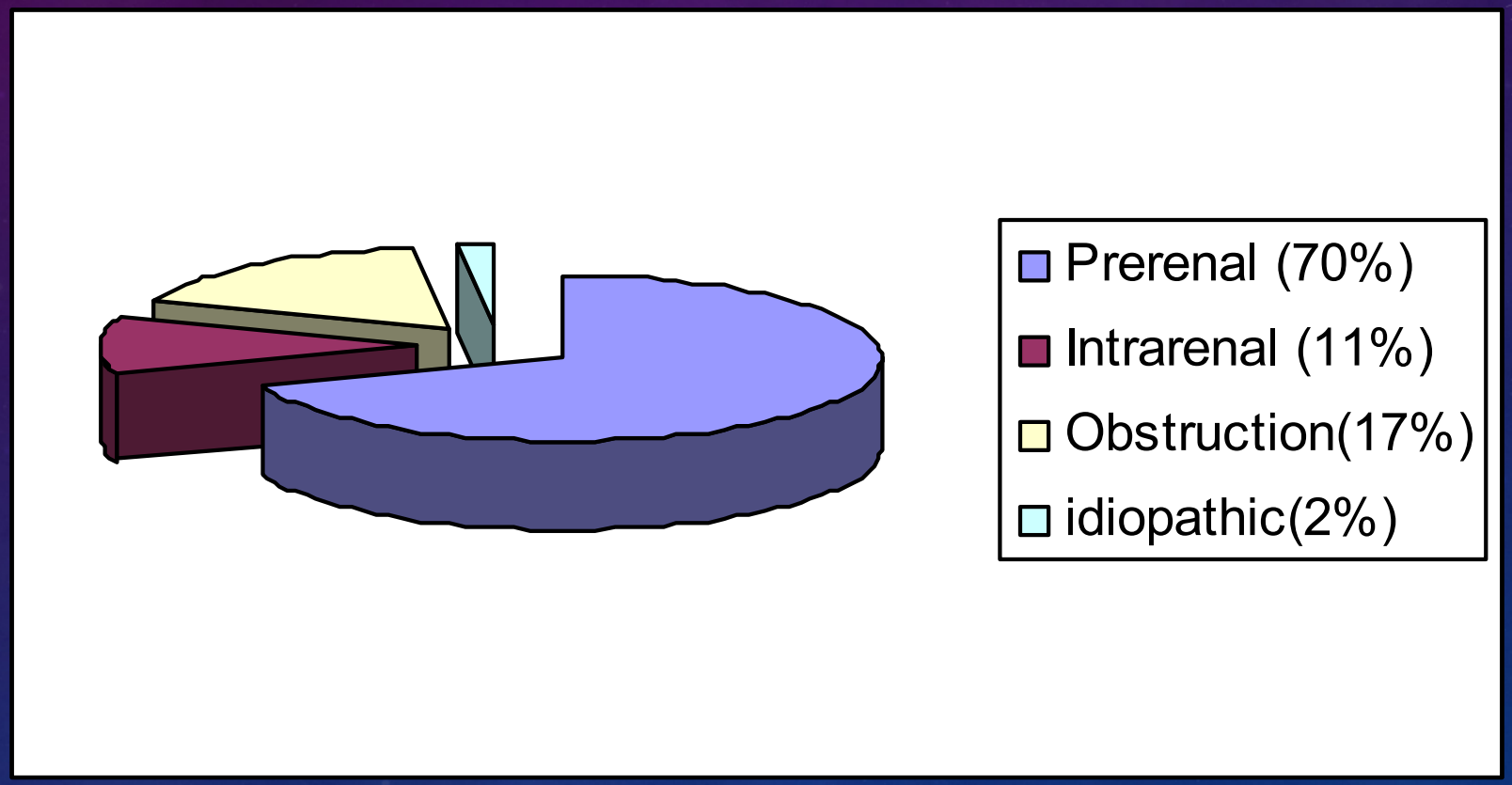
Azotemia: elevated blood urea nitrogen not from an intrinsic renal disease

Oliguria: urine output less than 500cc/24hr.

Nonoliguria: urine output greater than 500cc/24hr.

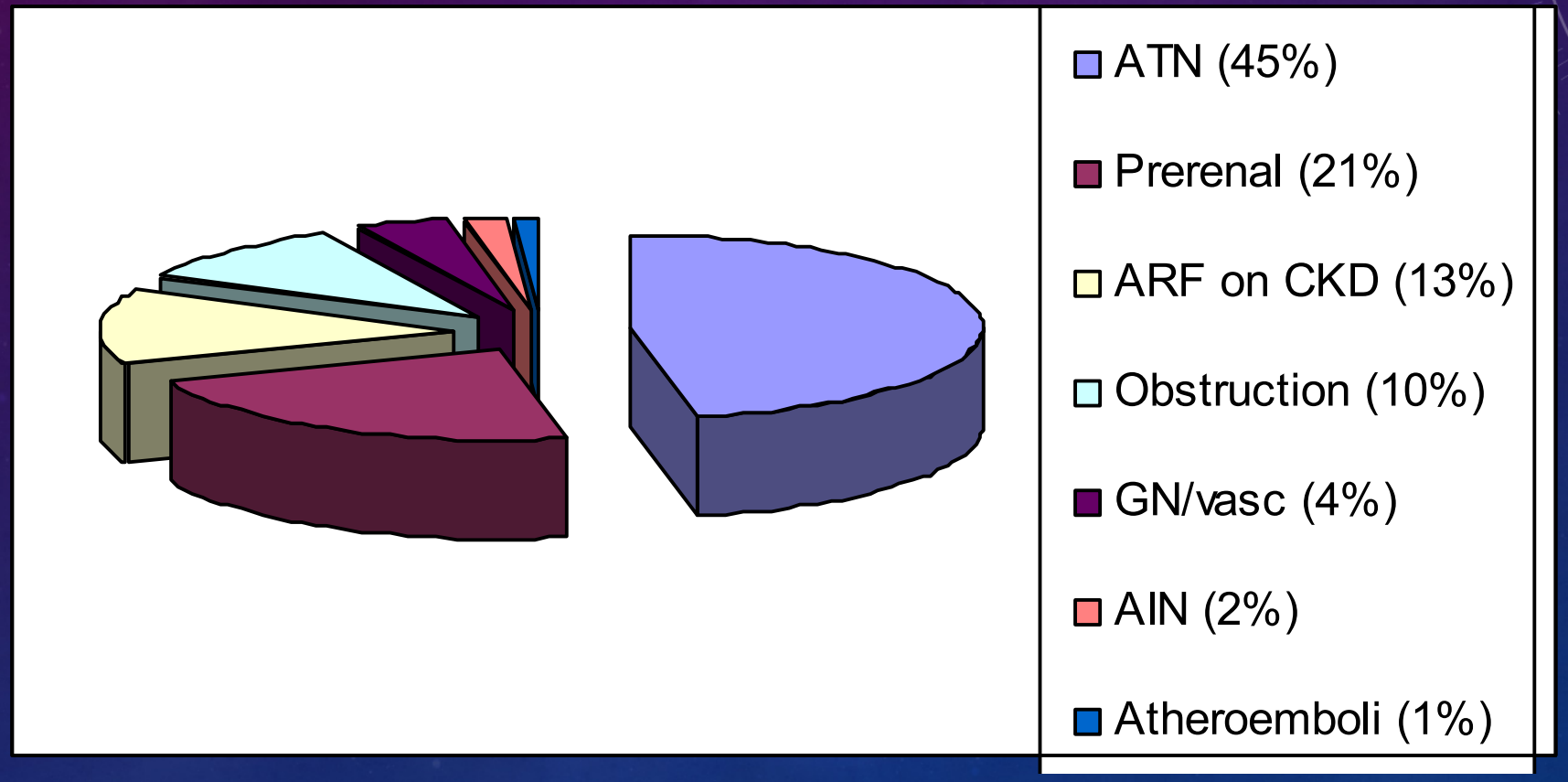
Anuria: urine output less than 50cc/24hr.

ETIOLOGY OF ARF AMONG OUTPATIENTS



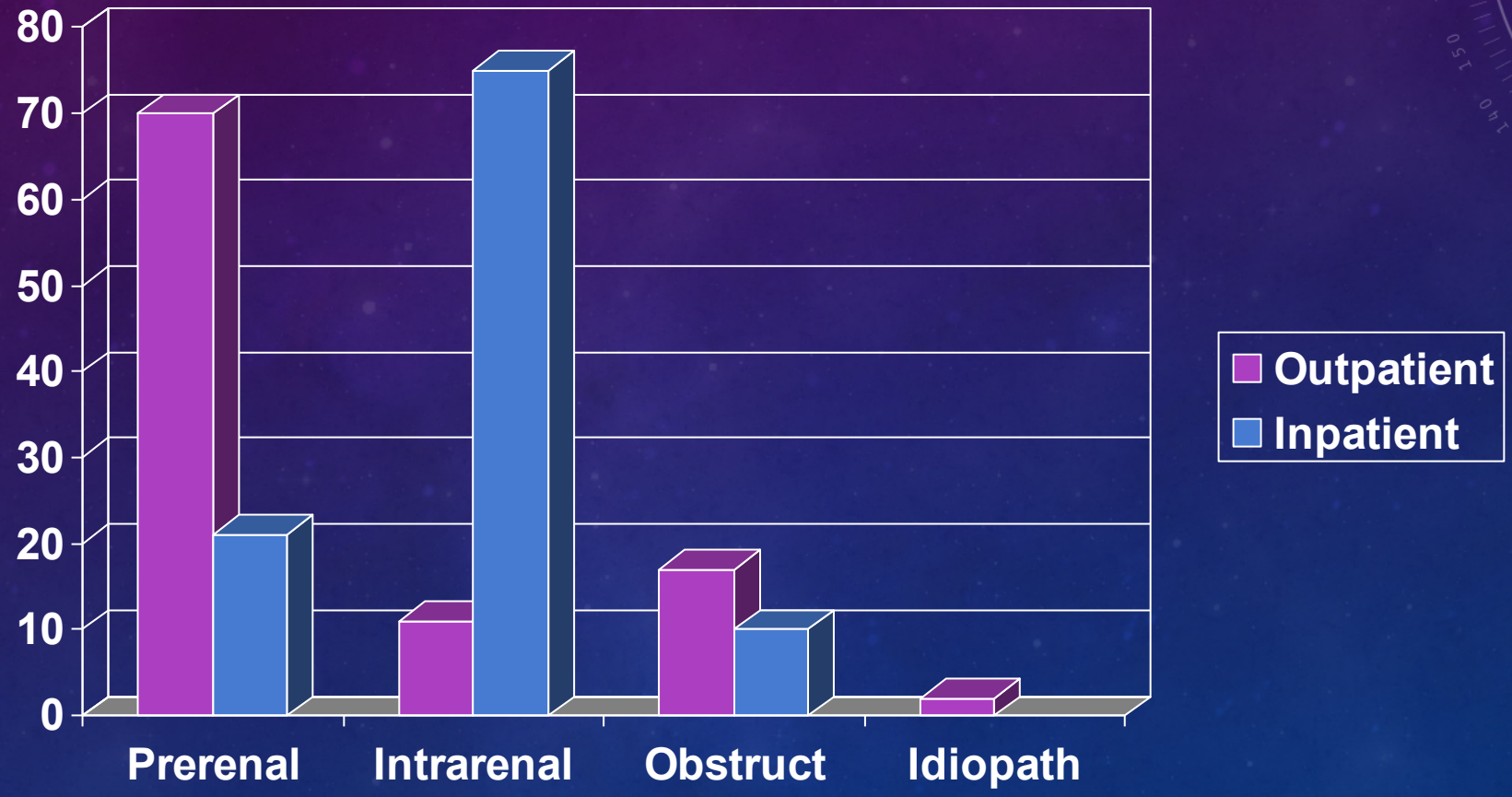
AJKD 17:191-198, 1991

ETIOLOGY OF ARF AMONG INPATIENTS



KI 50:811-818, 1996

ETIOLOGY OF ARF



MORTALITY OF ARF

- “Despite technical progress in the management of acute renal failure over the last 50 years, mortality rates seem to have remained unchanged at around 50%.”

PREDICTORS OF DIALYSIS IN ARF

- Oliguria:
  - <400cc/24hr 85% will require dialysis
  - >400cc/24hr 30-40% will require dialysis
- Mechanical ventilation
- Acute myocardial infarction
- Arrhythmia
- Hypoalbuminemia
- ICU stay
- Multi-system organ failure

JASN 9(4):692-698, 1998 Arch IM 160:1309-1313, 2000

THE PATHOPHYSIOLOGY OF ARF

JASN 1998;9(4):710-718

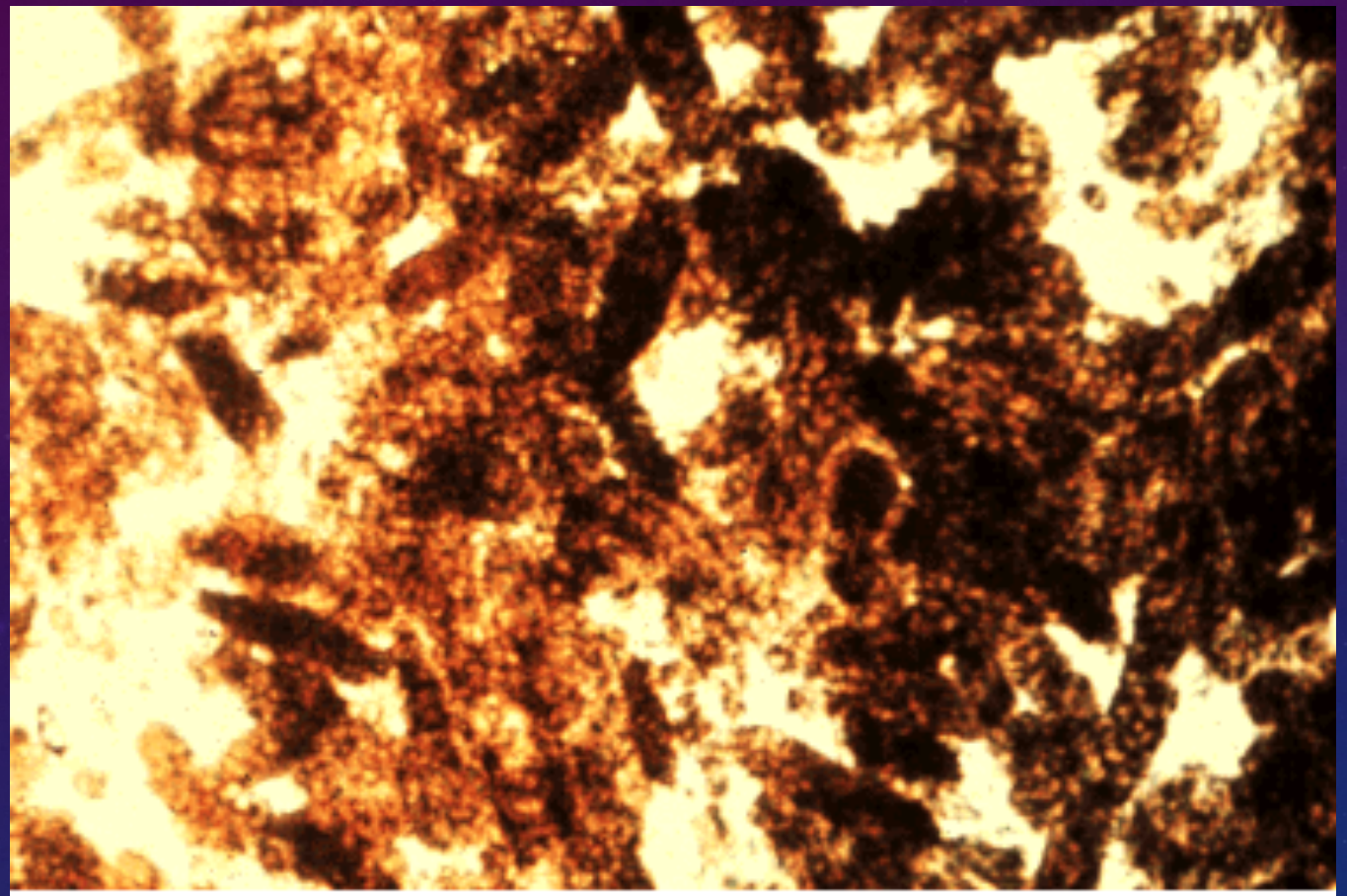
PRERENAL ARF (DECREASED RENAL BLOOD FLOW)

- Hypotension
  - Sepsis, cardiogenic, medication
- Cardiogenic
- Vascular
  - Vasculitis, renal artery compromise, AAA, atheroemboli
- Third Spacing
  - Bowel obstruction, cirrhosis, nephrotic syndrome, major surgery,
- Volume depletion
  - GI losses: vomiting, diarrhea
  - Skin losses: burns, sweat
  - Renal losses: DKA, DI, Addison's, Na wasting
- Drug-induced
  - NSAID, CsA, FK506, ACE, ARB

THERE IS A CONTINUUM FROM PRERENAL PHYSIOLOGY TO ISCHEMIC PATHOLOGY.

TUBULAR TOXINS

- Antimicrobials: aminoglycosides, vancomycin, foscarnet, pentamidine, amphotericin B
- Chemotherapeutics: cisplatin, mitomycin C, ifosfamide
- Immunotherapy: IVIG
- Complex Sugars: maltose, sucrose, mannitol
- Heavy metals
- Sepsis, hypoxia
- Radiocontrast agents



Sediment in ATN Urine sediment showing multiple, muddy brown granular casts. These findings are highly suggestive of acute tubular necrosis in a patient with acute renal failure. Courtesy of Harvard Medical School.

Uptodate Online 11.2, Rose BD, 2003

ACUTE TUBULAR INJURY IS A CLINICOPATHOLOGICAL ENTITY: DEFINED BY

1- ACUTE RENAL FAILURE.

2- TUBULAR INJURY/NECROSIS

ACUTE RENAL FAILURE

I. Acute tubular necrosis (ATN)
II. Ischemic

1. Shock
2. Sepsis
3. Incompatible blood transfusions
4. thrombotic diseases

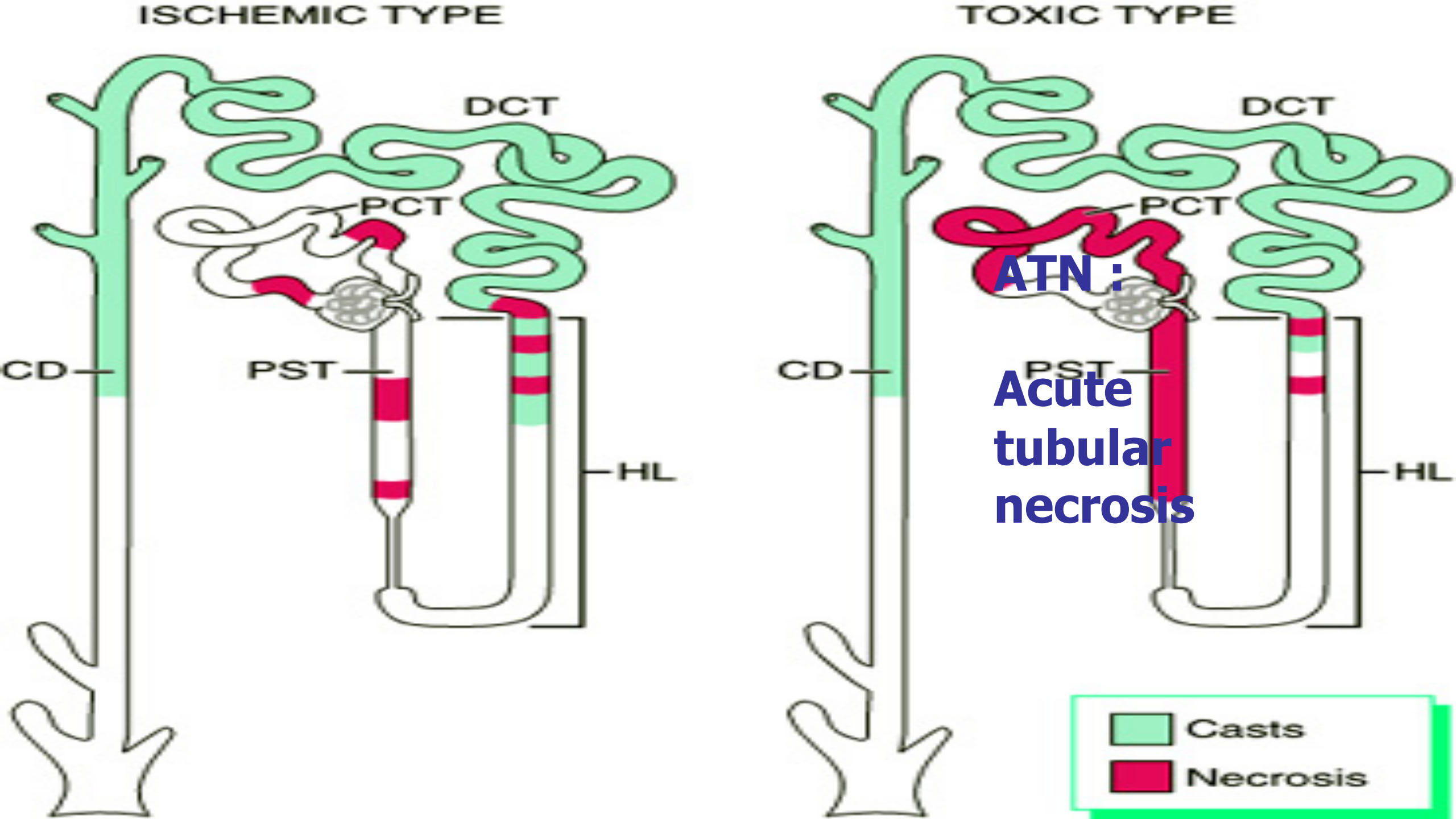
ACUTE RENAL FAILURE

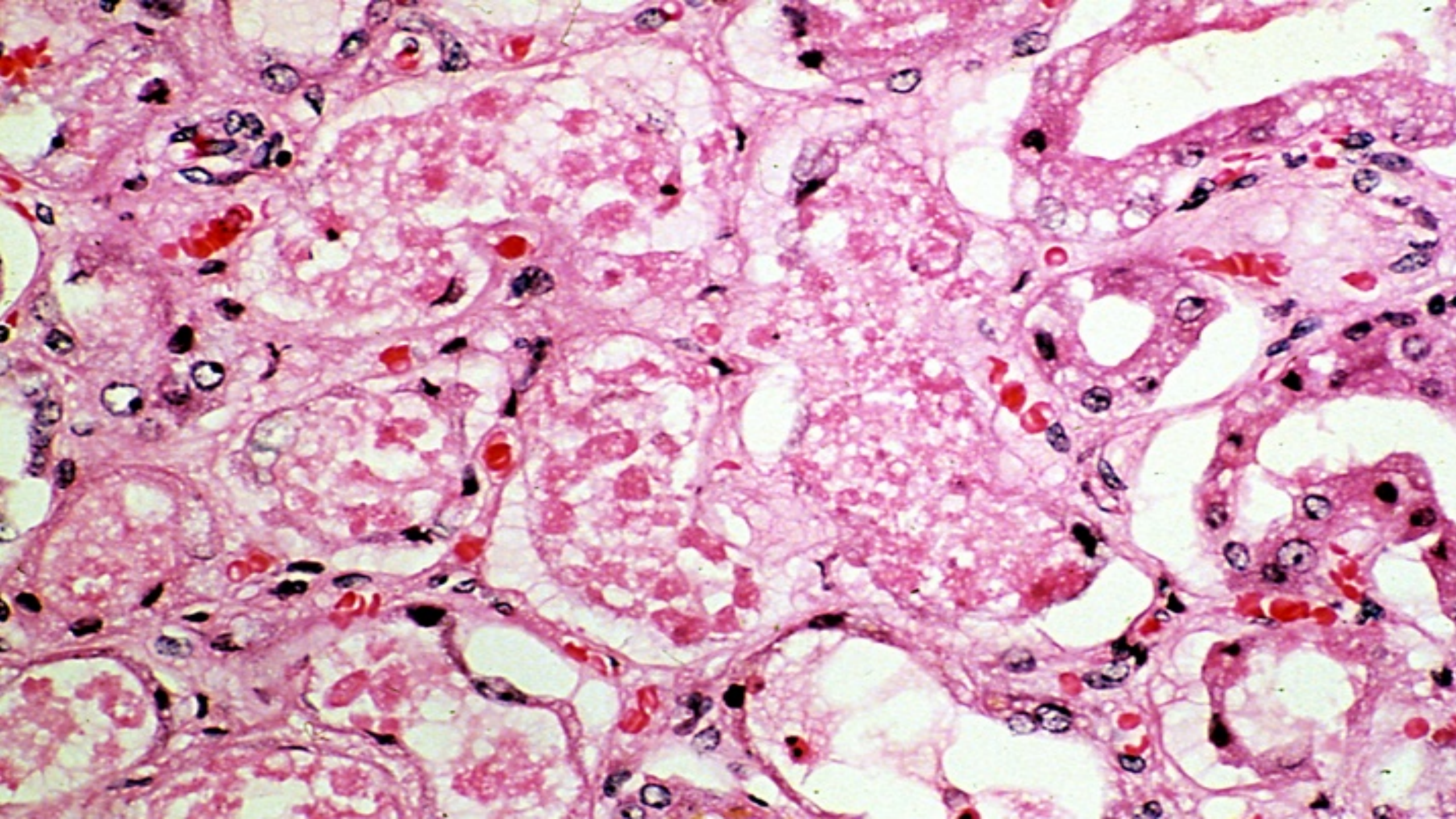
I. Acute tubular necrosis (ATN)

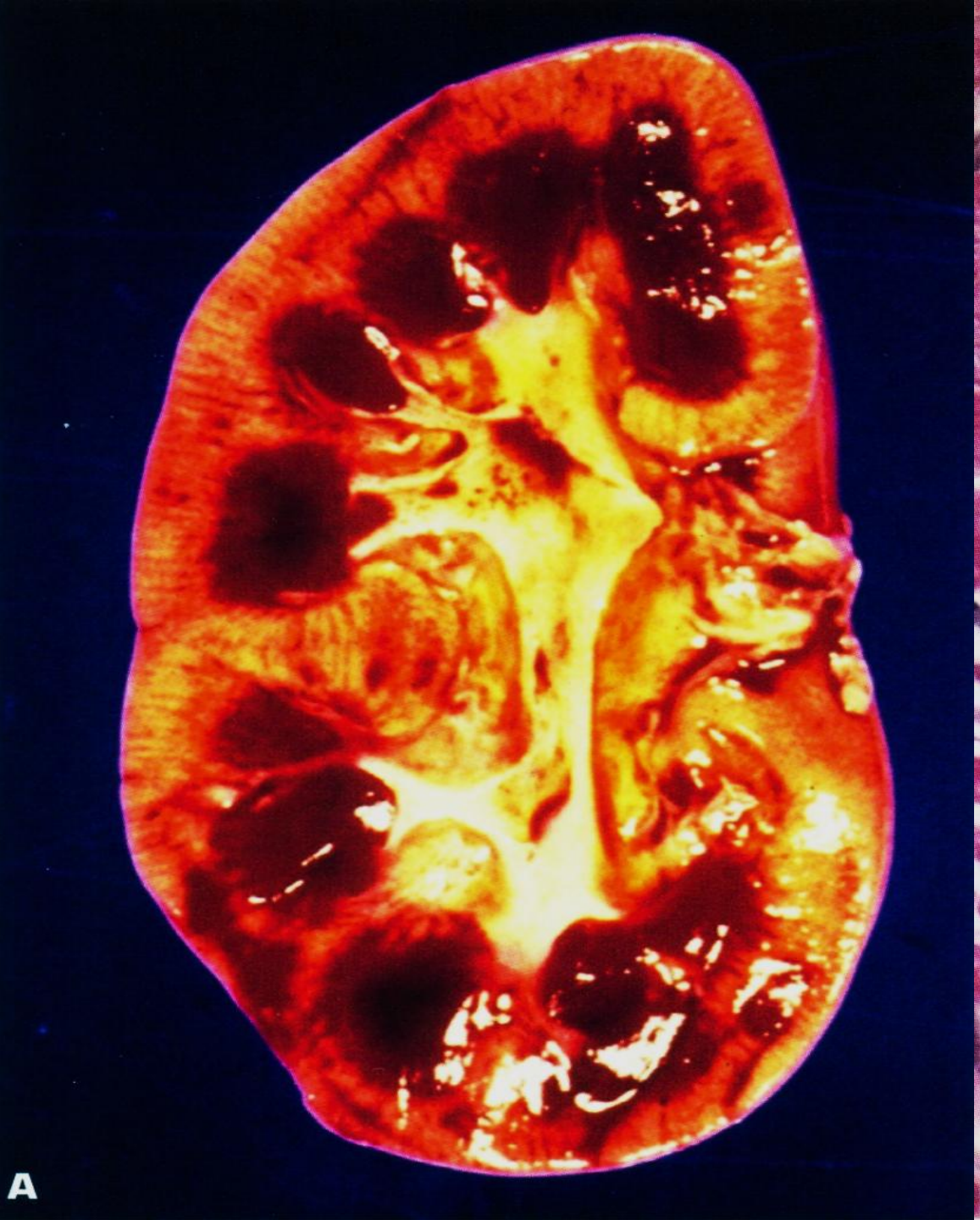
III. Toxic : A- Endogenous: Crush injury- Hemoglobinopathy.
B- Exogenous: Drugs- radiocontrast dye- metals..

Acute tubular necrosis (ATN)

- *Clinicopathological entity*
- *Destruction of tubular epithelial cell*
- *Clin. acute suppression of renal function (no urine or below 400 ml/24h)*
- *Most common cause of renal failure*


ISCHEMIC TYPE
DCT
PCT
CD
PST
HL
TOXIC TYPE
DCT
PCT
ATN :
Acute tubular necrosis
CD
PST
HL
Casts
Necrosis

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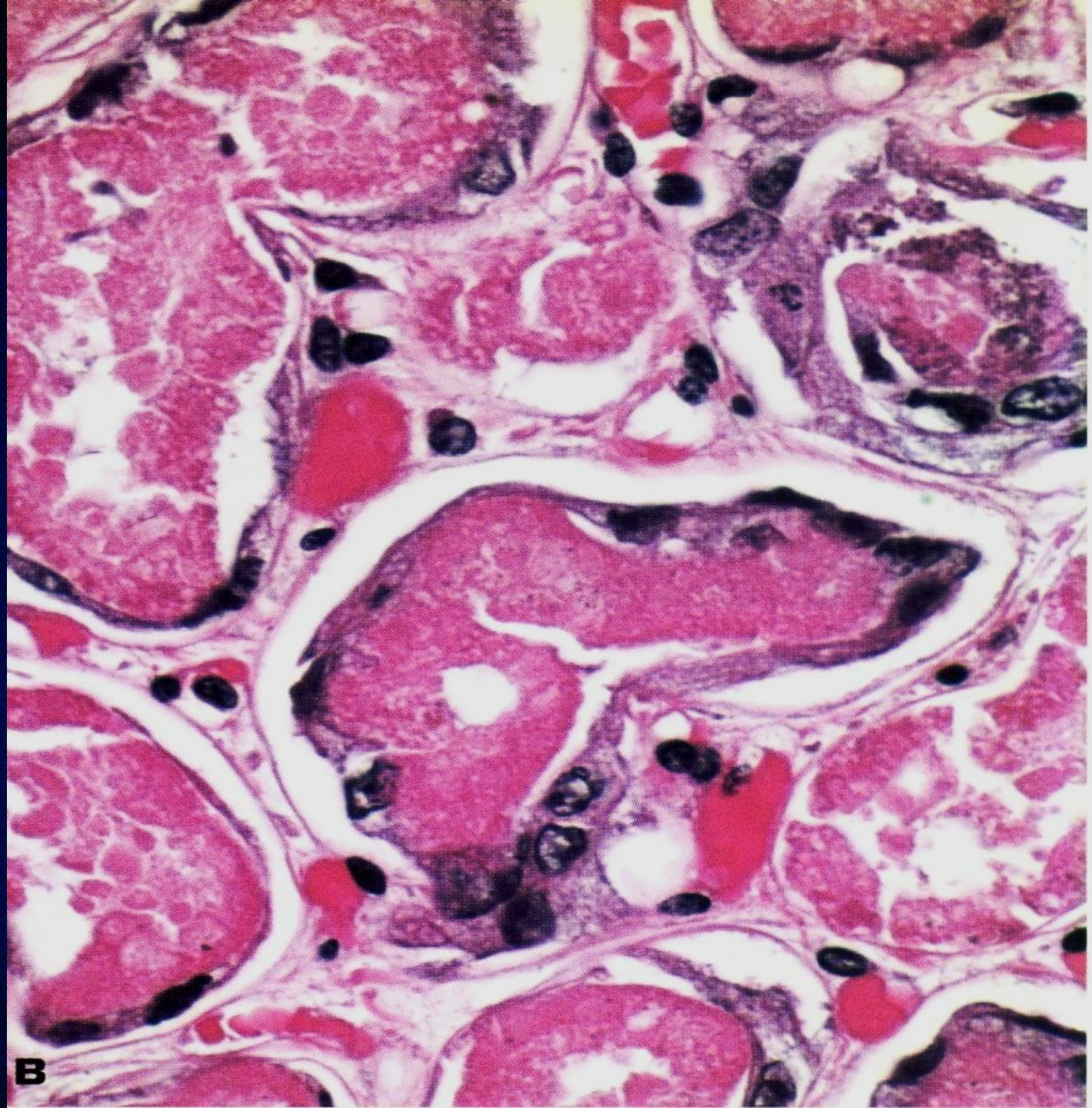
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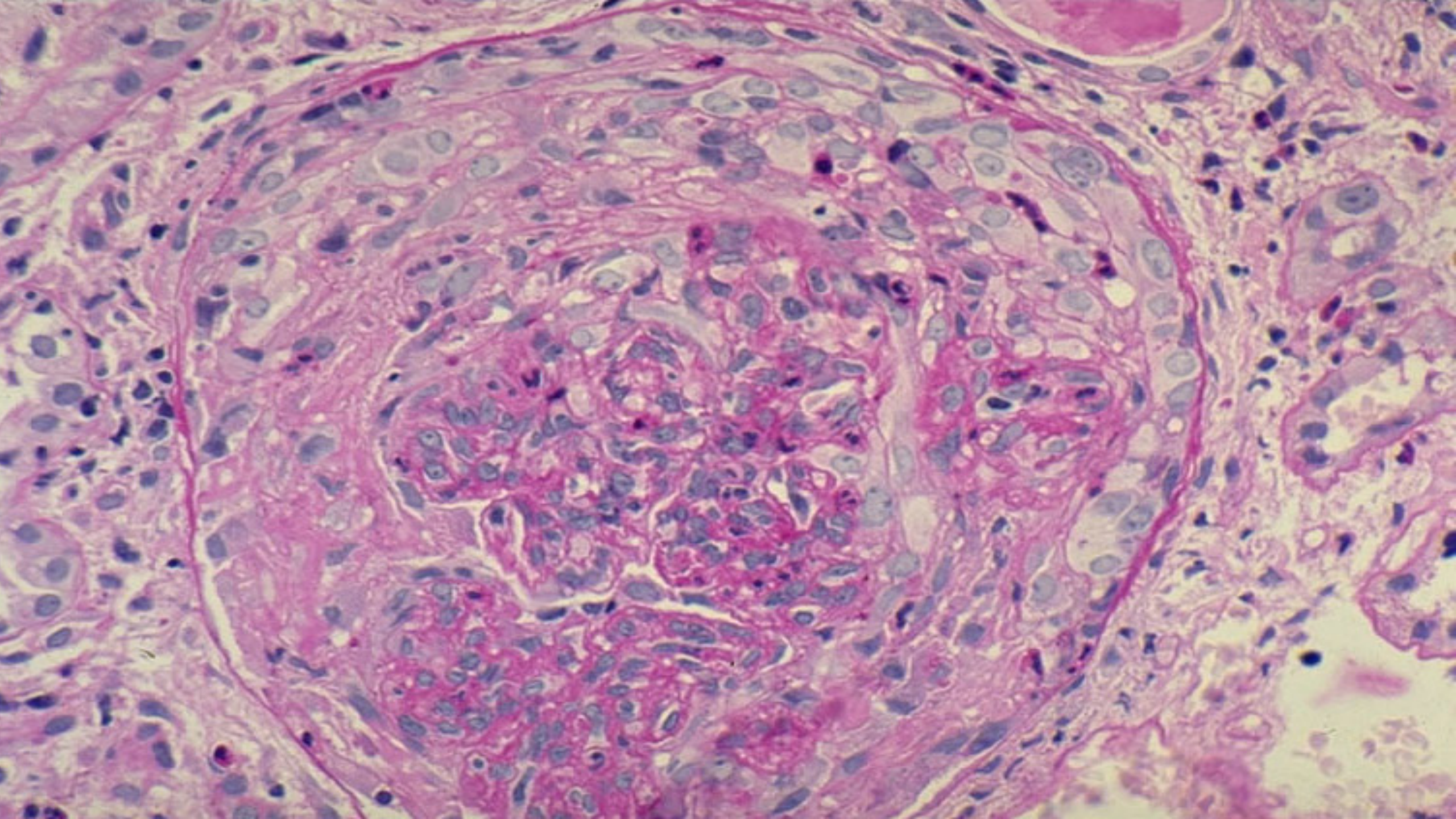
RPGN (RAPIDLY PROGRESSIVE GLOMERULONEPHRITIS) IS A SYNDROME DEFINED BY THE RAPID LOSS OF RENAL FUNCTION OVER DAYS TO WEEKS DUE TO ACUTE GLOMERULONEPHRITIS.



ACUTE KIDNEY INJURY

- Homework :
- 1- Autosomal dominant polycystic kidney disease
- 2- Autosomal recessive polycystic kidney disease
- 3- Renal dysplasia