

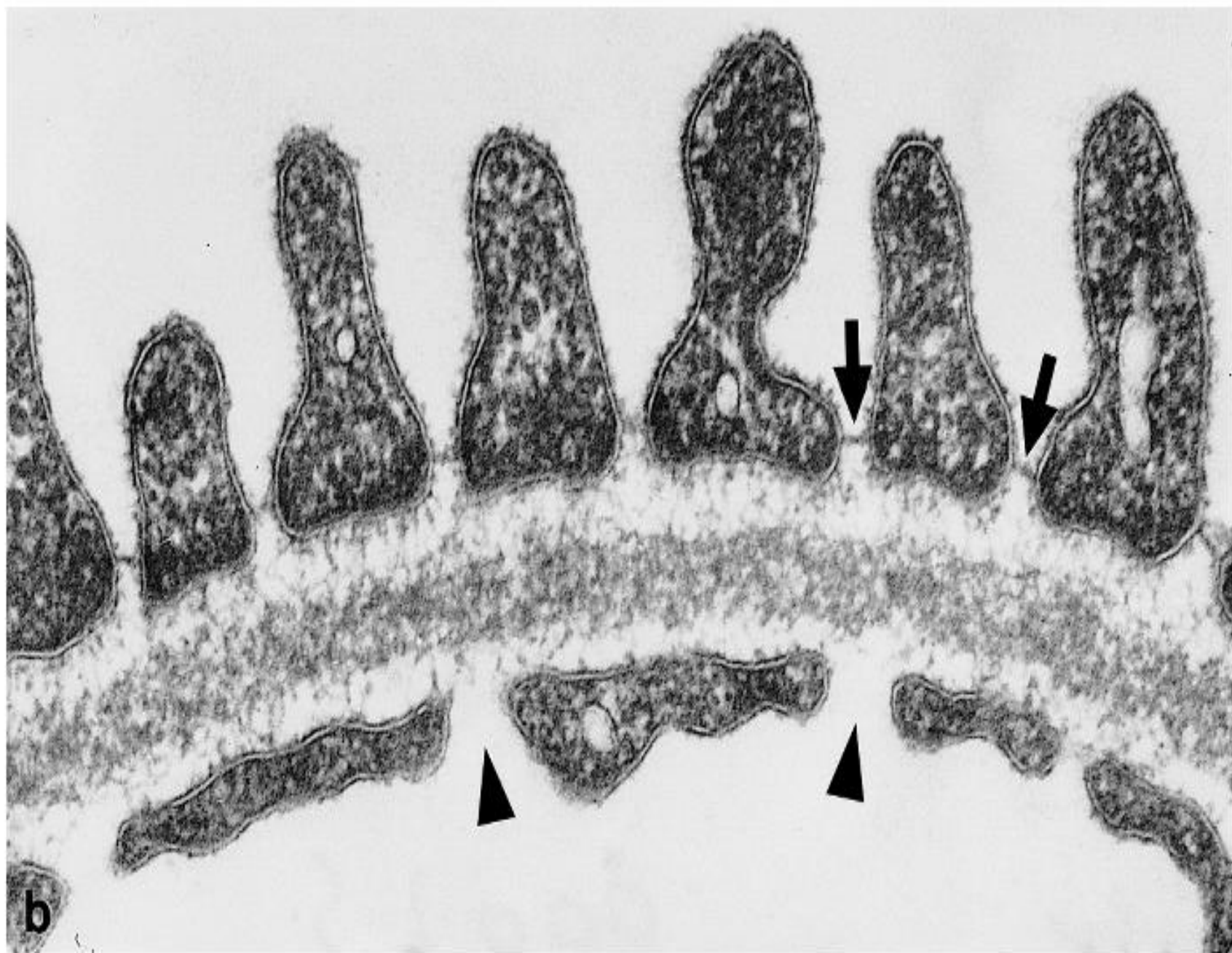
IN THE NAME
OF GOD

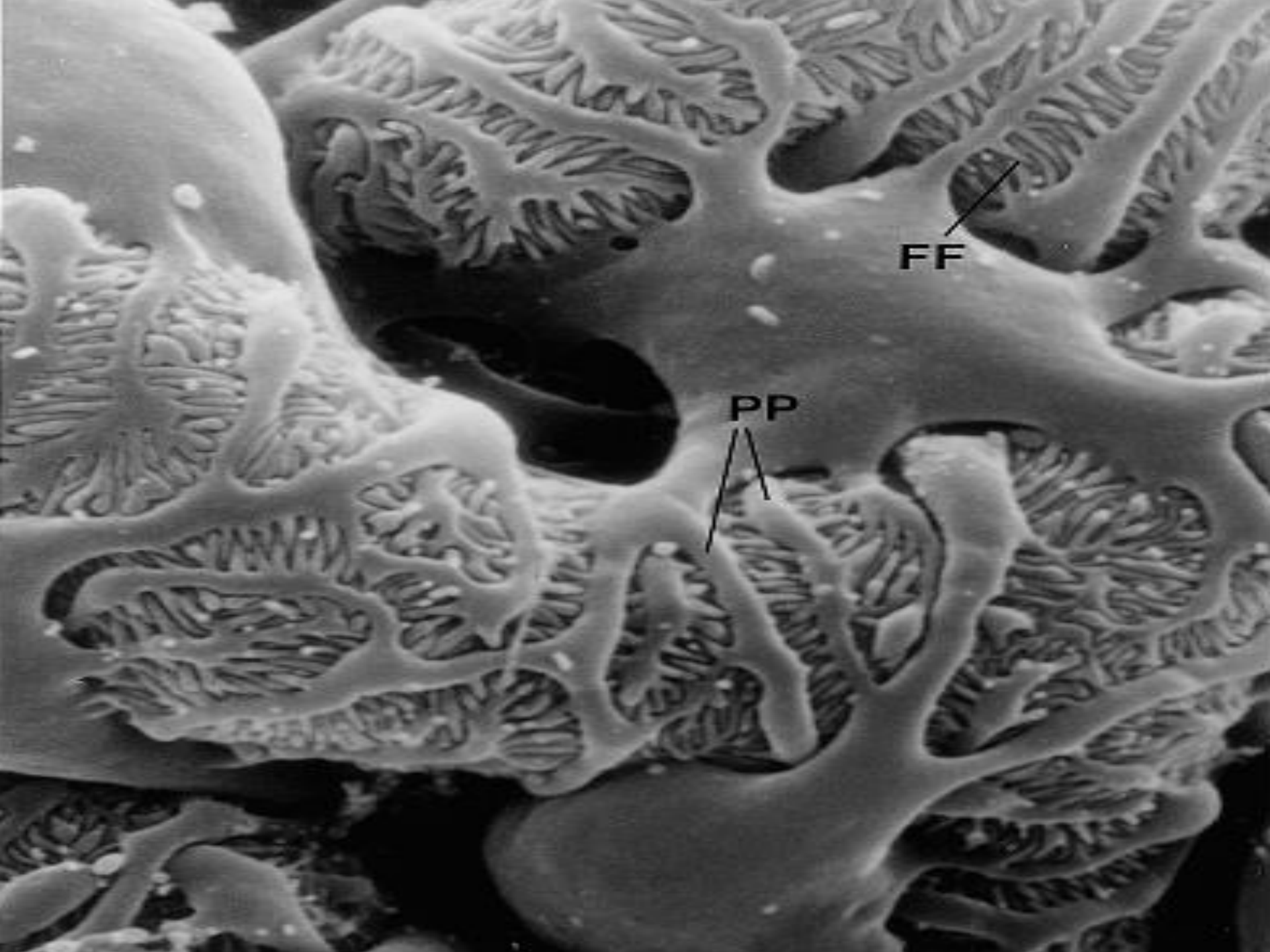
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FILTRATION MEMBRANE

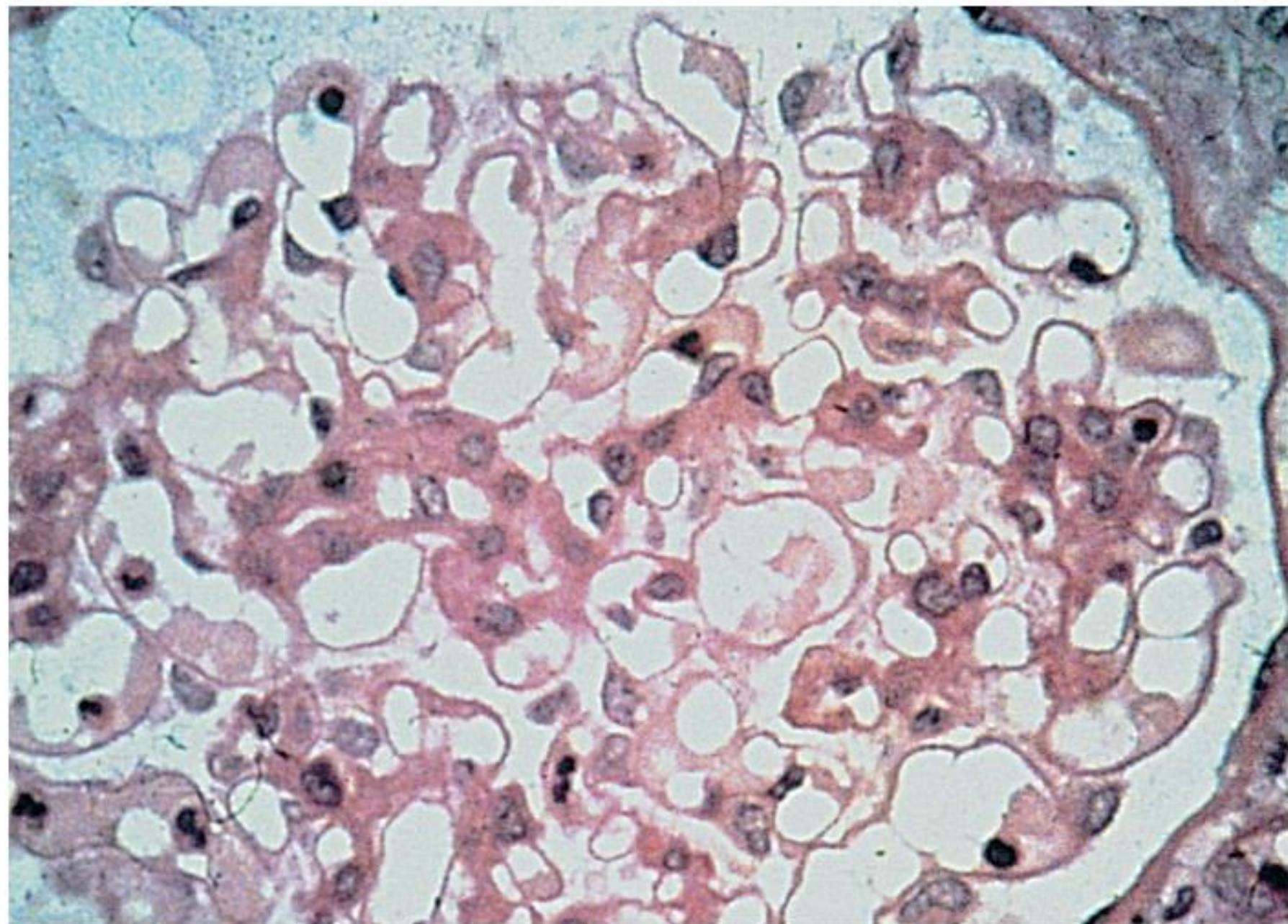
- 1-Epithelial cell with foot processes and structural proteins.
- 2-GBM (lamina rara externa,lamina densa,lamina rara interna).
- 3-Endothelial cells.





FF

PP



PROTEINURIA

- Less than 150mg/day is in normal range
- Microalbuminuria:30-300mg/day
- Urine protein to urine Cr ratio $> 0.1-0.15$

MECHANISMS OF PROTEINURIA

- 1-FUNCTIONAL PROTEINURIA:
- Transient
- Absence of renal disease
- Fever, Emotions, Acute medical illness
- Orthostatic proteinuria due to hemodynamic change (2-5% of teenagers but rare in adults >30 years)

MECHANISMS OF ...

- 2-OVER-PRODUCTION
- High plasma concentration of some proteins such as light chains, heavy chains, and other fragments of Ig.
- Multiple myeloma

MECHANISMS OF

- 3-TUBULAR:
- Impaired tubular re-absorption of normally filtered proteins.
- Hereditary diseases (Wilson)
- Toxic injuries (Cadmium, Lead, Genetamicin)
- Metabolic (hypokalemia)
- CTIN
- Fanconi syndrome
- Diuretic phase of ATN
- Heparan sulfate, Tom-Horsefal protein loss

MECHANISMS OF

- 4-GLOMERULAR due to:
- A-Loss of the negative charge of GBM
- B-An increase in effective pore size or number due to direct damage
- C-Disease related changes in glomerular hemodynamic.
- D-Abnormality in the synthesis, composition, and negative charge density of GBM.

PROTEINURIA IS GLOMERULAR IF:

- A-amount >2 g/day
- B-protein is $>70\%$ albumin.

GLOMERULAR SYNDROMES

- 1-Asymptomatic proteinuria
- 2-Asymptomatic hematuria
- 3-Recurrent gross hematuria
- 4-Acute nephritis
- 5-Nephrotic syndrome
- 6-Nephritic syndrome
- 7-Pulmonary renal syndrome (vasculitic syndromes)
- 8-RPGN
- 9-CRF(chronic sclerosing GN)

NEPHROTIC SYNDROME

DEFINITION:

Urinary protein loss > 3.5 g/day/ 1.73m^2
of body surface

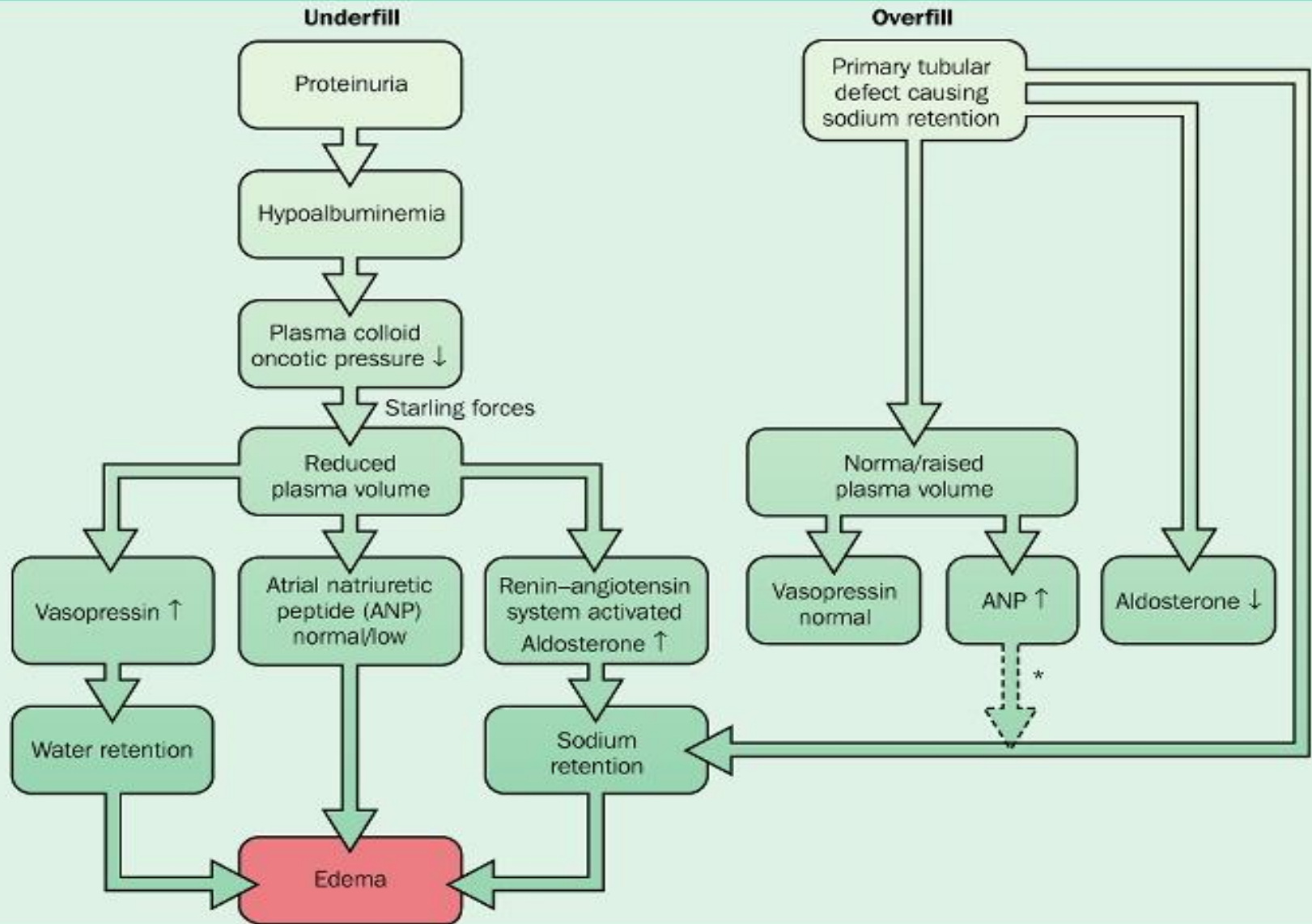
ETHIOLOGY

- 1-Infectious (bacterial, viral, parasitic)
- 2-Metabolic
- 3-Collagen vascular
- 4-Toxins and drugs
- 5-Malignancies
- 6-Hereditary and familial
- 7-Idiopathic

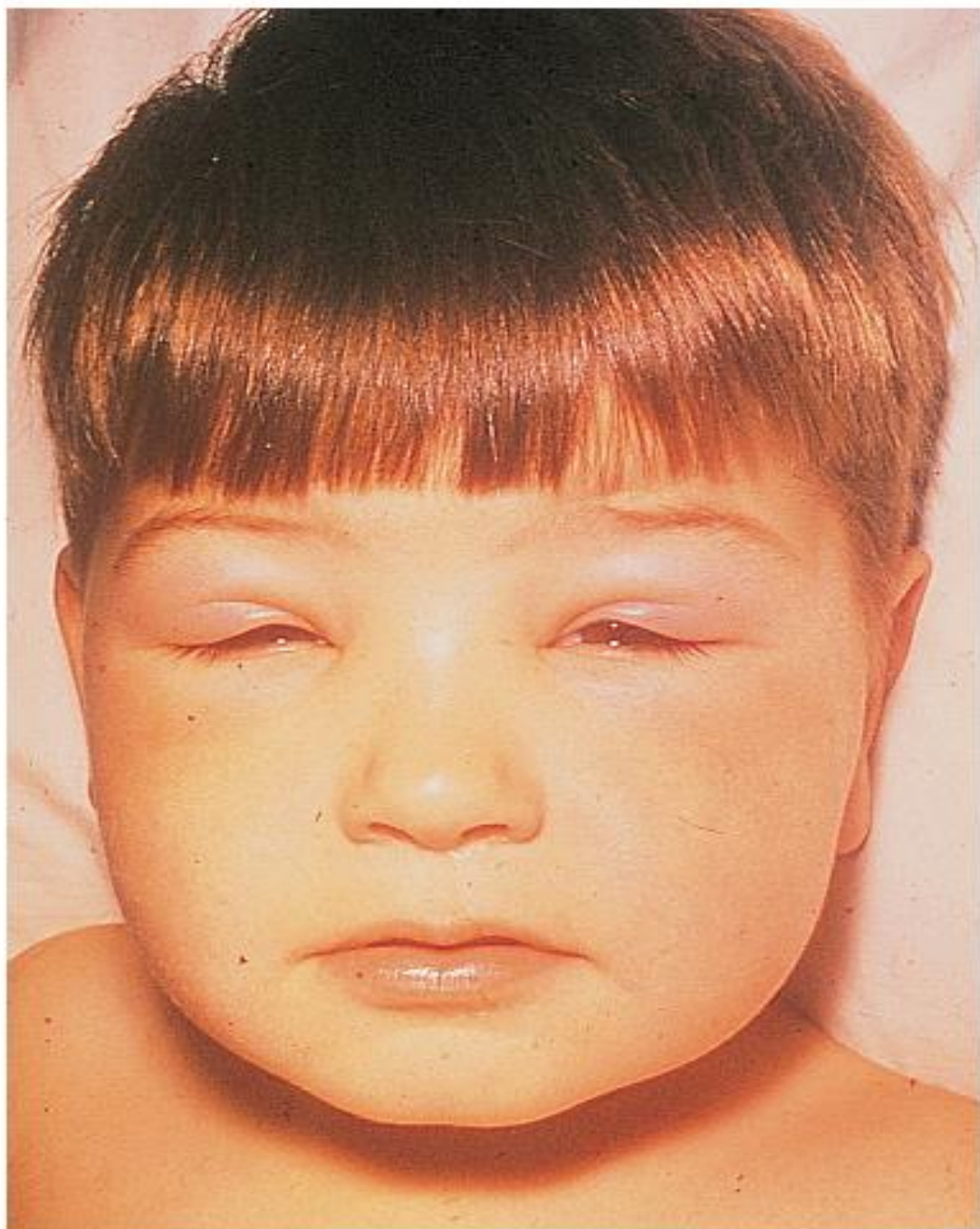
CLINICAL COMPLICATION OF NEPHROTIC SYNDROME

- 1-HYPOALBUMINEMIA:
- a-Edema
- B-Increased hepatic lipoprotein synthesis so hyperlipoproteinemia.
- Increased platelets aggregation

Formation of nephrotic edema



*The kidney is relatively resistant to ANP in this setting, so it has little effect in countering sodium retention

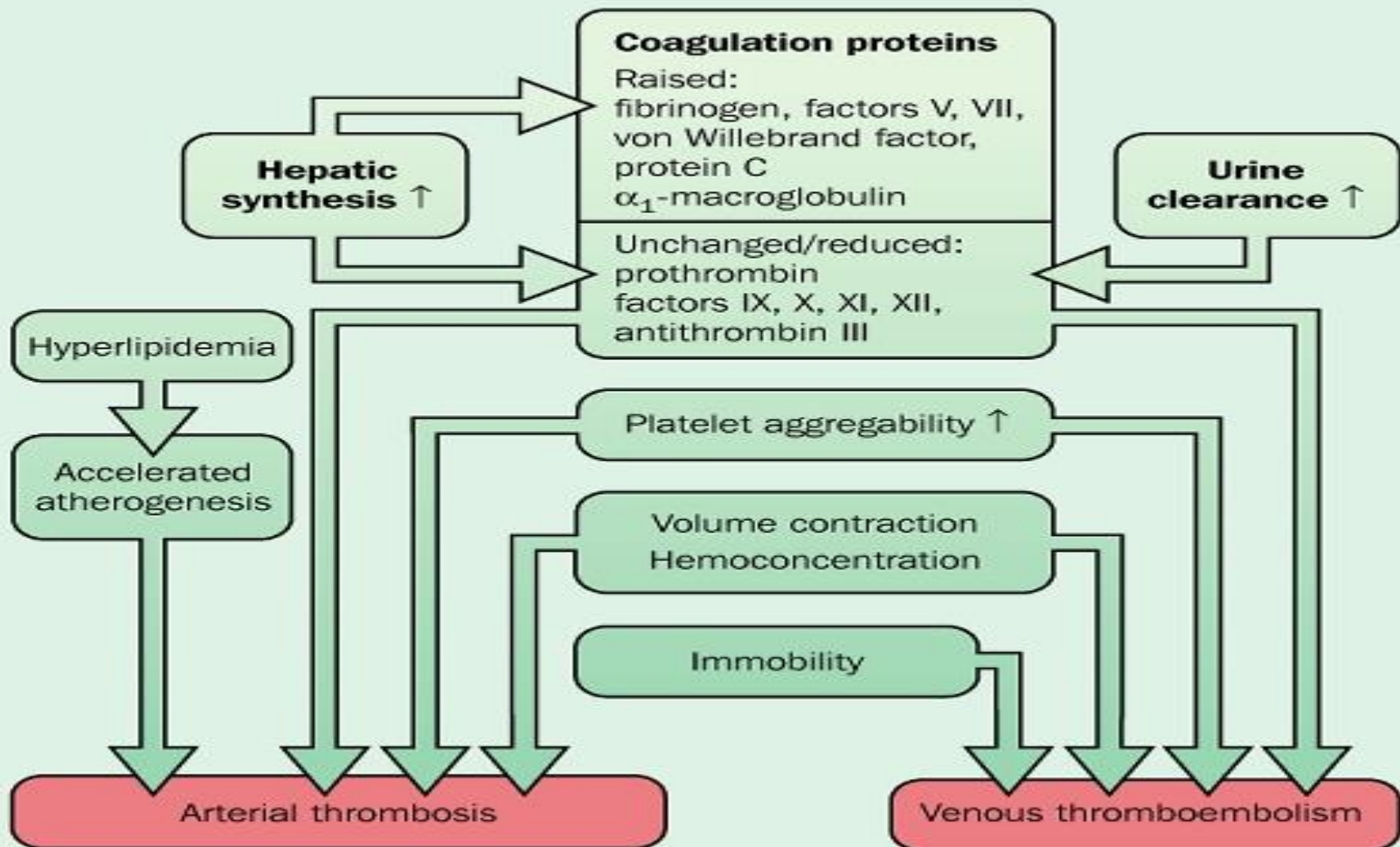




COMPLICATIONS OF....

- 2-INCREASED TUBULAR PROTEIN REABSORPTION:
 - a-Tubular dysfunction
 - b-Tubular damage
- 3-LOSS OF PROTEINS CARRYING VITAMINS, HORMONS, AND MINERALS.
- 4-LOSS OF Ig
 - a-Reduced cellular immunity
 - B-Susceptibility to infection
- 5-ALTERATION IN COAGULATION FACTORS
 - DVT,PTE, RVT
- 6-NEGATIVE NITROGEN BALANCE→ Malnutrition
- 7-ALTERATION IN DRUGS METABOLISM (binding proteins)
- 8-DIURETIC RESISTANCE

Coagulation abnormalities in nephrotic syndrome



PATHOLOGIC TYPES

	nephrotic	nephritic
■ MCD	++++	-
■ MGN	++++	+
■ Diabetic GN	++++	+
■ FSGS	+++	++
■ MPGN	++	+++
■ Acute GN	+	++++
■ RPGN	+	++++

TREATMENT

- 1-Treatment of underlying disease
- 2-Specific treatment (corticosteroids, cyclosporine, MMF, plasmapheresis, cytotoxics,.....)
- 3-Nonspecific treatment
 - a-Dietary protein restriction (reducing both GFR & P_{Gc}) (0.6g/kg+urinary Pr loss)
 - b-ACE-I & ARB
 - c-NSAIDS in high dose
 - d-Statins
 - e-Soy protein
 - f-Anticoagulants

THE END

