ΝΕΦΡΩΣΙΚΟ ΣΥΝΔΡΟΜΟ

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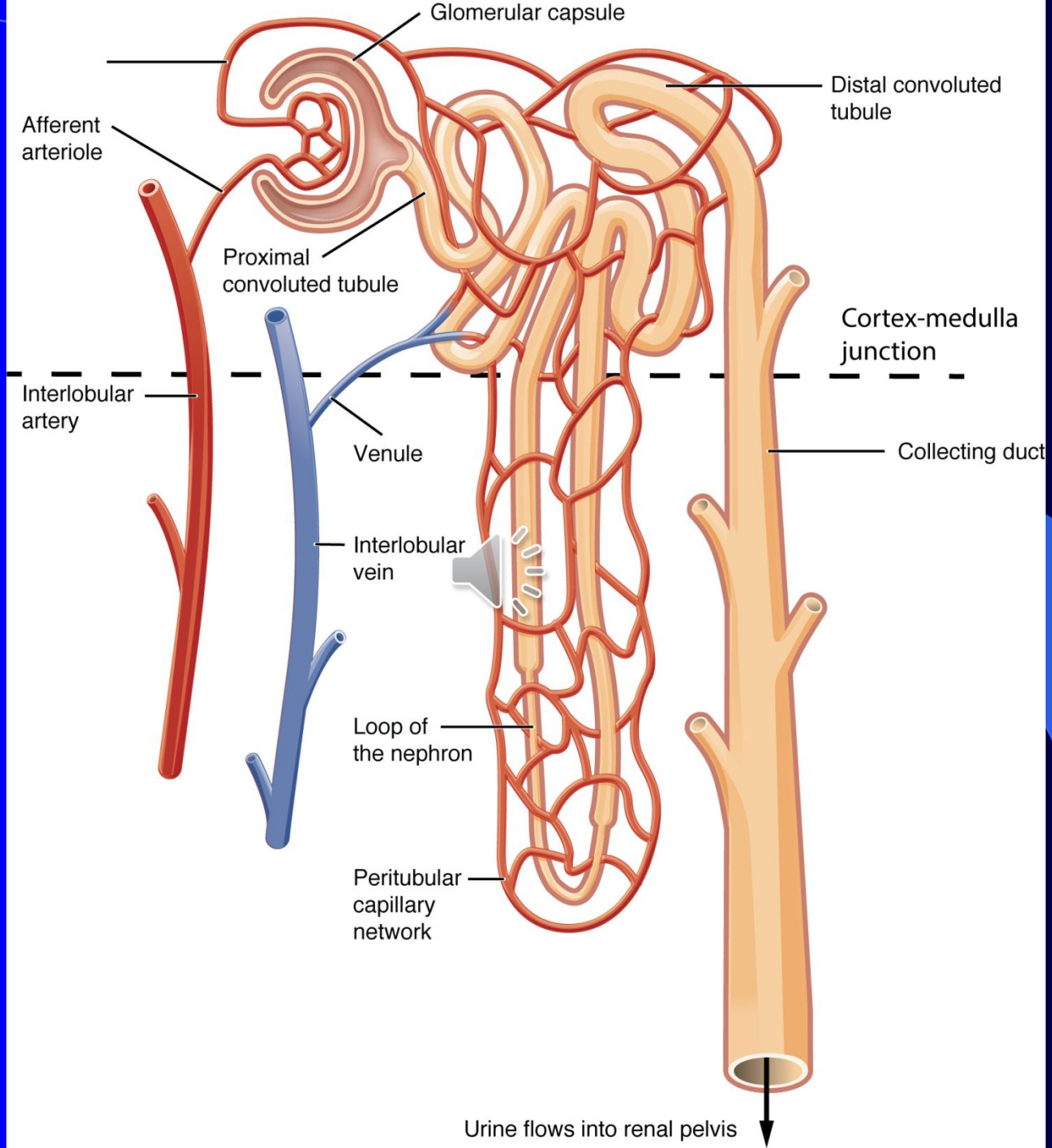
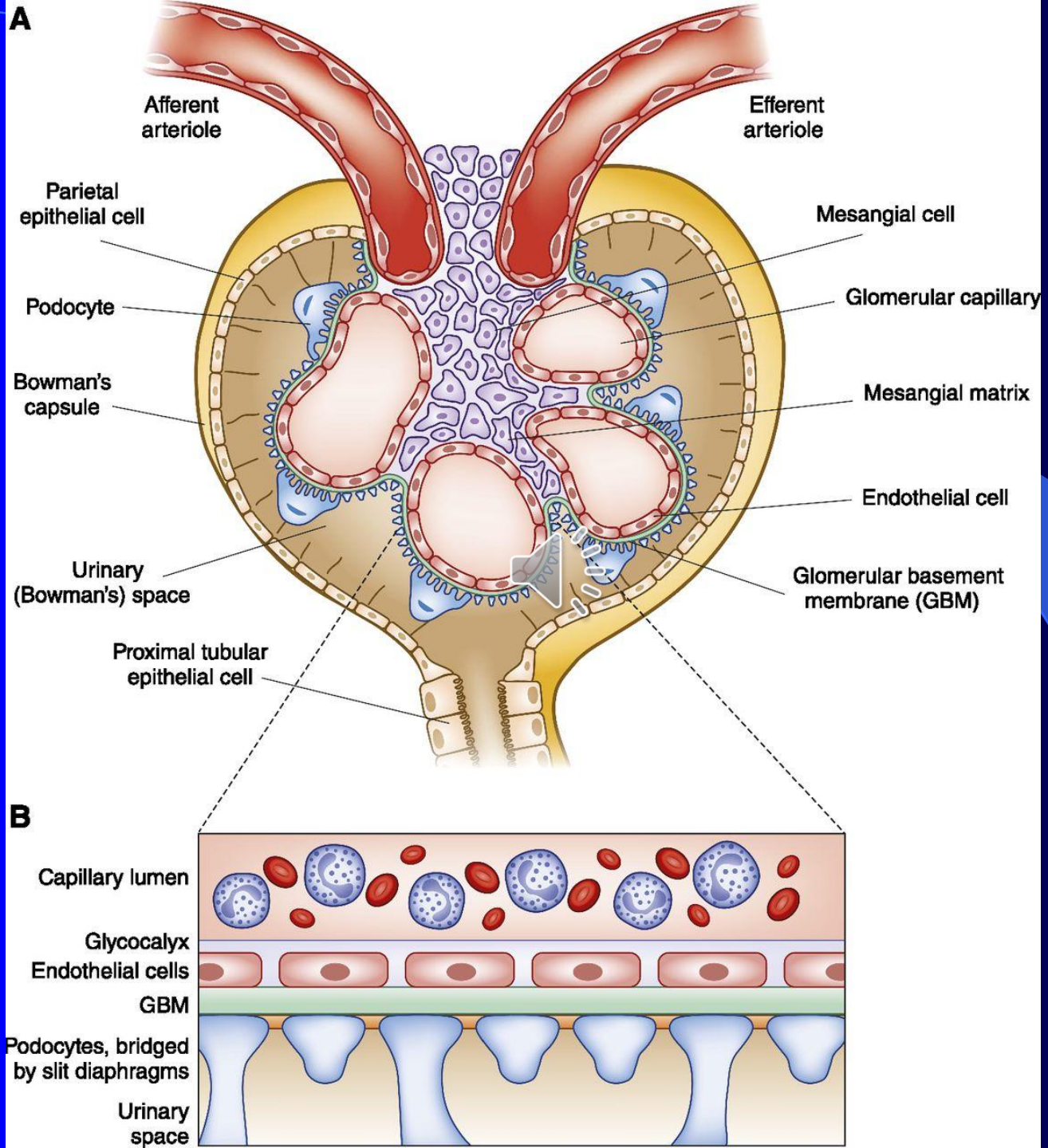
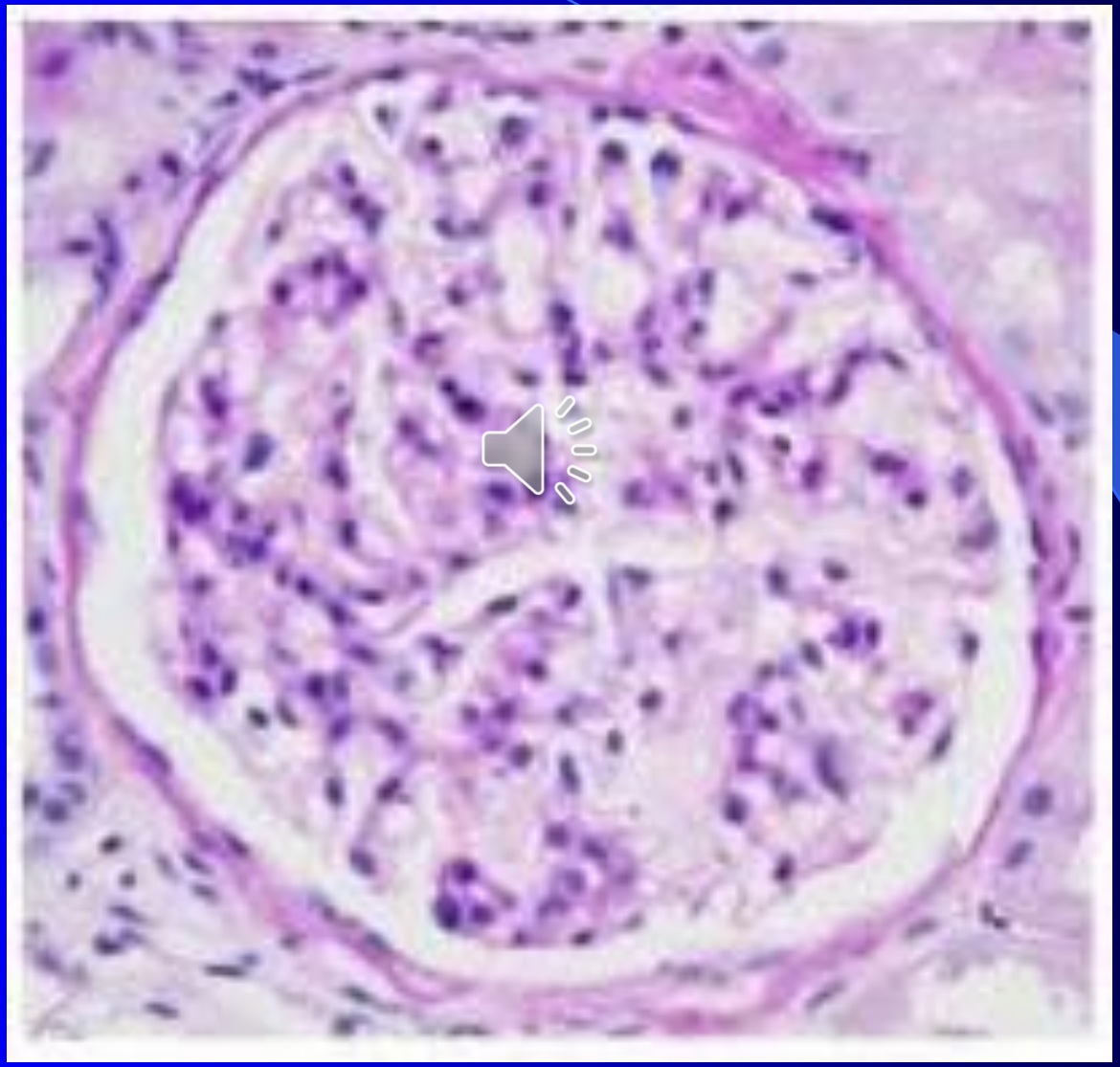
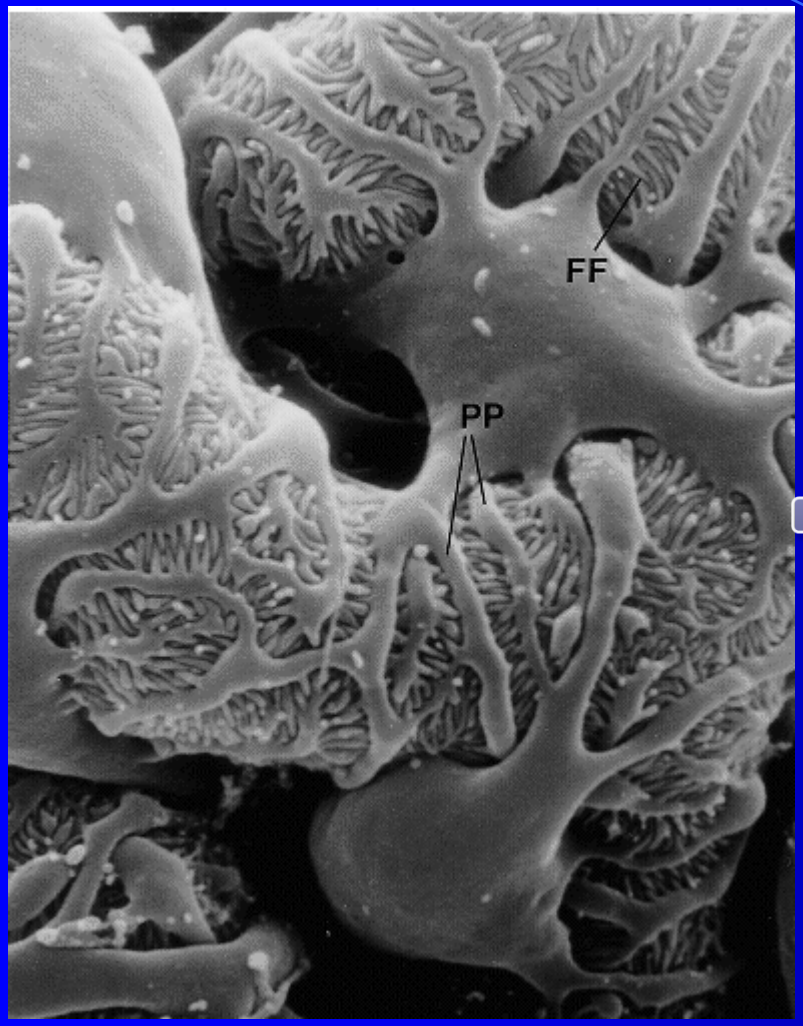
Υπεύθυνος Νεφρολογικής Μονάδας
Β΄ Προπαιδευτική Παθολογική Κλινική
Πανεπιστημιακό Γενικό Νοσοκομείο «ΑΤΤΙΚΟΝ»

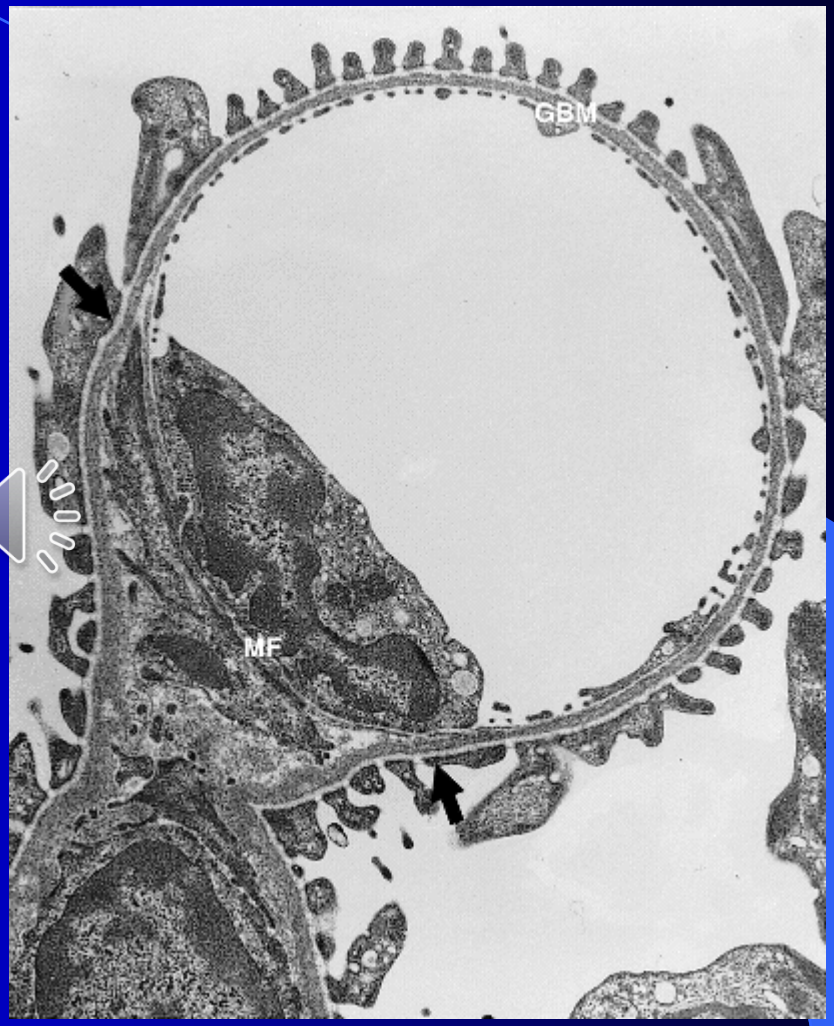

Glomerular capsule
Distal convoluted tubule
Afferent arteriole
Proximal convoluted tubule
Cortex-medulla junction
Interlobular artery
Venule
Collecting duct
Interlobular vein
Loop of the nephron
Peritubular capillary network
Urine flows into renal pelvis

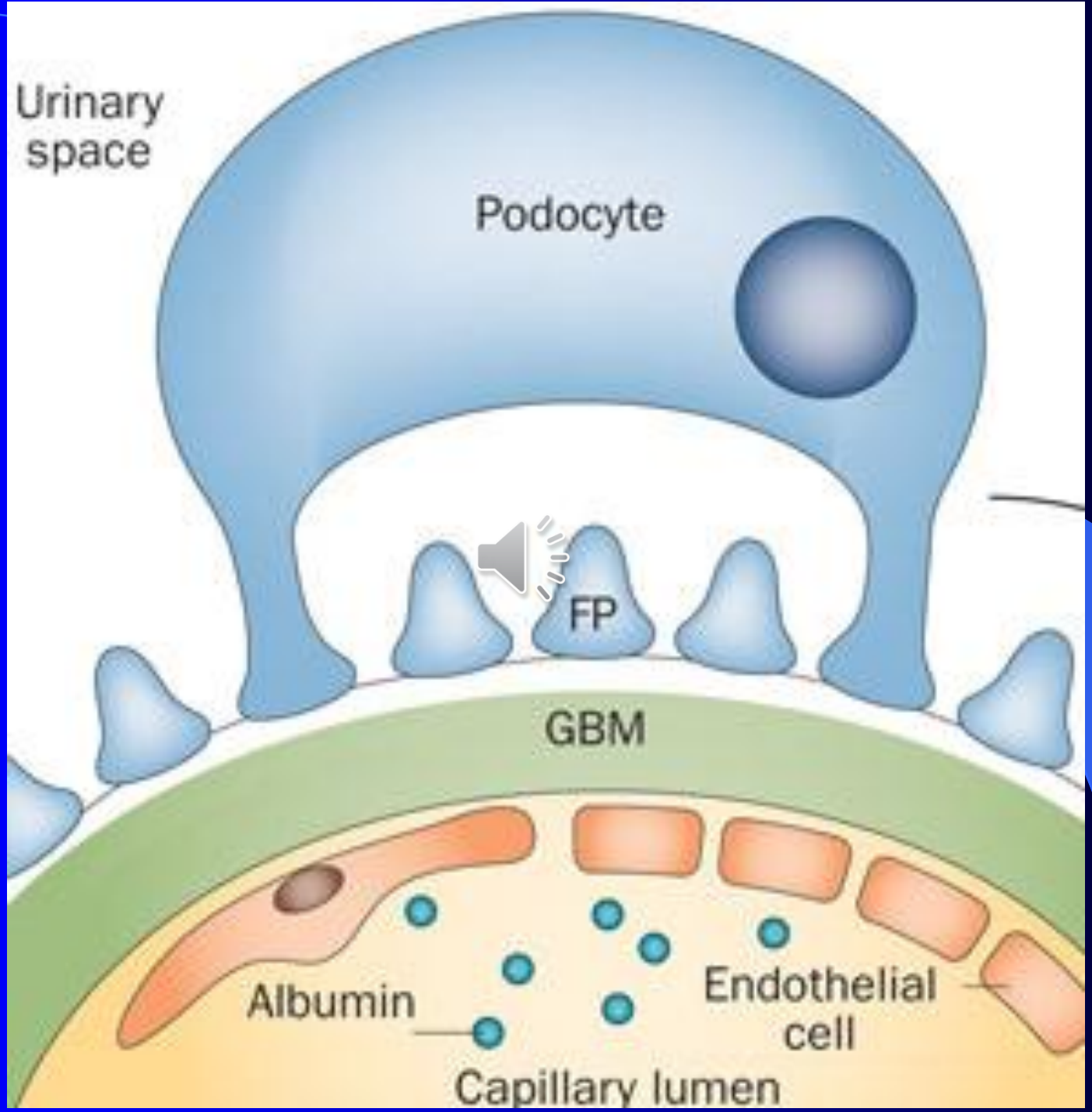

A
Afferent arteriole
Efferent arteriole
Parietal epithelial cell
Podocyte
Bowman's capsule
Urinary (Bowman's) space
Proximal tubular epithelial cell
Mesangial cell
Glomerular capillary
Mesangial matrix
Endothelial cell
Glomerular basement membrane (GBM)
B
Capillary lumen
Glycocalyx
Endothelial cells
GBM
Podocytes, bridged by slit diaphragms
Urinary space

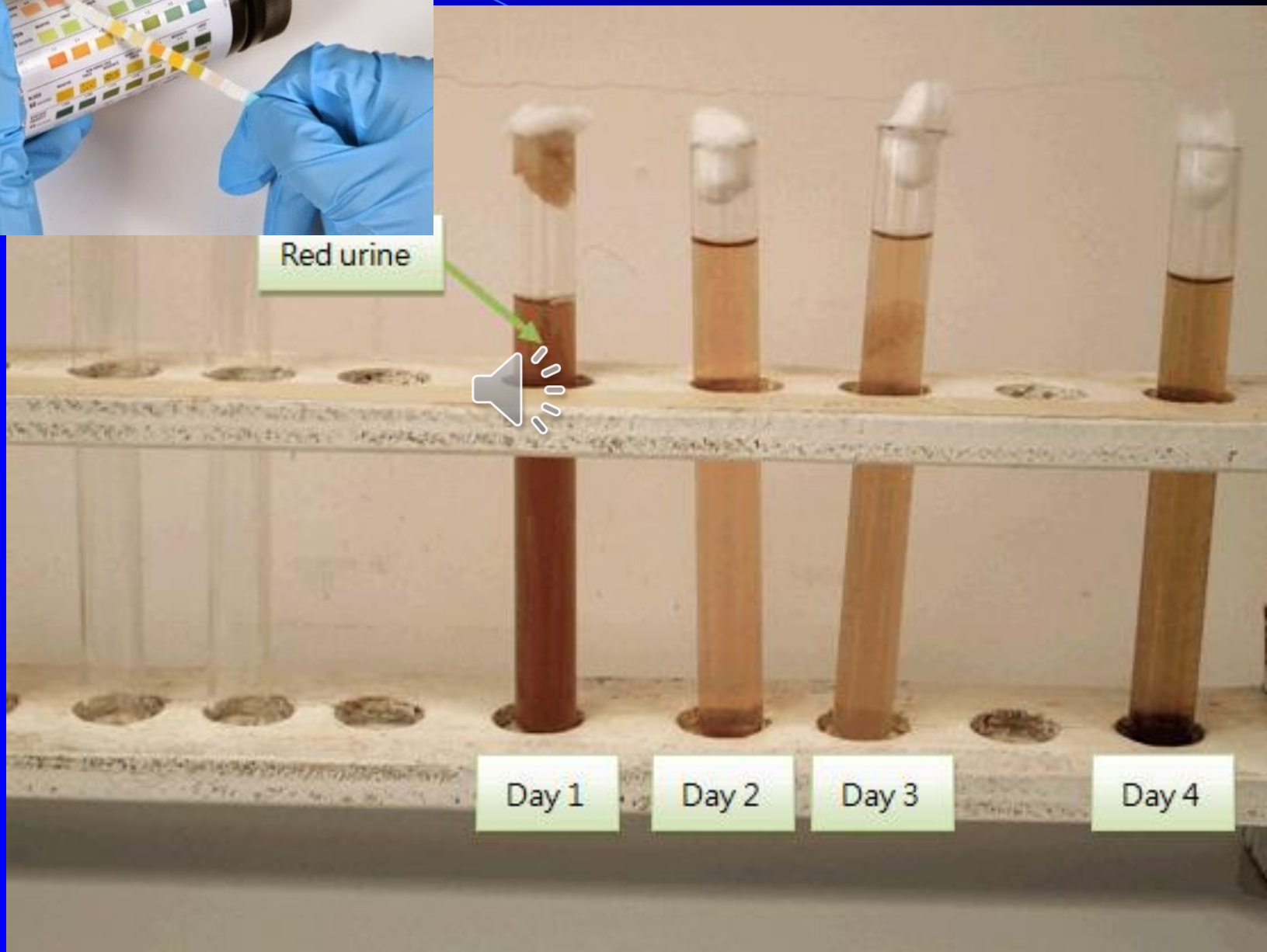
Φυσιολογικό σπείραμα

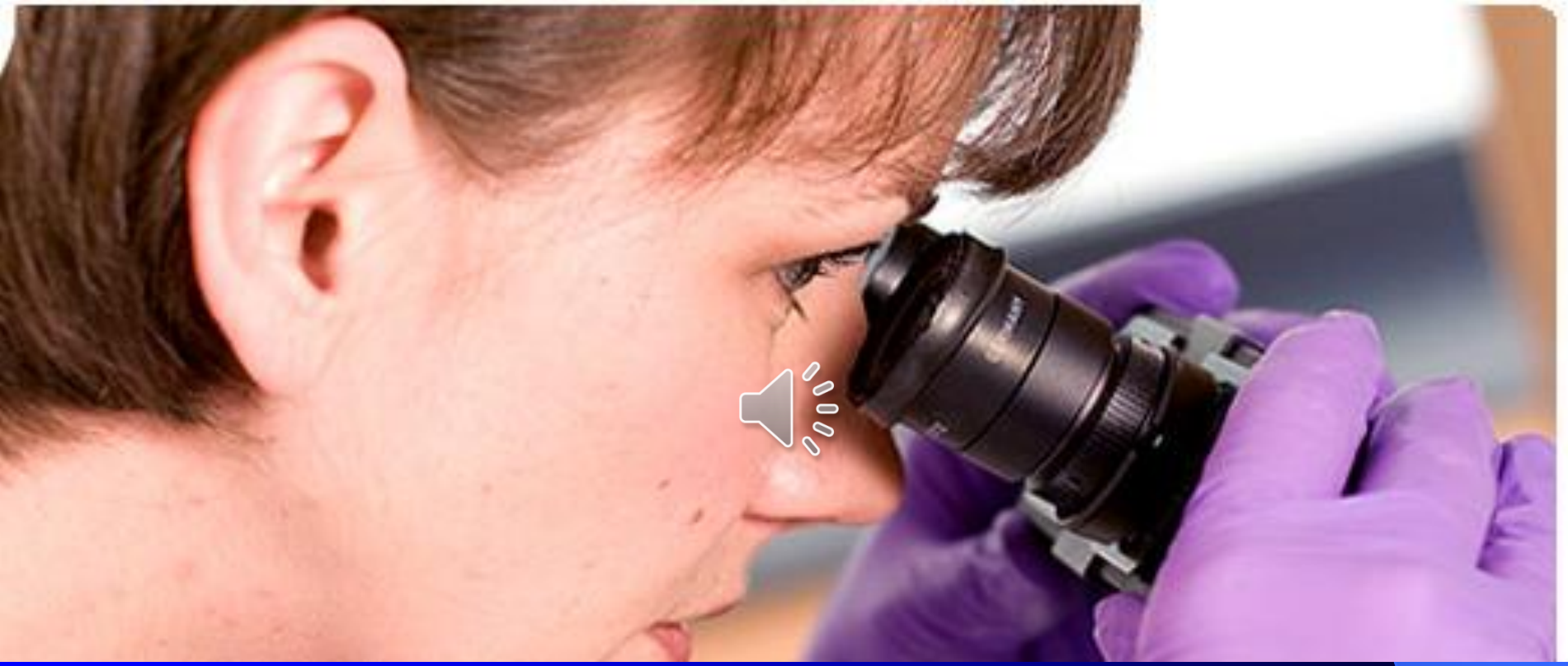



FF
PP

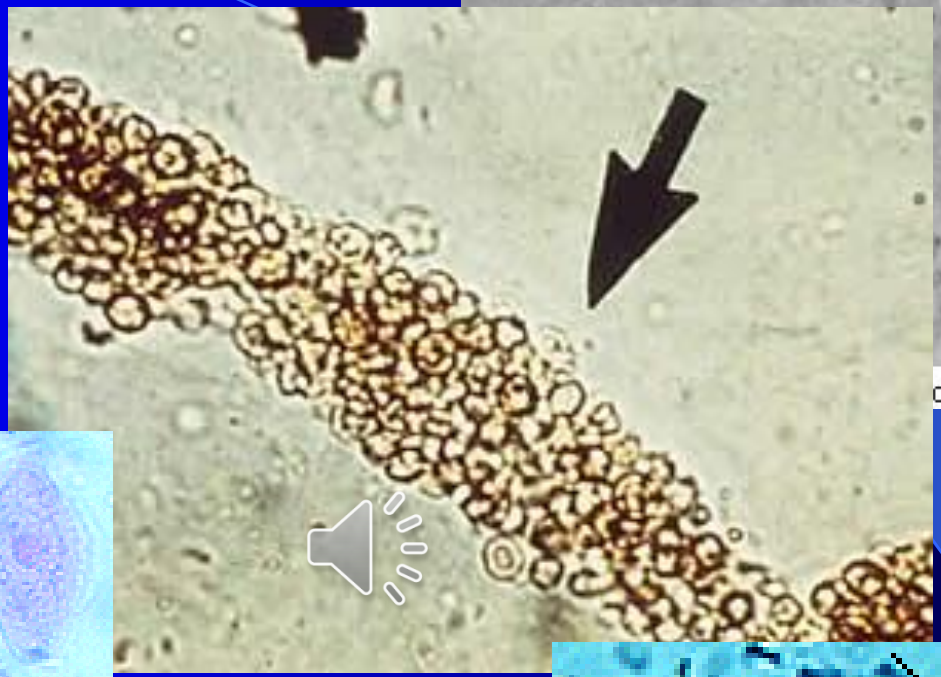

GBM
MF

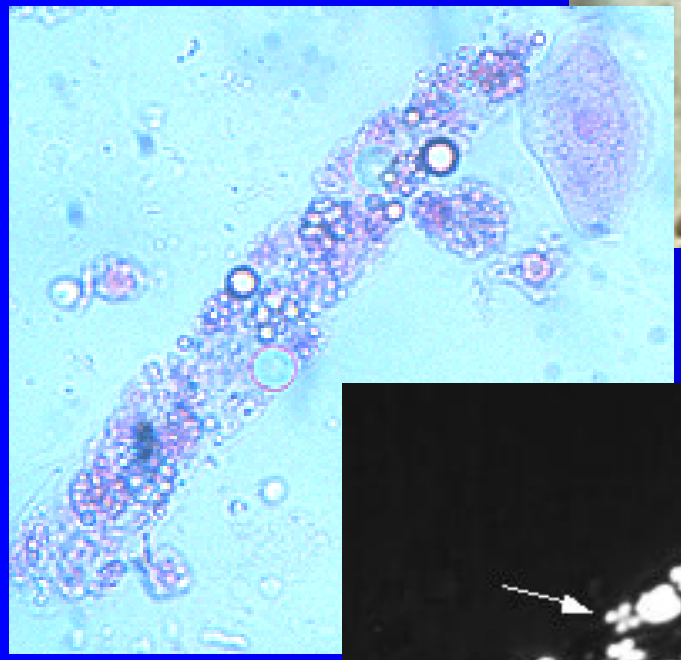

Urinary space
Podocyte
FP
GBM
Albumin
Endothelial cell
Capillary lumen

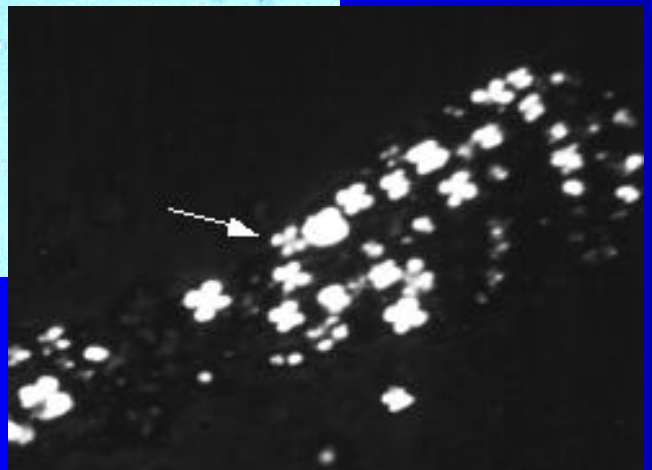

Red urine
Day 1
Day 2
Day 3
Day 4

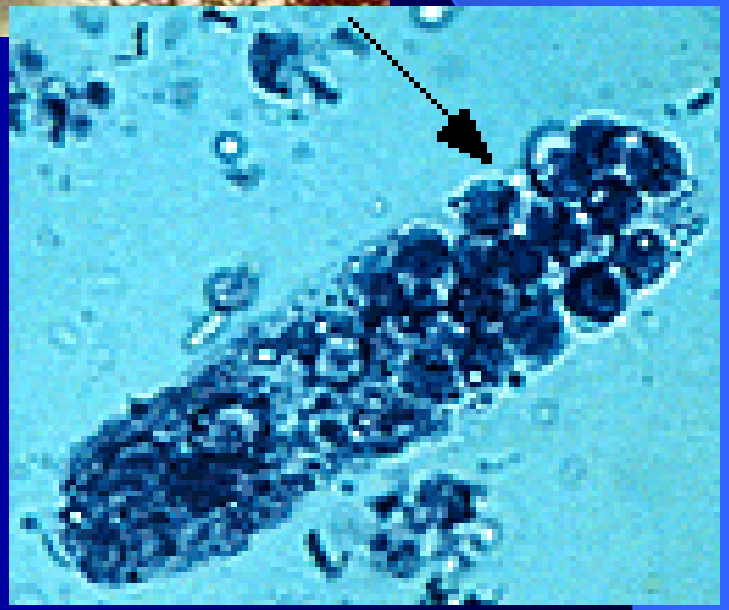


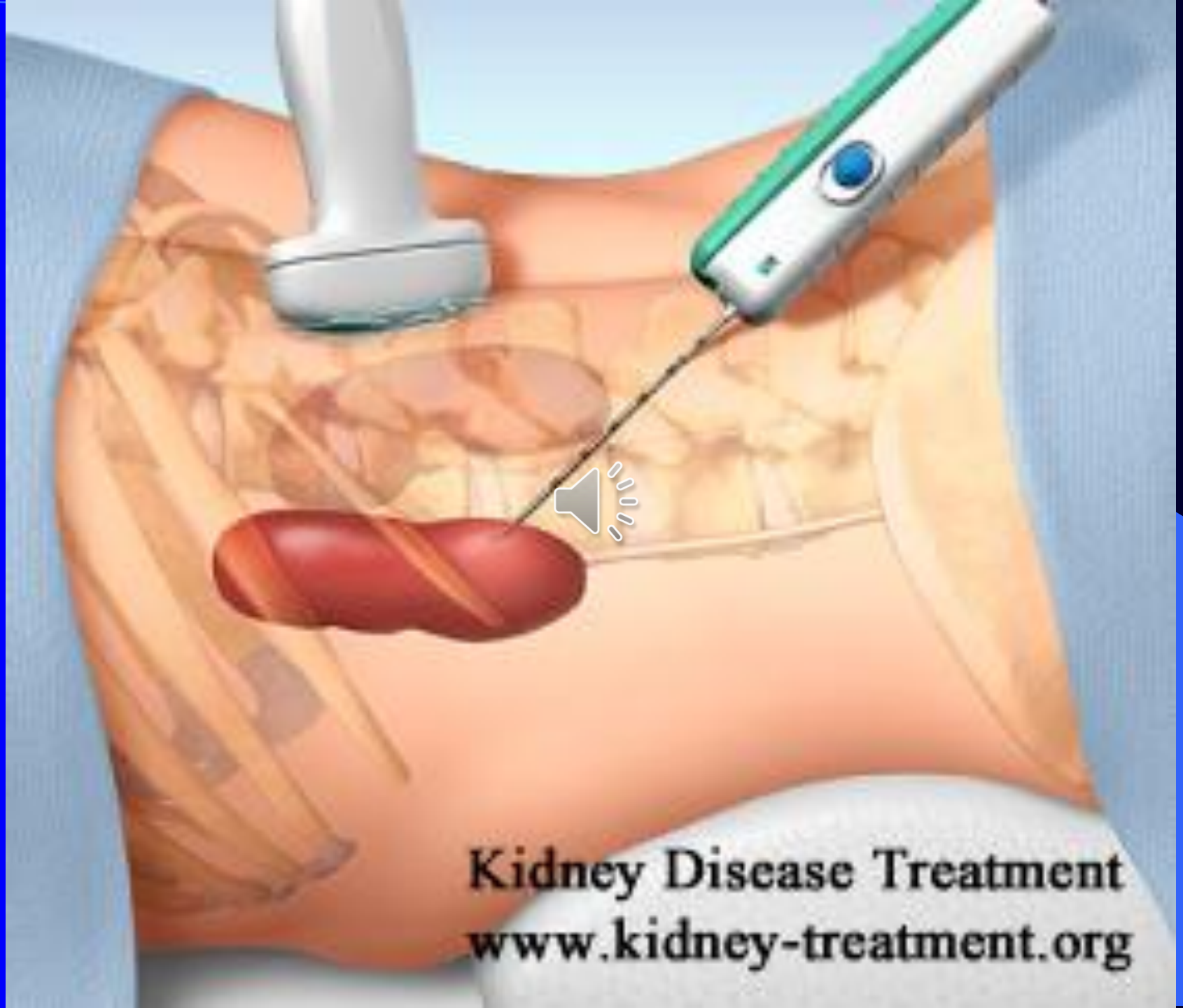

ontrast microscopy










Kidney Disease Treatment
www.kidney-treatment.org

MNEMONIC “ANNURIC”)

A	Asymptomatic hematuria/proteinuria
N	Nephrotic syndrome
N	Nephritic syndrome
U	Urolithiasis
R	Rapidly progressive glomerulonephritis
I	Interstitial and tubular diseases
C	Chronic renal disease

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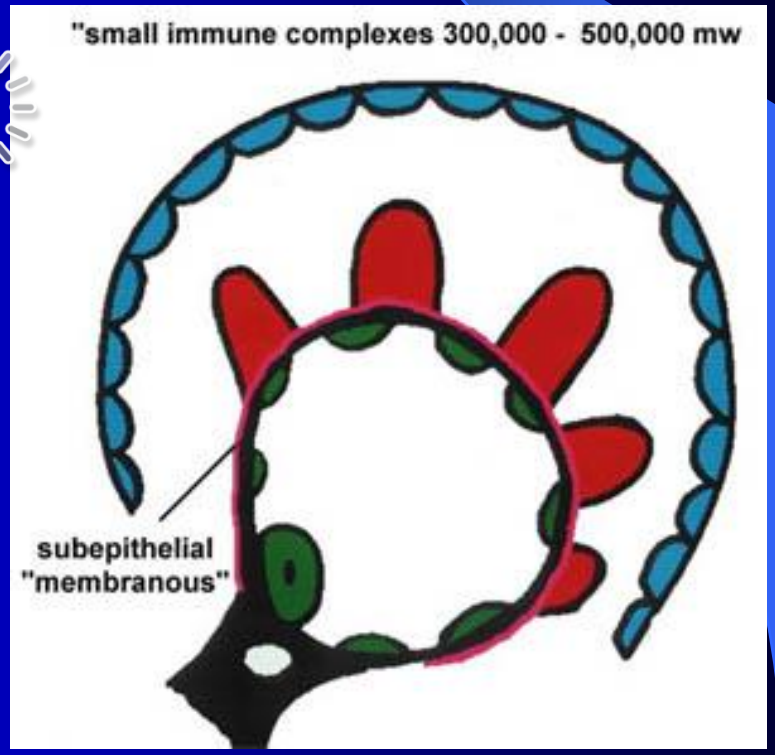
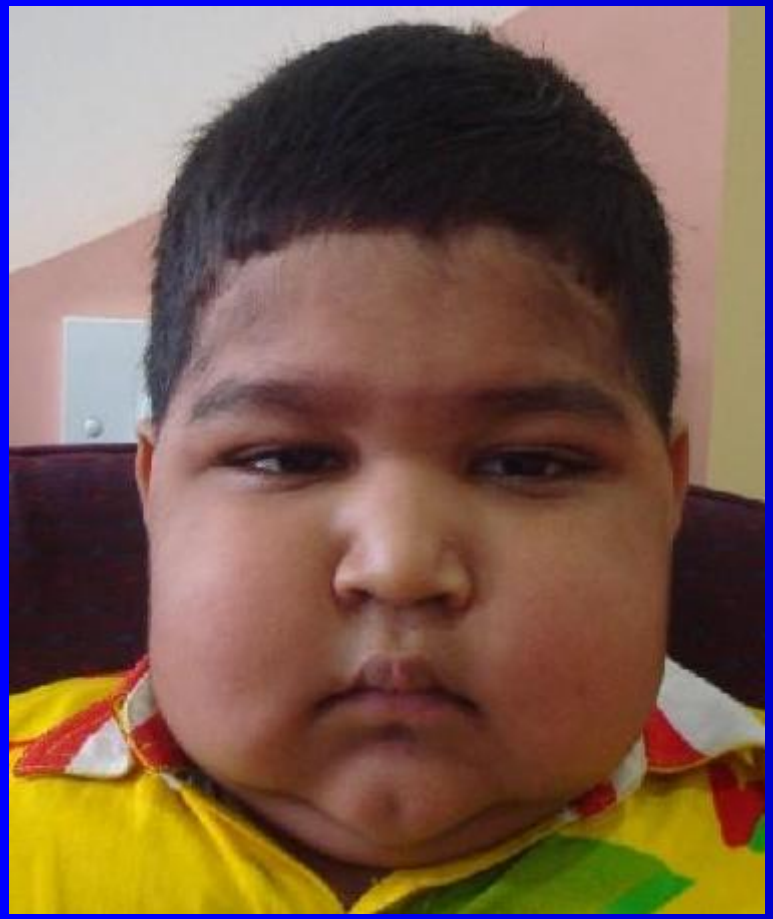
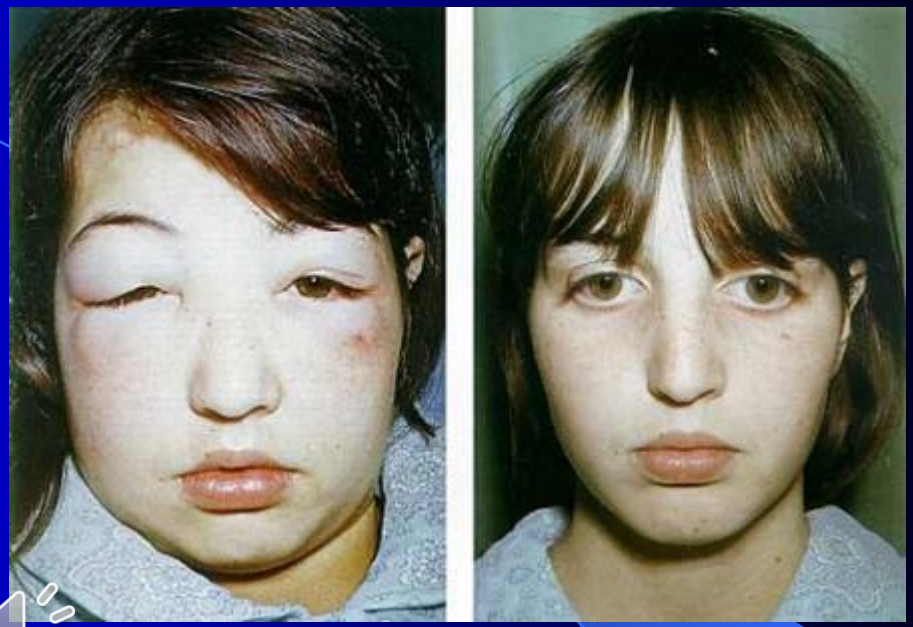
Νεφρωσικό Σύνδρομο

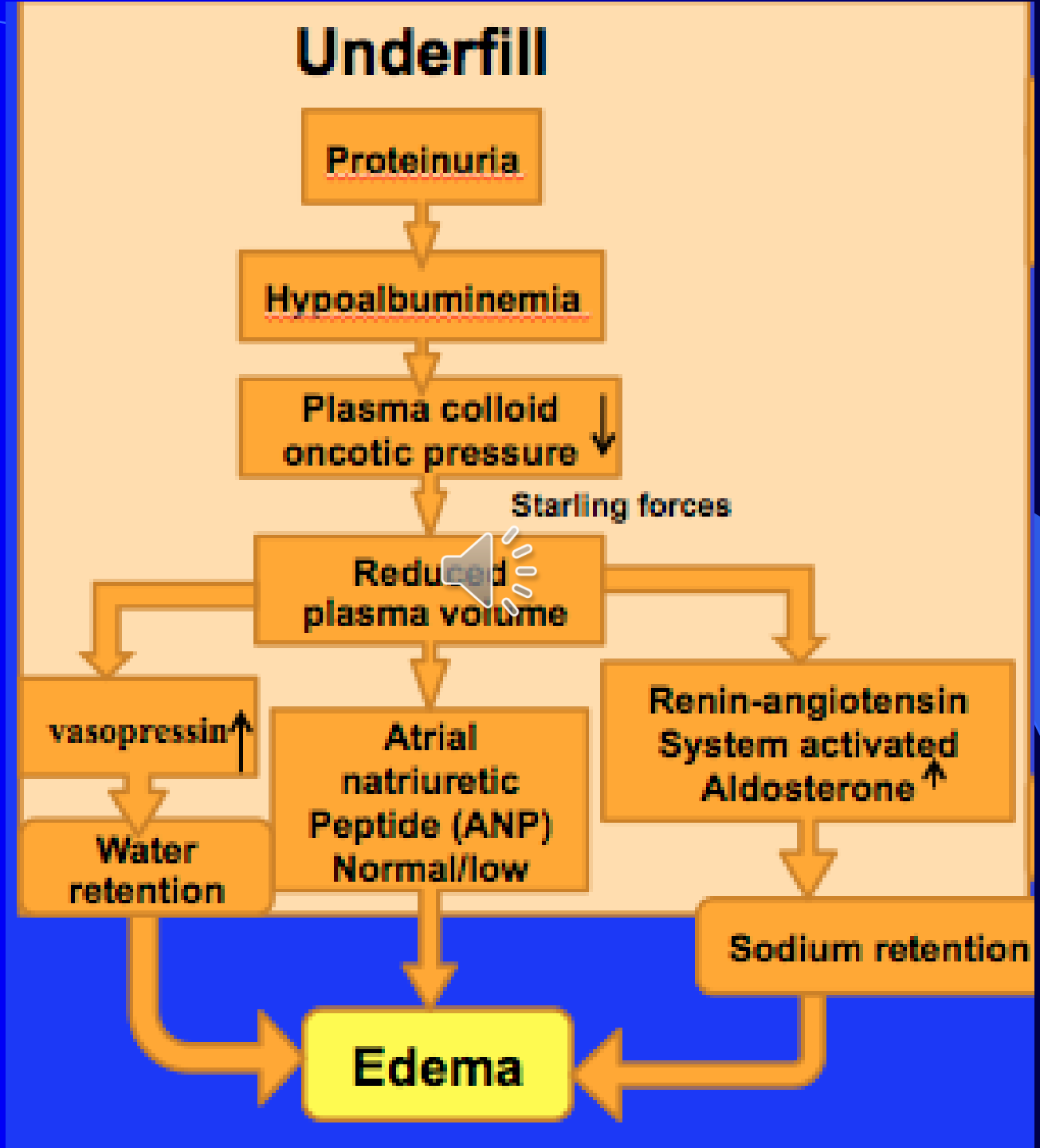
- **Πρωτεϊνουρία > 3g / 24ωρο**
- **Υπολευκωματιναιμία (< 3 g/dl)**
- **Υπερλιπιδαιμία**
- **Λιπιδουρία**
- **Οίδημα**

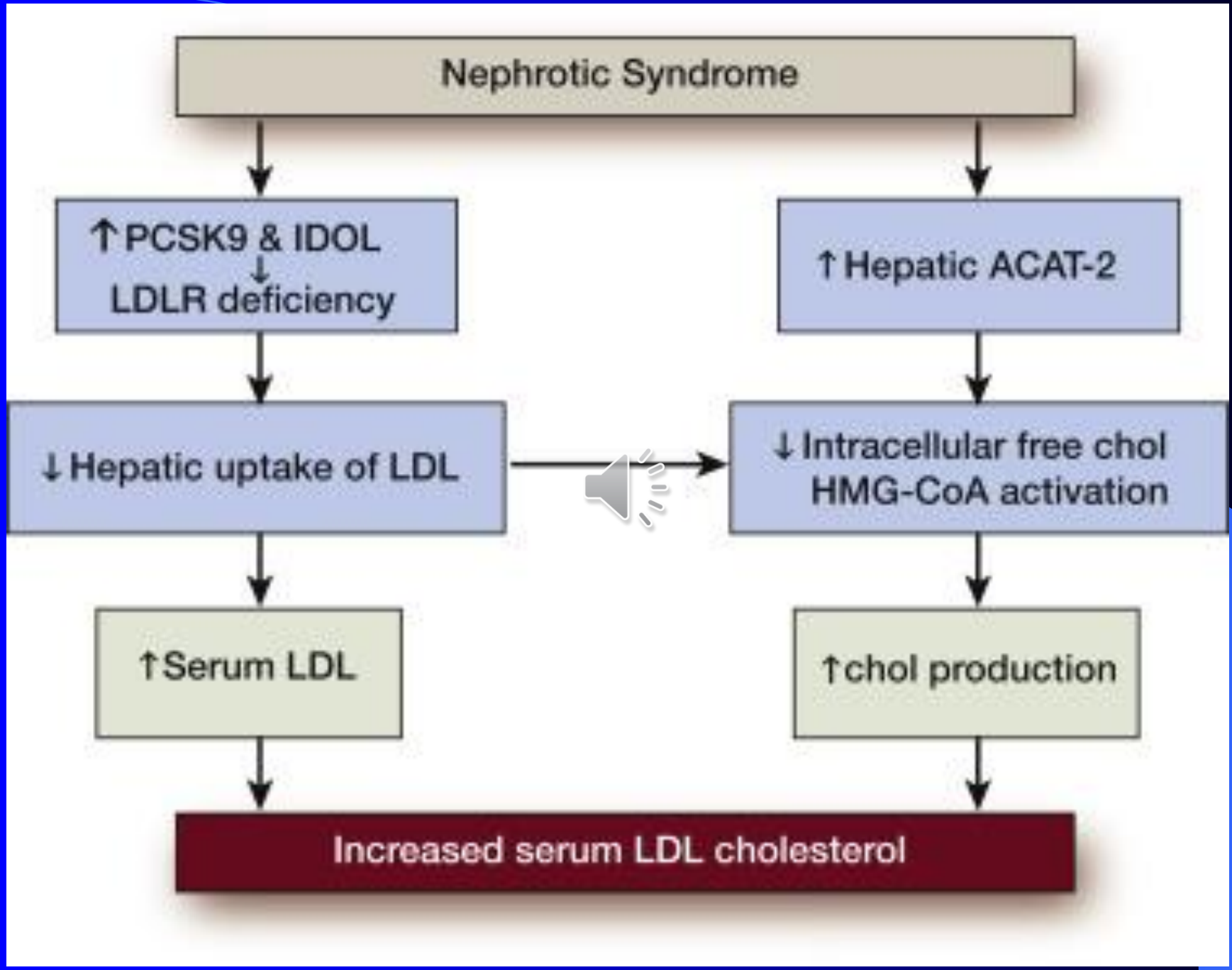




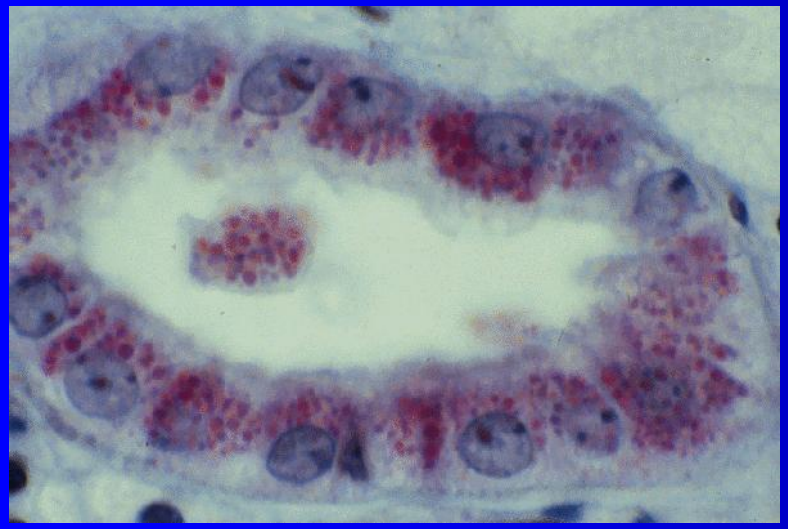


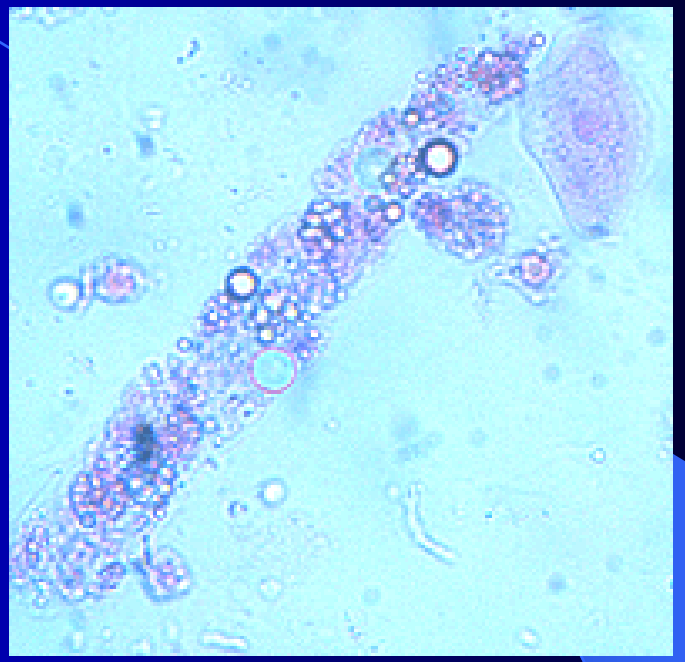

Edema (swelling) of
the ankles and feet

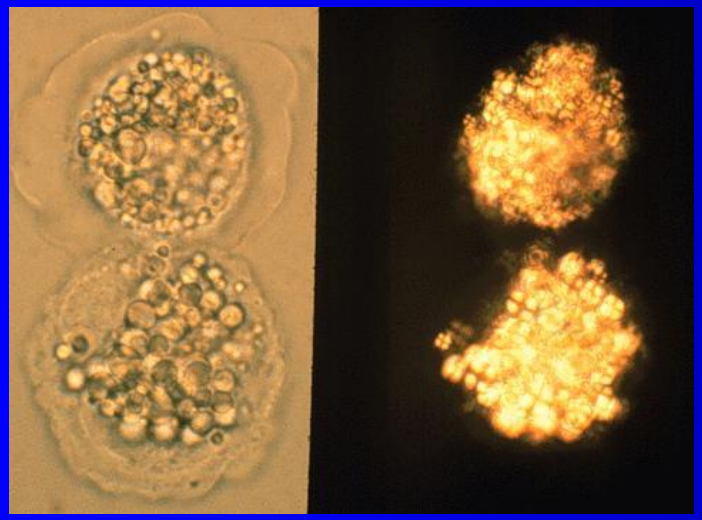

Underfill
Proteinuria
Hypoalbuminemia
Plasma colloid oncotic pressure
Starling forces
Reduced plasma volume
vasopressin
Atrial natriuretic Peptide (ANP) Normal/low
Renin-angiotensin System activated Aldosterone
Water retention
Sodium retention
Edema

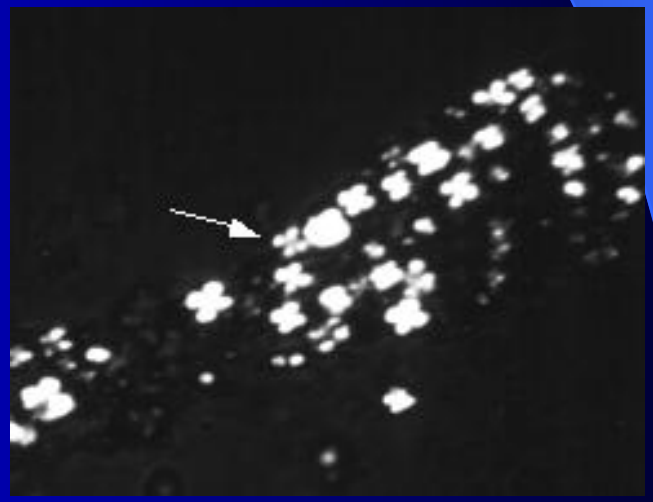

Nephrotic Syndrome
↑PCSK9 & IDOL
↓
LDLR deficiency
↑Hepatic ACAT-2
↓Hepatic uptake of LDL
↓Intracellular free chol
HMG-CoA activation
↑Serum LDL
↑chol production
Increased serum LDL cholesterol

ΙΖΗΜΑ ΟΥΡΩΝ ΣΕ ΝΕΦΡΩΣΙΚΟ ΣΥΝΔΡΟΜΟ









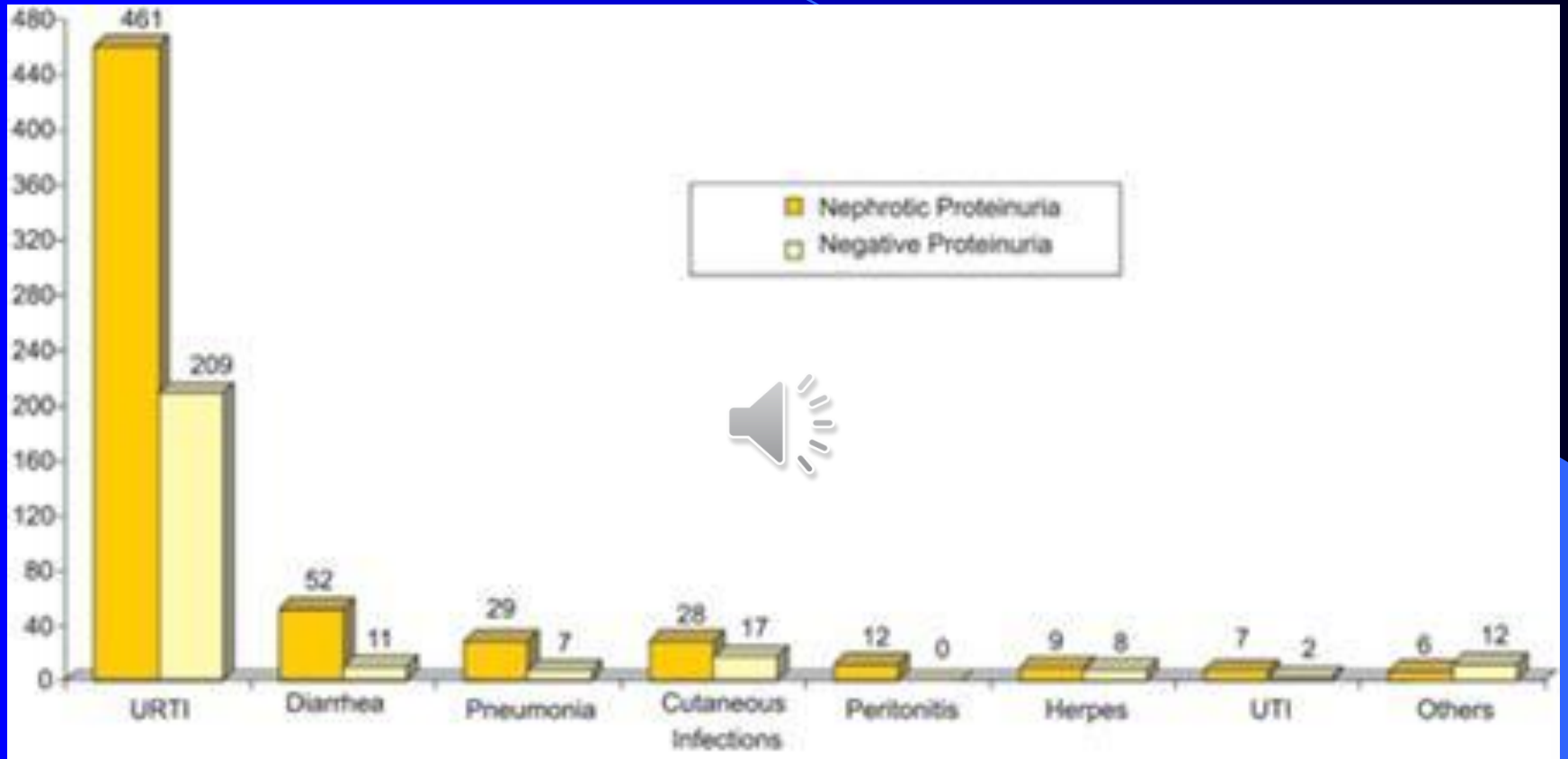
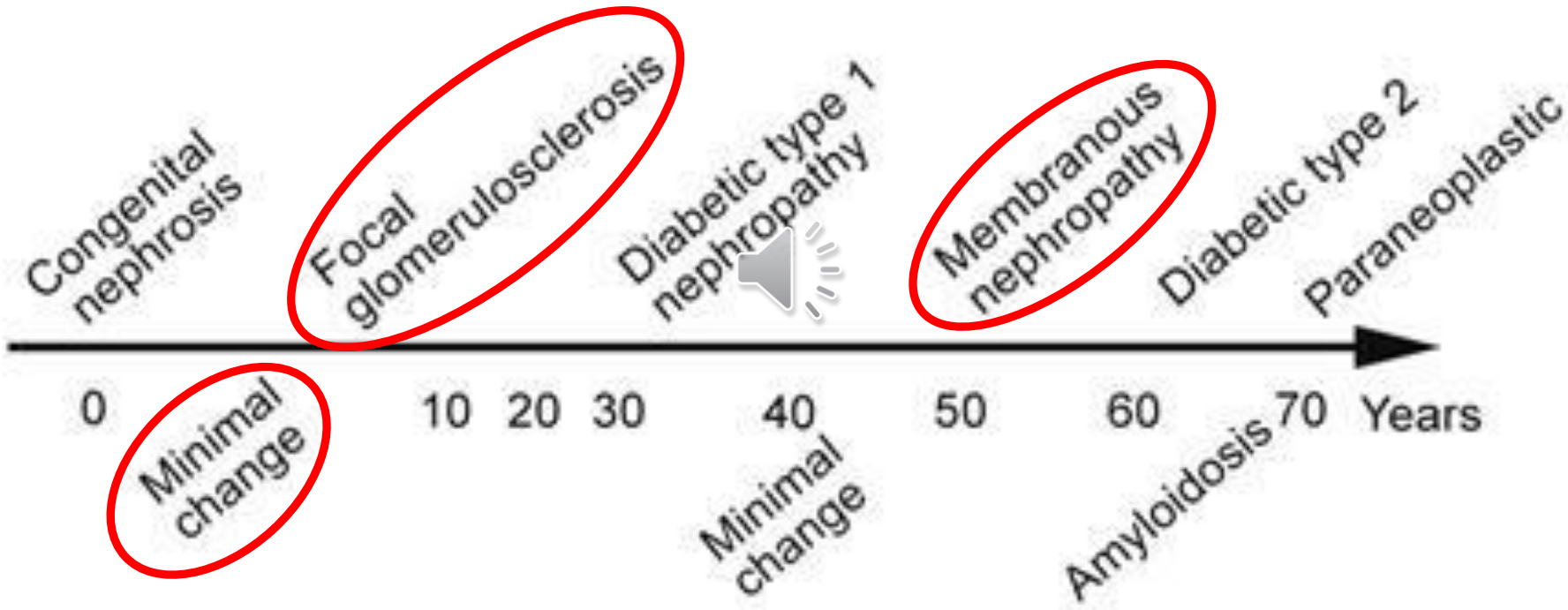


Figure 1 - Number and type of infection of 92 patients during the period with nephrotic proteinuria (604 infections/1140 months) and of the 89 patients during the period with negative proteinuria (266 infections /6822 months).

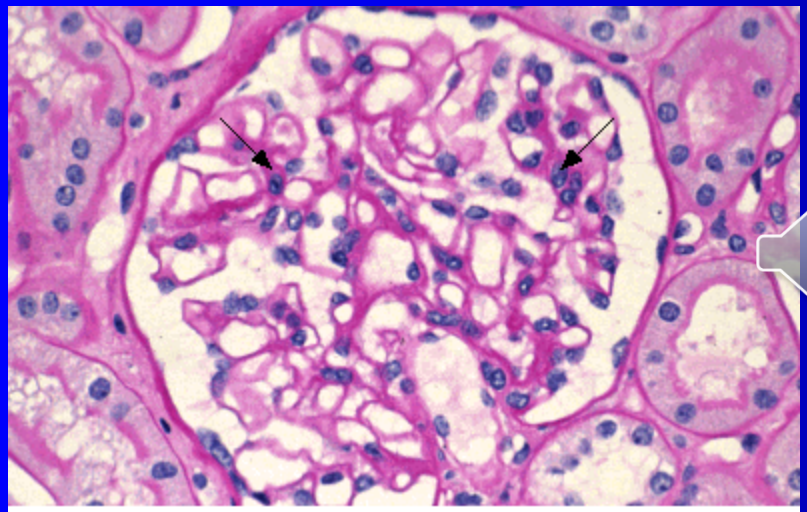
Hypercoagulation in NS

Low zymogen factos: factos Ⅸ, factor Ⅺ
Increased procoagulatory cofactors. factor Ⅴ, factor Ⅷ
Increased fibrinogen levels
Decreased coagularion inhibitors: antithrombin Ⅲ (bur protein C and Protein S increased)
Altered fibrinolytic system (a2-antipiasmin increased, plasmingoen decreased)
Increased platelet reactivity
Thrombocytosis
Increased release reaction *in vitro* (adenosine diphosphate: thrombin, collagen, arachidonic acid, epinephrine)
Increased factor Ⅳ and b-thromboglobulin *in vivo*
Altered endothelial-cell function

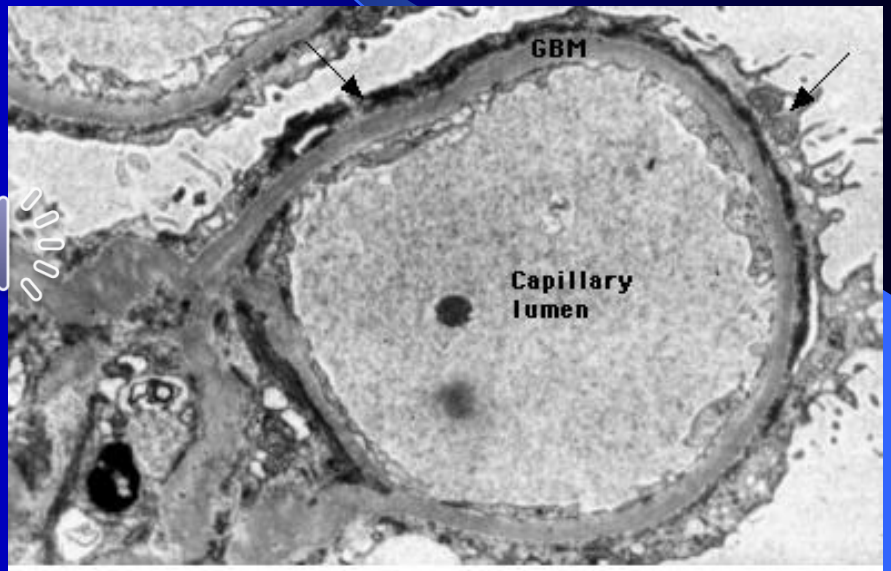
average ages of types of nephrotic syndrome



Νόσος Ελαχίστων Αλλοιώσεων



Minimal change disease Light micrograph of an essentially normal glomerulus in minimal change disease. There are only 1 or 2 cells per capillary tuft, the capillary lumens are open, the thickness of the glomerular capillary walls is normal, and there is neither expansion nor hypercellularity in the mesangial areas in the central or stalk regions of the tuft (arrows). Courtesy of Helmut G Rennke.



Minimal change disease Electron micrograph in minimal change disease showing a normal glomerular basement membrane (GBM), no immune deposits, and the characteristic widespread fusion of the epithelial cell foot processes (arrows). Courtesy of Helmut Rennke, MD.

MINIMAL CHANGE GLOMERULOPATHY

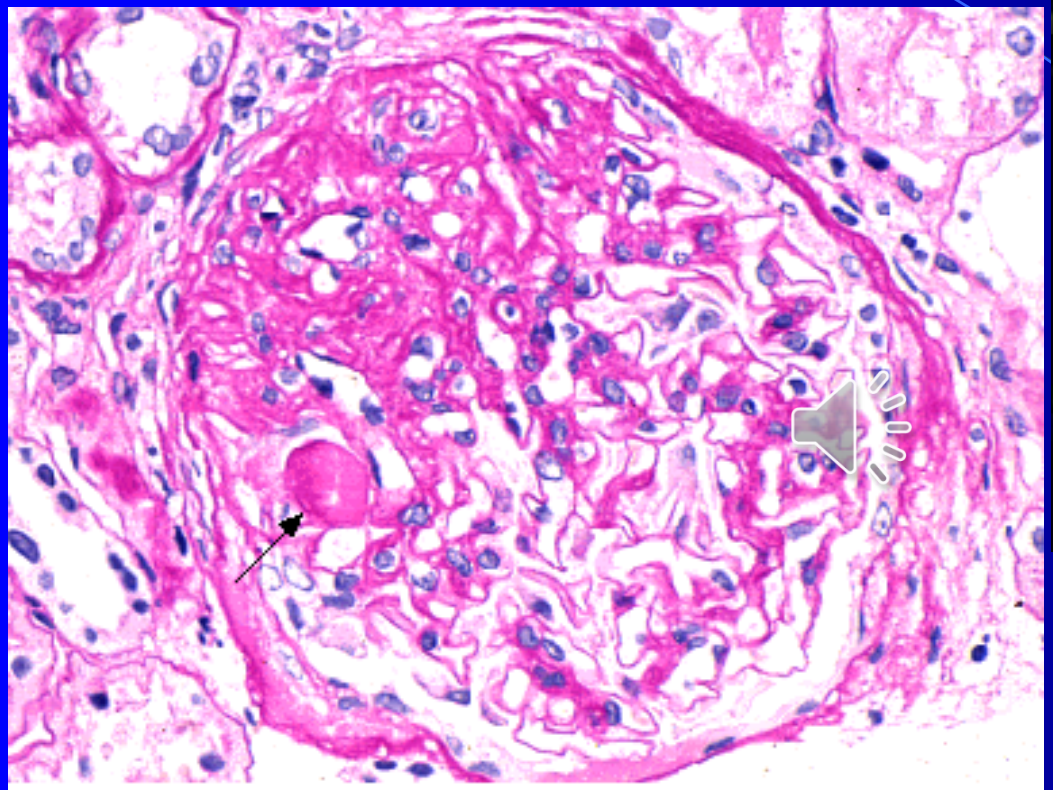
CL: Most common cause of nephrotic syndrome in children

E/P: Remission can be induced by measles, occurs more frequently in Hodgkin lymphoma, cured by glucocorticoids, cyclophosphamide or retuximab, the permeability factor seems to be **IL-13**.

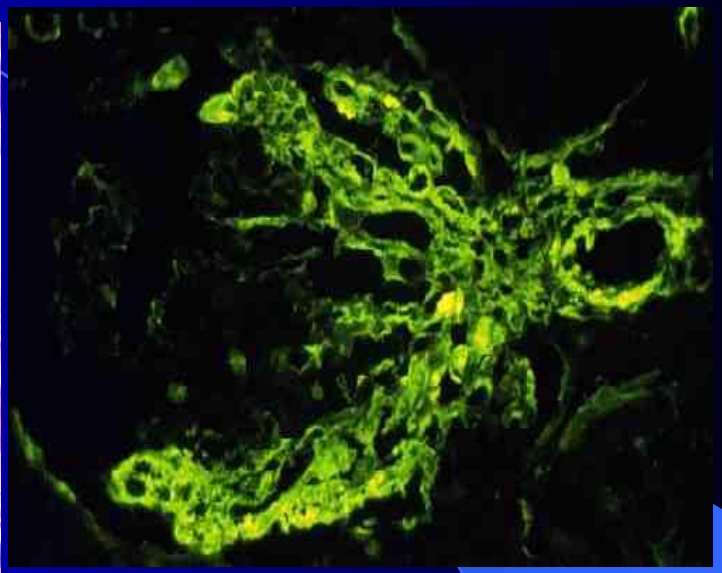
Path: normal by LM and IF

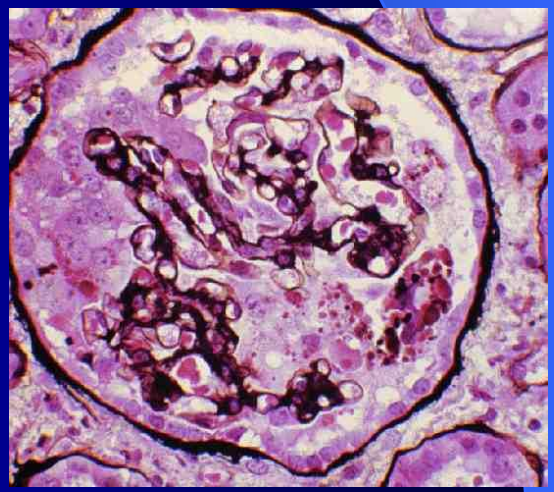
EM: fusion of foot processes

ΕΣΤΙΑΚΗ ΣΠΕΙΡΑΜΑΤΟΣΚΛΗΡΥΝΣΗ



Moderate FGS Light micrograph in focal segmental glomerulosclerosis shows a moderately large segmental area of sclerosis with capillary collapse on the upper left side of the glomerular tuft; the lower right segment is relatively normal. Focal deposition of hyaline material (arrow) is also seen. Courtesy of Helmut Rennke, MD.





FOCAL SEGMENTAL GLOMERULOSCLEROSIS

Def: 15% of all nephrotic syndromes; heterogenous group of diseases (primary vs secondary)

E/P: Increased circulating levels of soluble urokinase receptor (**suPAR**). In HIV, IV drug abuse, CHD, obesity, sickle-cell disease

Path: focal and segmental glomerular hyalinosis

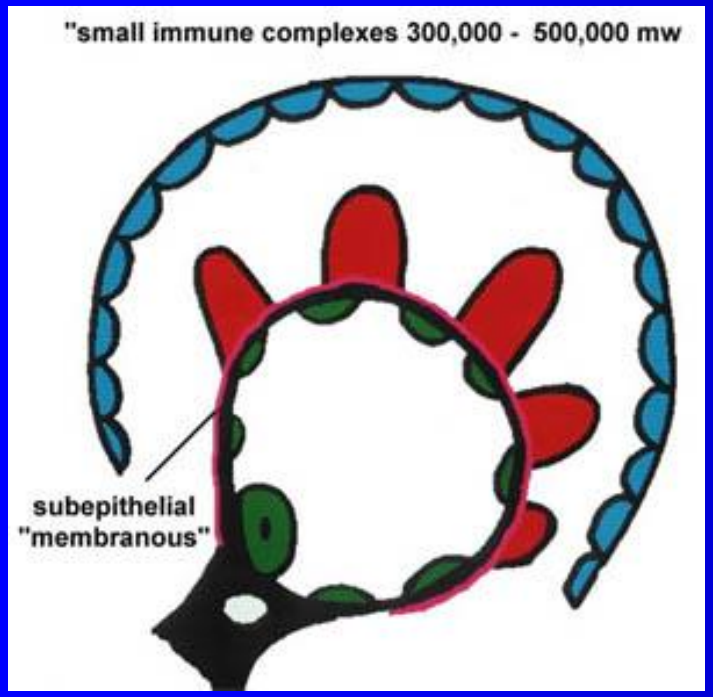
"Collapsing" pattern (e.g. HIV)

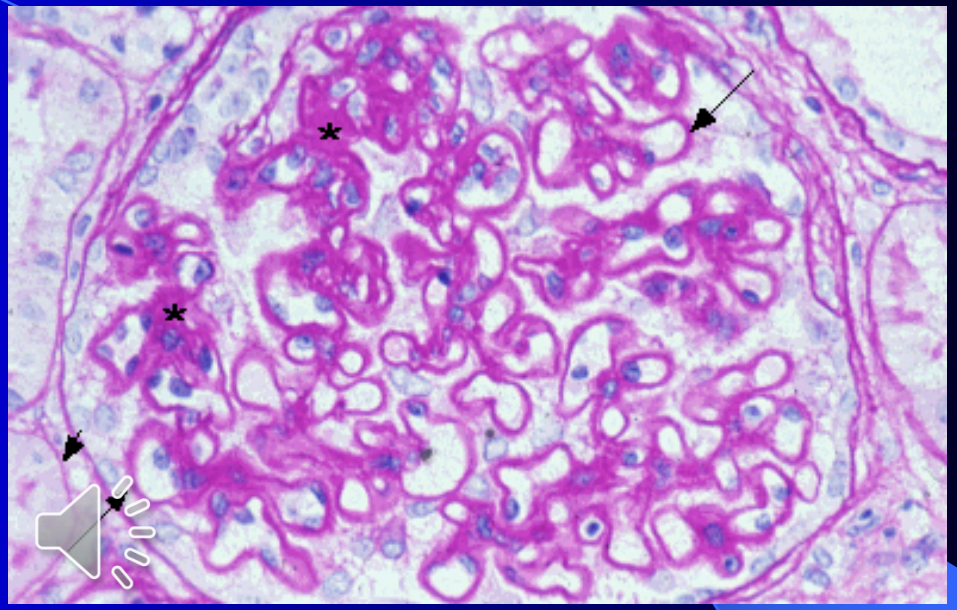
Trapping of serum proteins (IF and EM)

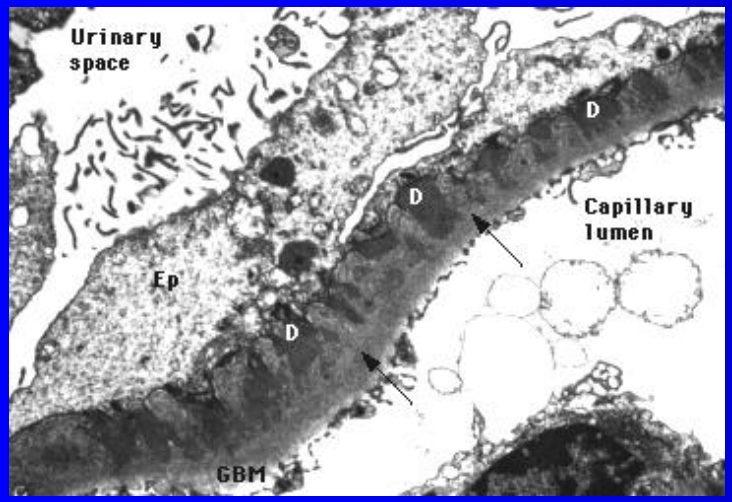
Clin: Nephrotic syndrome→ESRD (5-20y); In HIV related FSGS → ESRD (1 year)

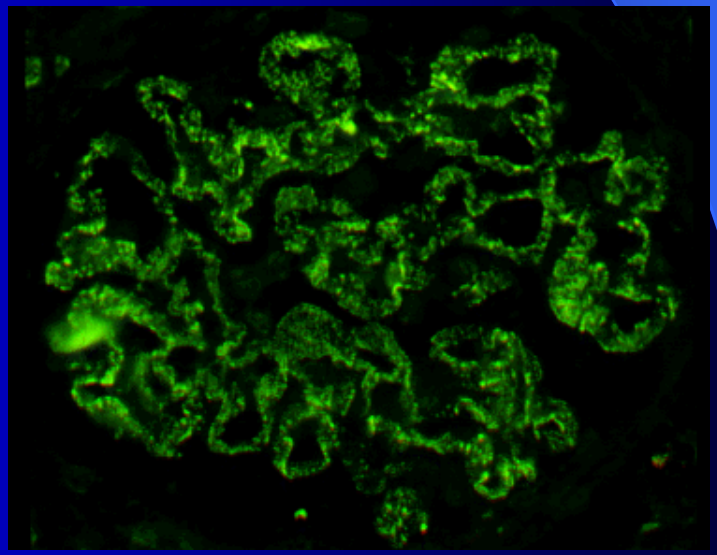
Therapy: Glycocorticosteroids +/- calcineurin inhibitors

ΜΕΜΒΡΑΝΩΔΗΣ ΣΠΕΙΡΑΜΑΤΟΠΑΘΕΙΑ









MEMBRANOUS NEPHROPATHY

Def: Most common cause of nephrotic syndrome in adults (40%)

M-Type **Phospholipase A_2 Receptor** as Target Antigen in Idiopathic Membranous Nephropathy -> Immune complex→BM thickening

E/P: Primary

Secondary (SLE, HBV, drugs, cancer)

Path: Subepithelial deposits of immune complex

CL: Nephrotic syndrome

(25% recover, 50% persist, 25% progress)

Therapy: Glycocorticoids and cytotoxic therapy

Αίτια Μεμβρανώδους Σπειραματοπάθειας

Major Causes of Membranous Nephropathy

Idiopathic, may represent autoantibody against glomerular epithelial cell antigens
Malignancy, primarily solid tumors
Systemic lupus erythematosus
Rheumatoid arthritis
Drugs:
- Penicillamine
- Gold
- Tiopronin

Hepatitis B virus
Syphilis – congenital and secondary
Chronic renal transplant rejection
Hepatitis C virus
Hepatosplenic schistosomiasis
Other glomerular diseases
Rare:
- Sarcoidosis
- Captopril
- Formaldehyde

ΕΥΧΑΡΙΣΤΩ ΓΙΑ ΤΗΝ ΠΡΟΣΟΧΗ ΣΑΣ