

Chapter 14: Cell Membrane and Coat

Ghadially's Ultrastructural Pathology of Cell and Matrix (5th edition)

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North West London Pathology

Hosted by Imperial College Healthcare NHS Trust

Ghent, Belgium

Thursday 26th June 2025



Patient focused



Collaborative



Expert

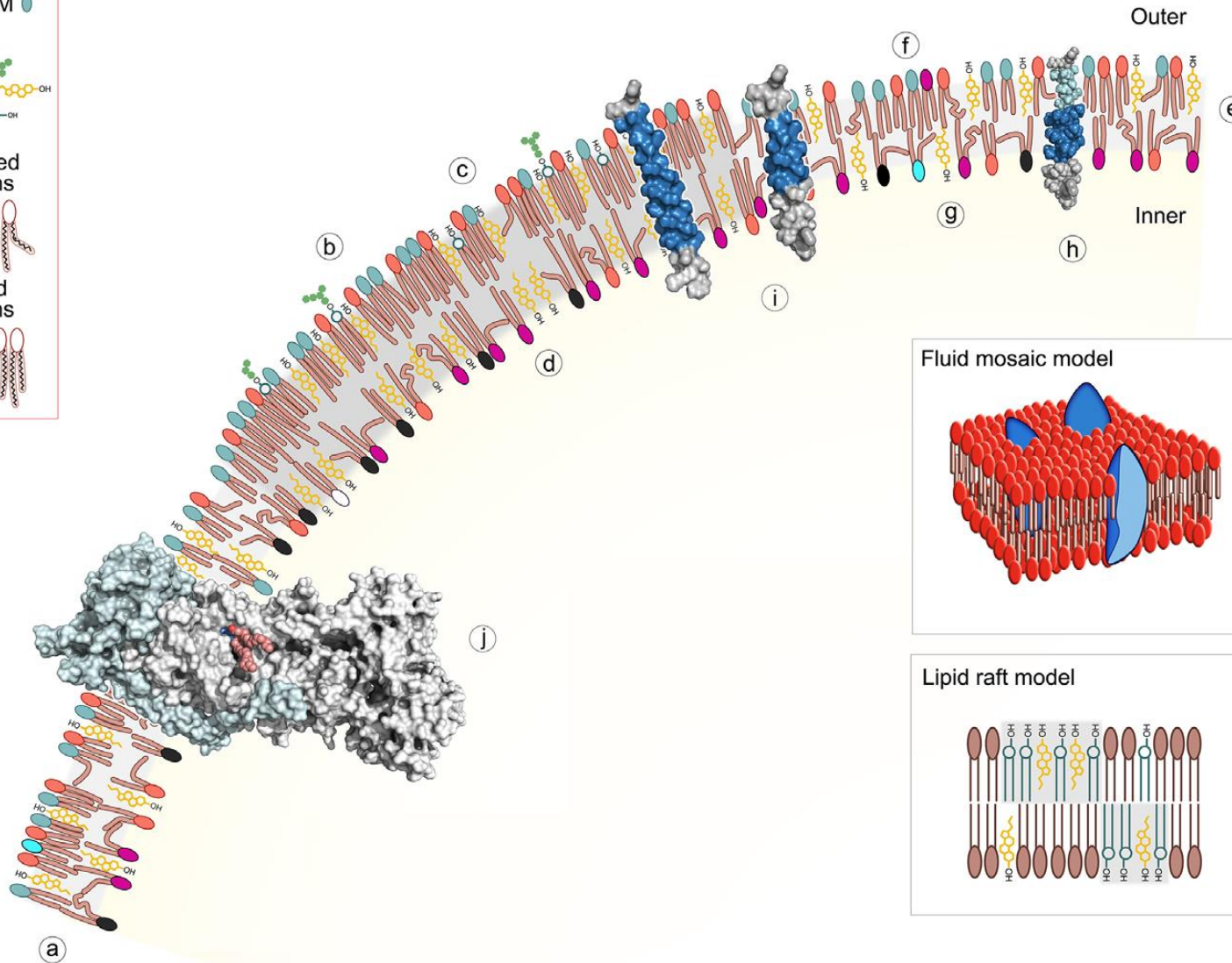
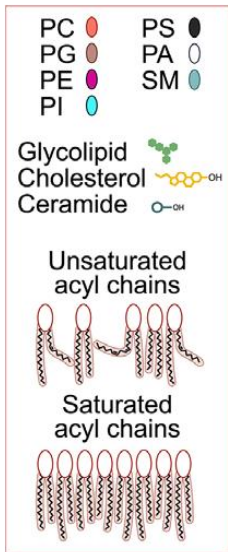


Caring

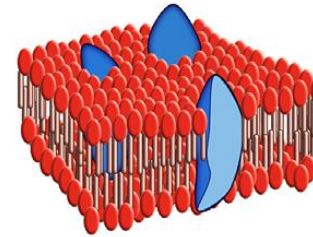


Cell Membrane

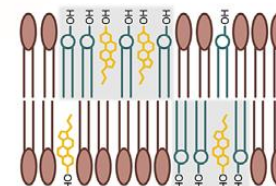
Fine-tuned model of cell membrane lipid bilayers



Fluid mosaic model



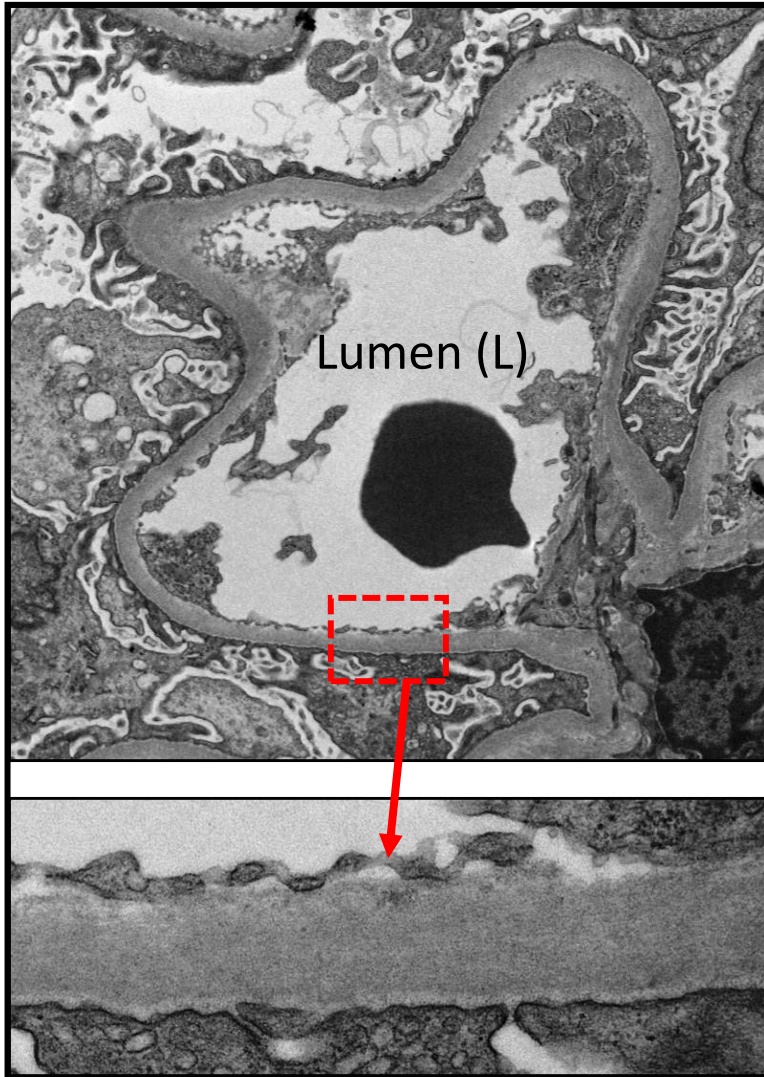
Lipid raft model



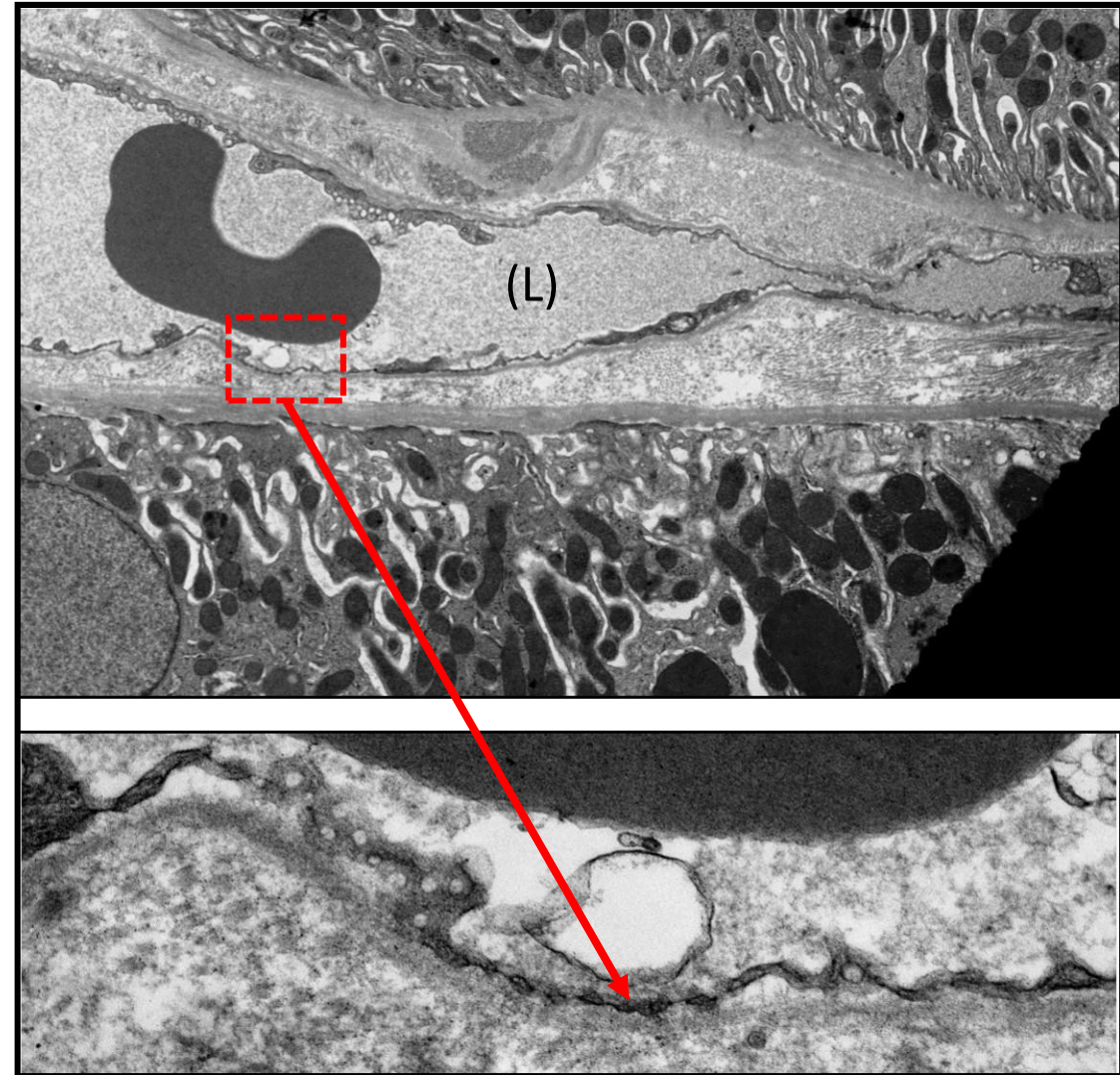
*Dingjan, T., Futerman, A.H. 2021.
The fine-tuning of cell membrane
lipid bilayers accentuates their
compositional complexity.*

Renal biopsy

Glomerular capillary loop



Peritubular capillary



Structure of the cell membrane

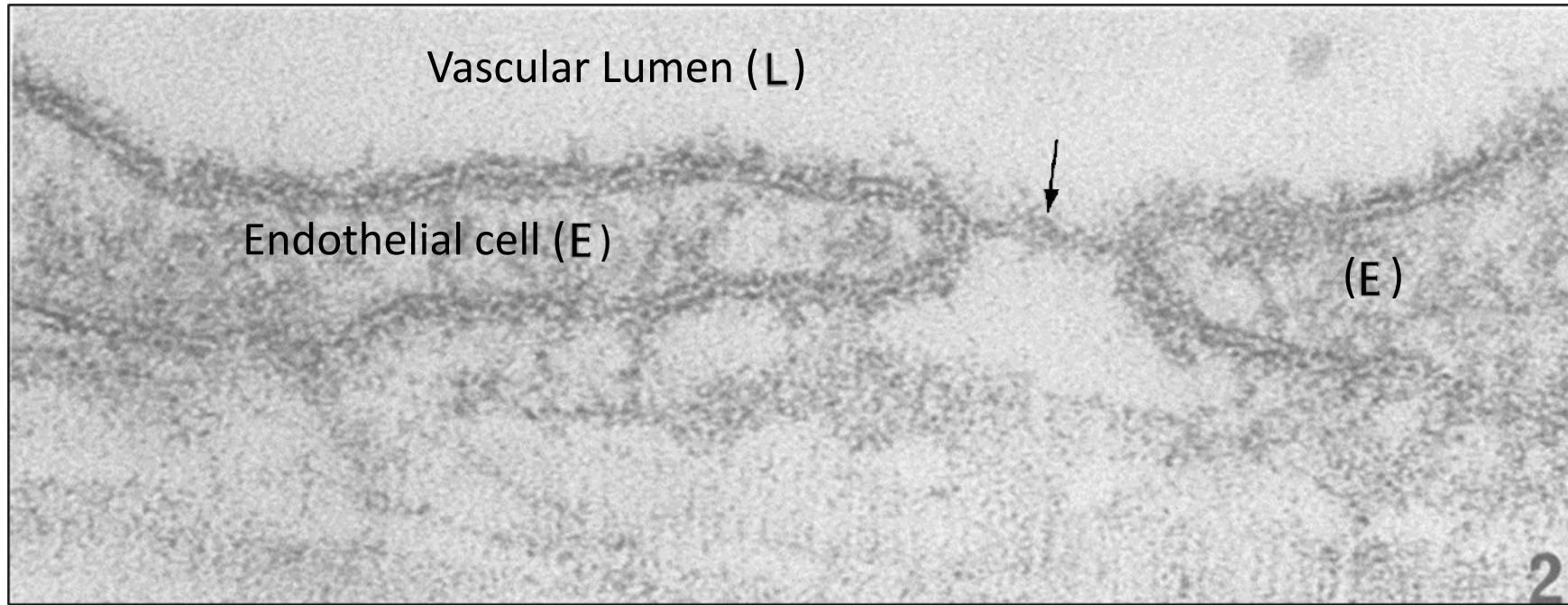


PLATE 14.2 *page 630*

Q1a) What characteristic structure of cell membrane is shown here in this endothelial cell ?

Q1b) Is a cell coat seen in this image?

Structure of the cell membrane

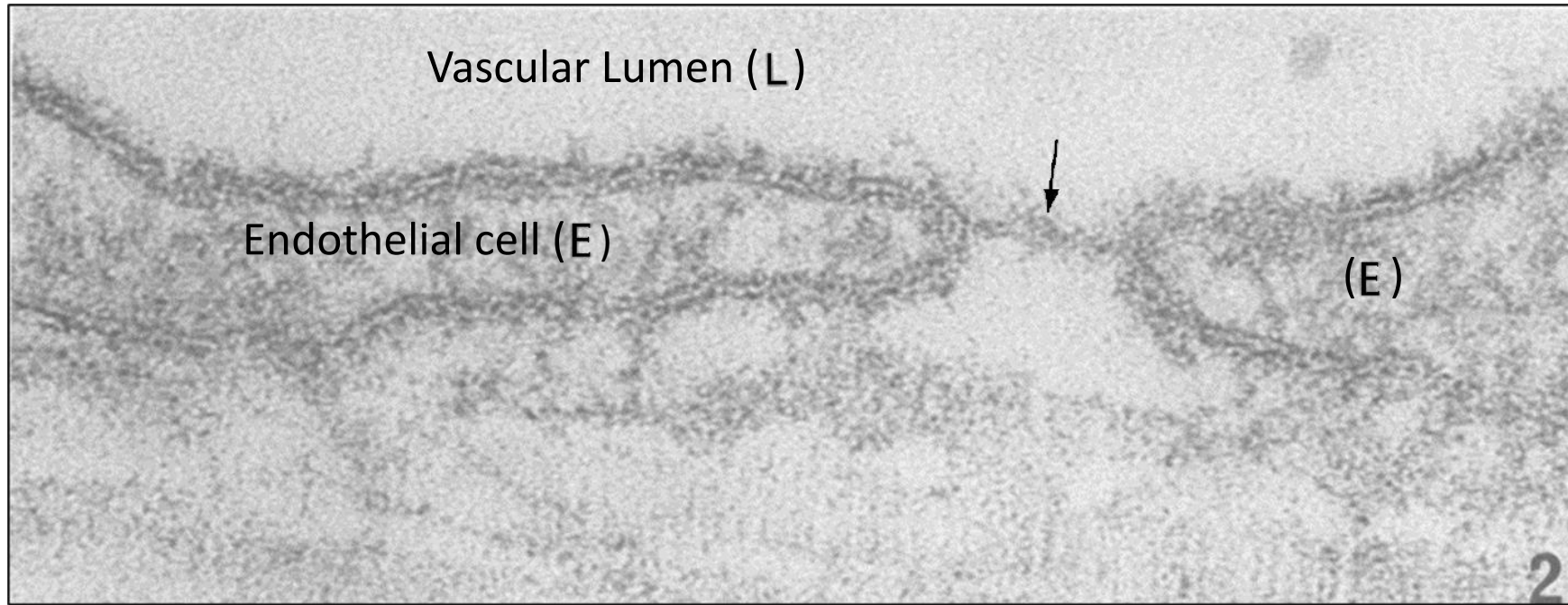


PLATE 14.2 *page 630*

Q1a) What characteristic structure of cell membrane is shown here in this endothelial cell ?

A1a) This is an endothelial cell from a fenestrated capillary, showing the characteristic trilaminar structure of the cell membrane.

Q1b) Is a cell coat seen in this image?

Structure of the cell membrane

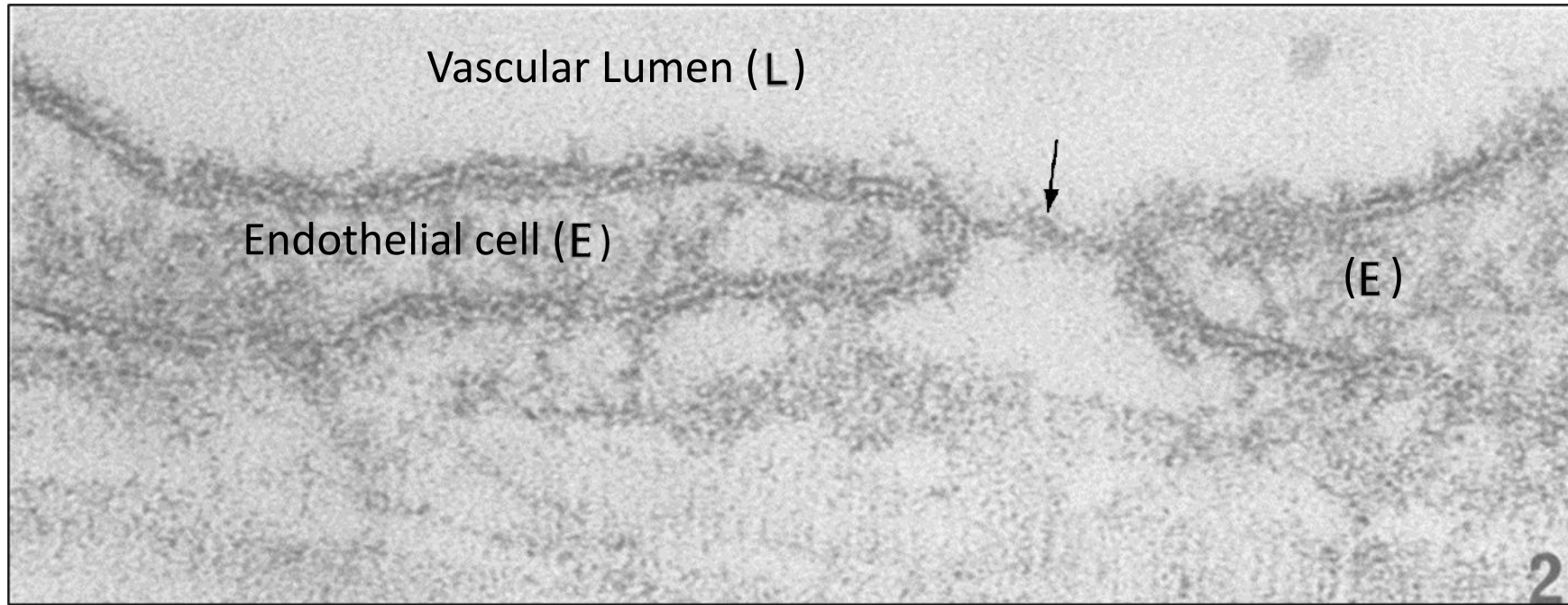


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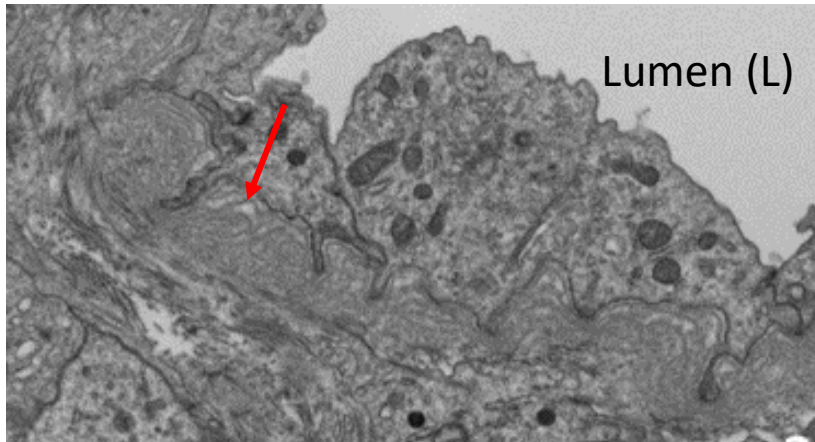
Q1b) Is a cell coat seen in this image?

A1b) “Fuzzy” material that represents the glycocalyx

Changes in composition of GBM

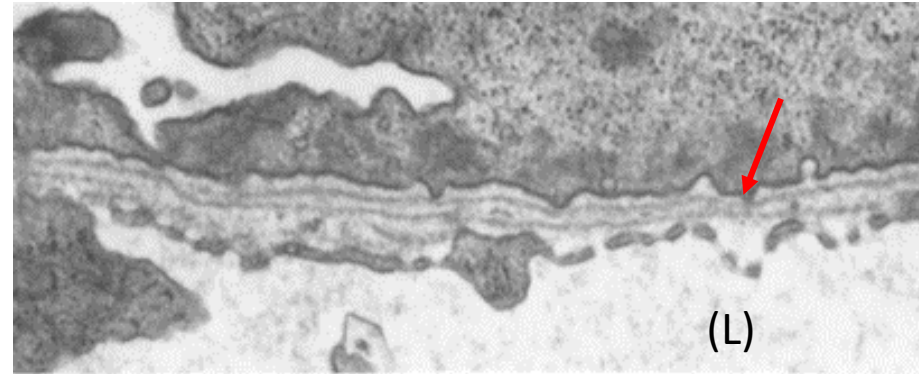
1) Alterations in the Basal Lamina

PLATE 14.5 [page 640](#)



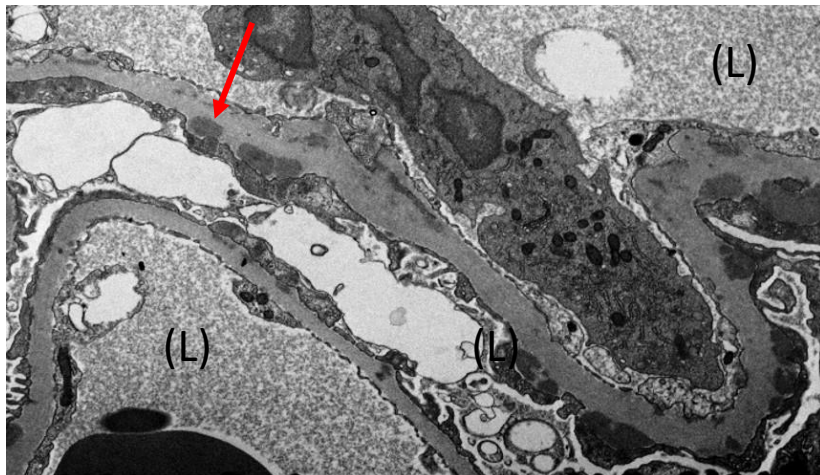
2) Hereditary Defects

PLATE 14.16 [page 641](#)



3) Electron Dense Deposits

PLATE 14.17 [page 642](#)

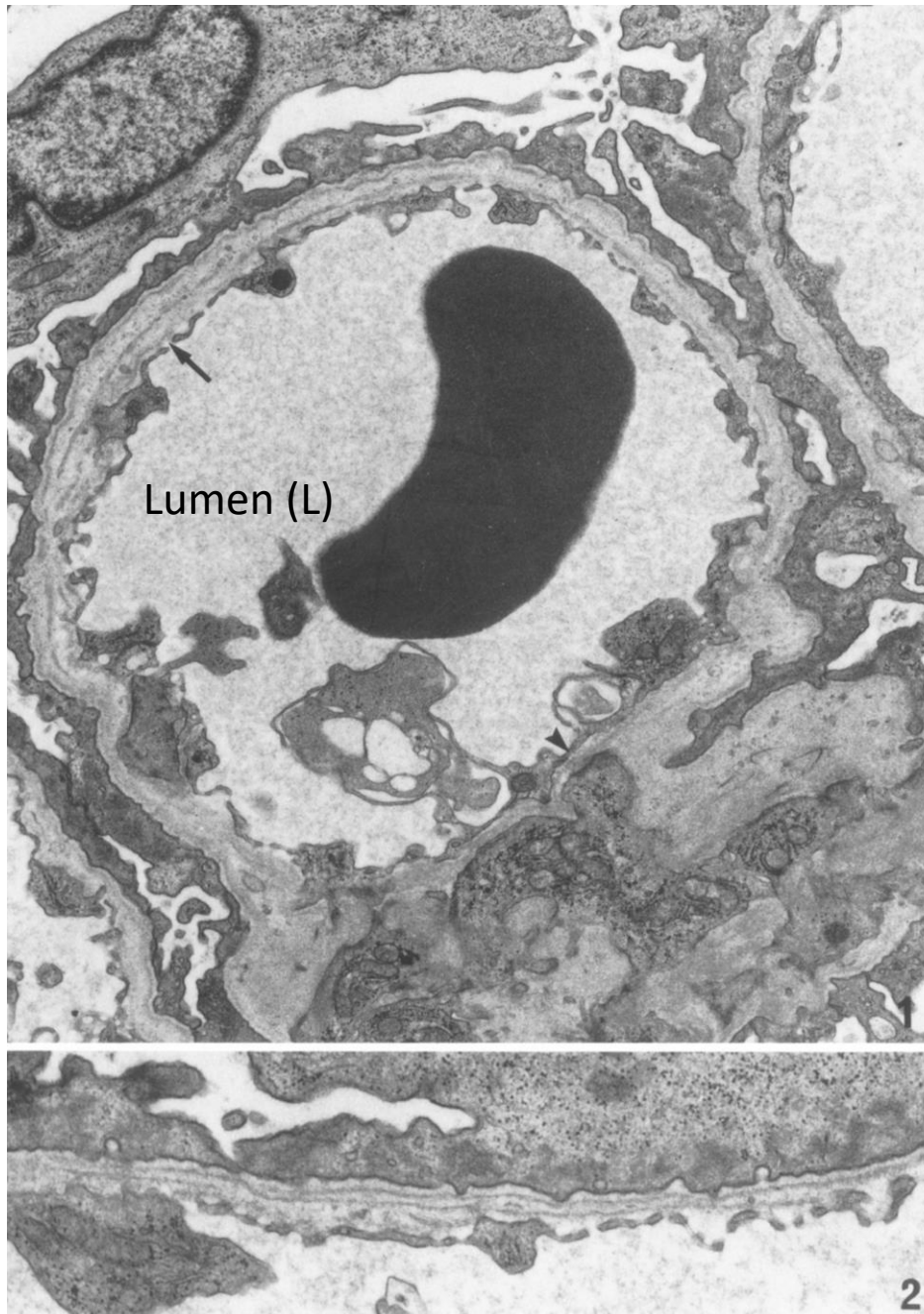


4) Crystalline Deposits

PLATE 14.29 [page 652](#)

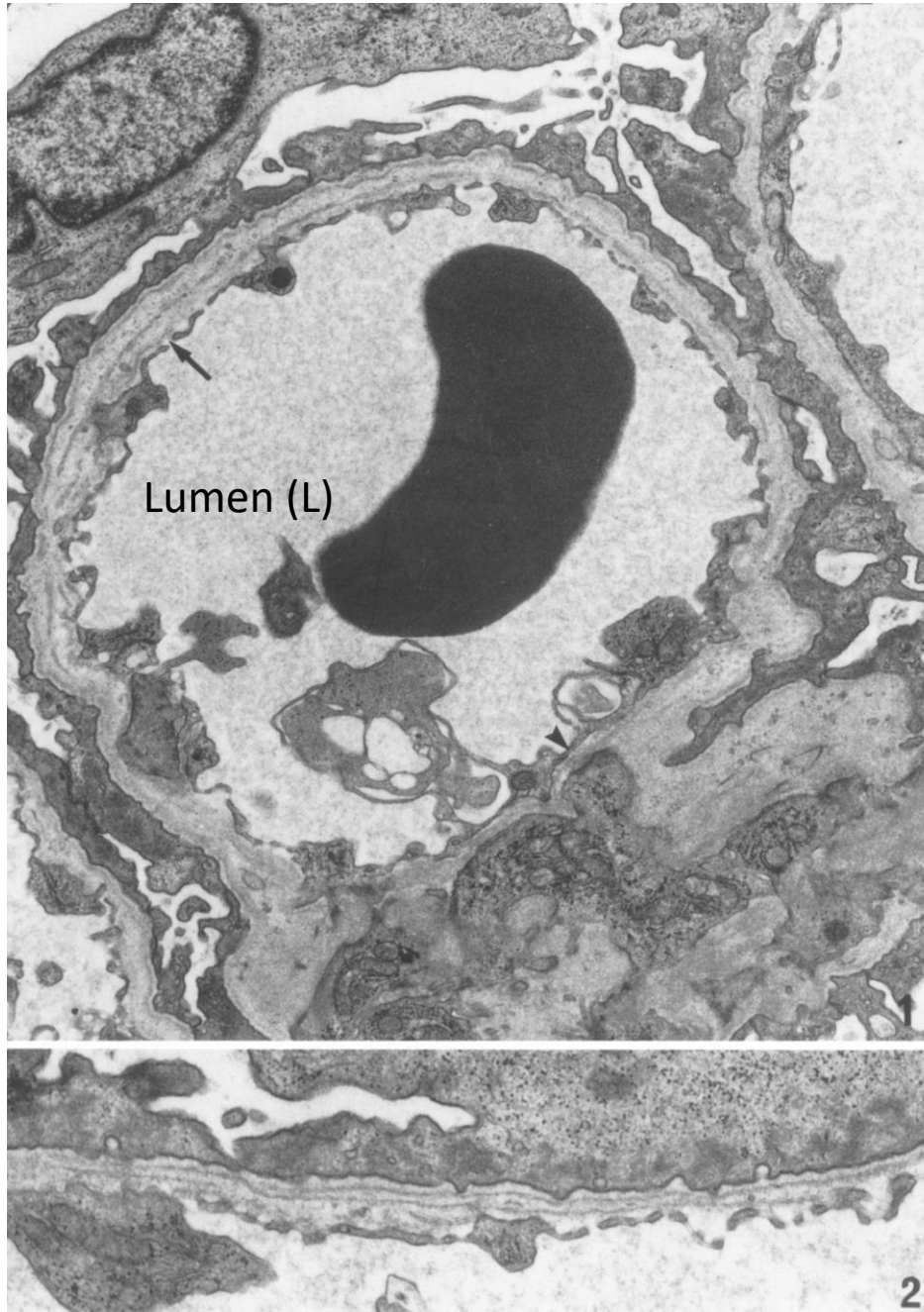


Hereditary defects



Q2a) What syndrome seen in the renal GBM is associated with these ultrastructural features? Focal thickening (arrow) and thinning (arrowhead) of the basal lamina.

Q2b) What component of the GBM is altered by the gene mutation associated?

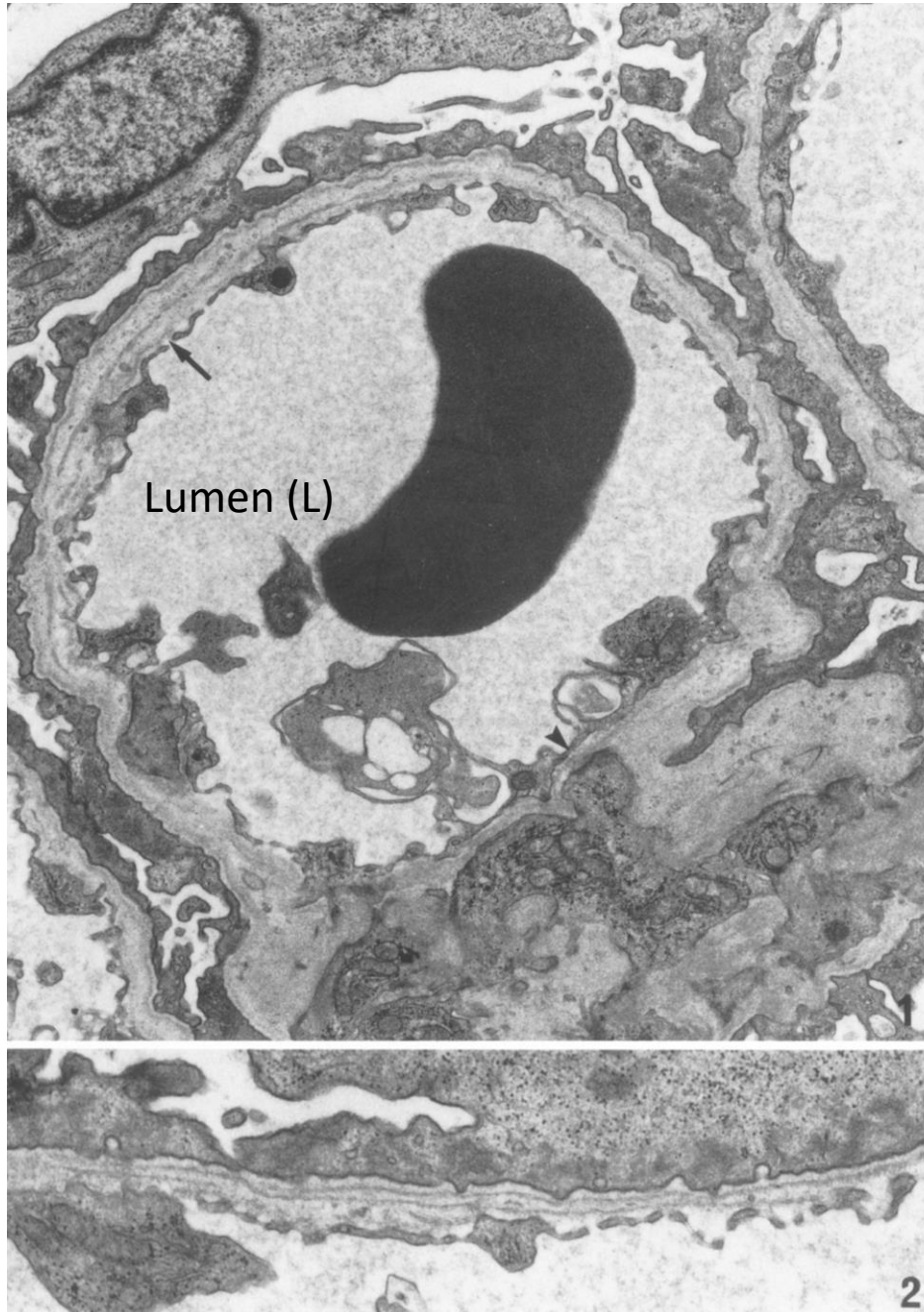


Hereditary defects

Q2a) What syndrome seen in the renal GBM is associated with these ultrastructural features?

A2a) Alport's Syndrome

Q2b) What component of the GBM is altered by the gene mutation associated?



Hereditary defects

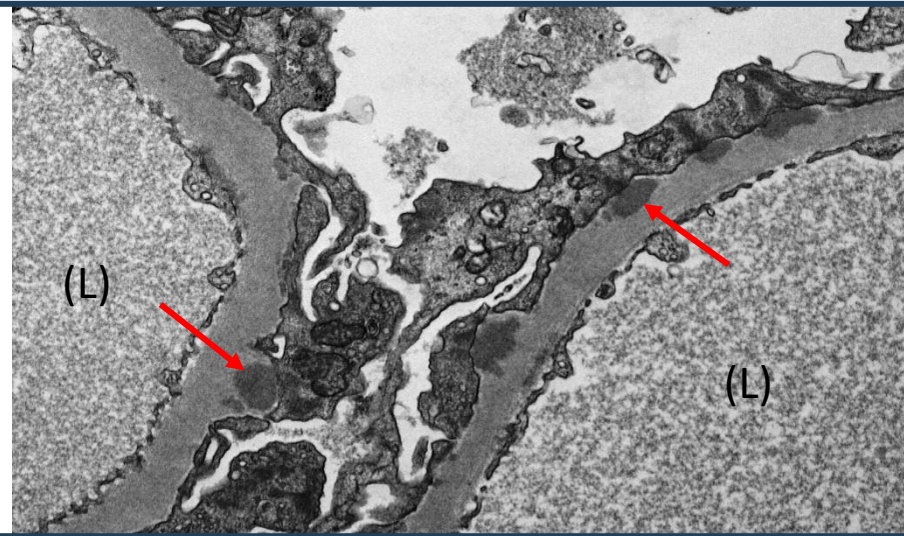
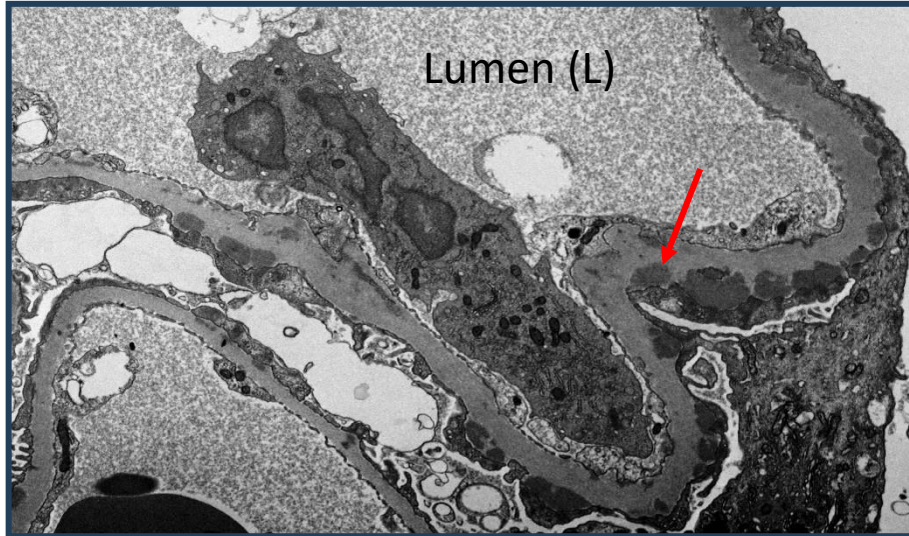
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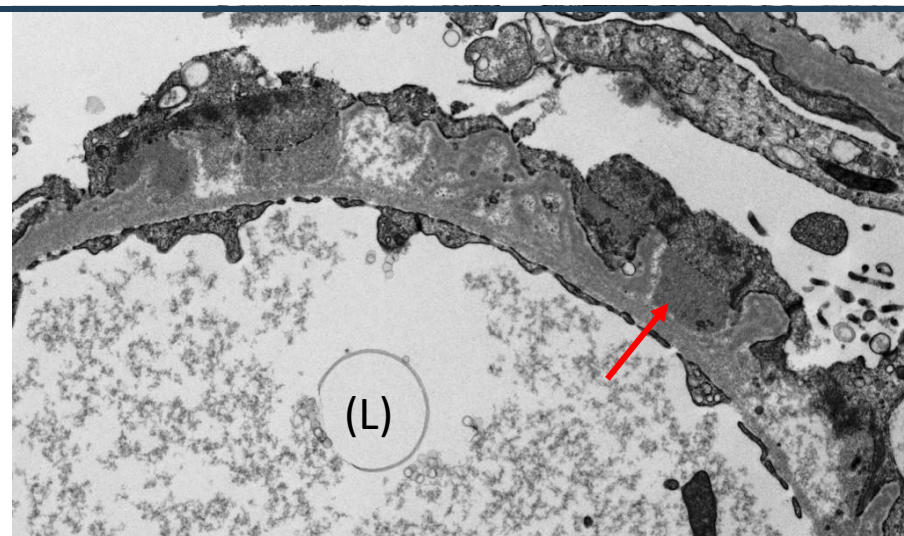
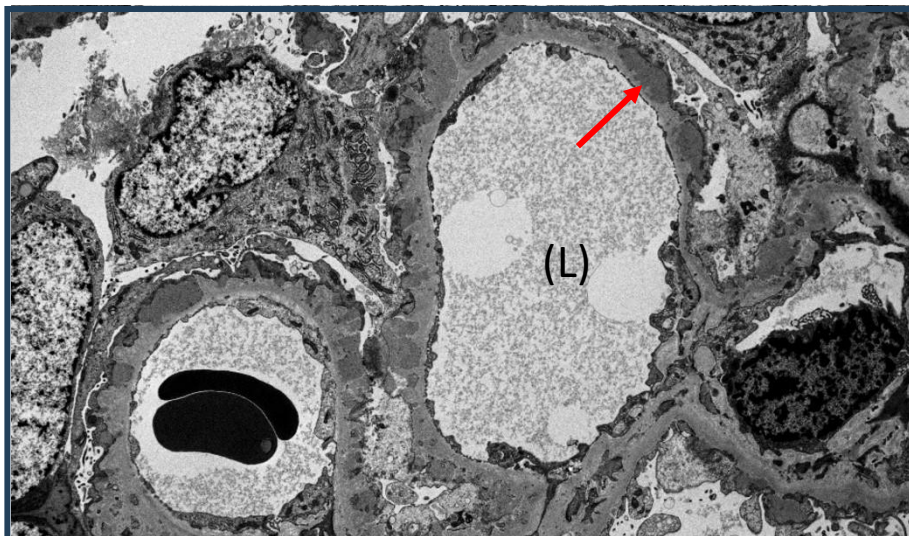
Q2b) What component of the GBM is altered by the gene mutation associated?

A2b) Read Chapter 14

Electron-dense deposits



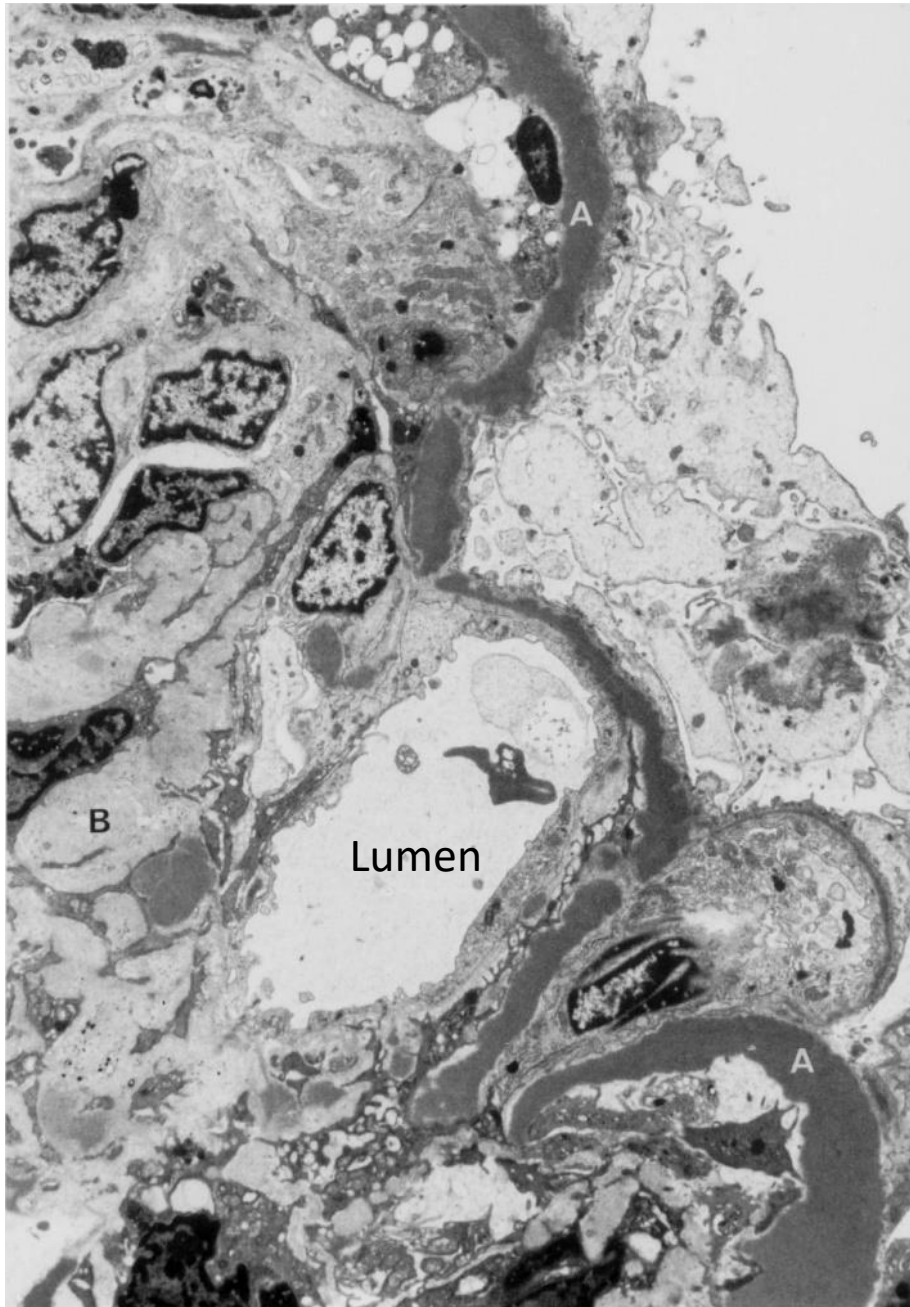
Lupus nephritis
nephropathy (Class V)

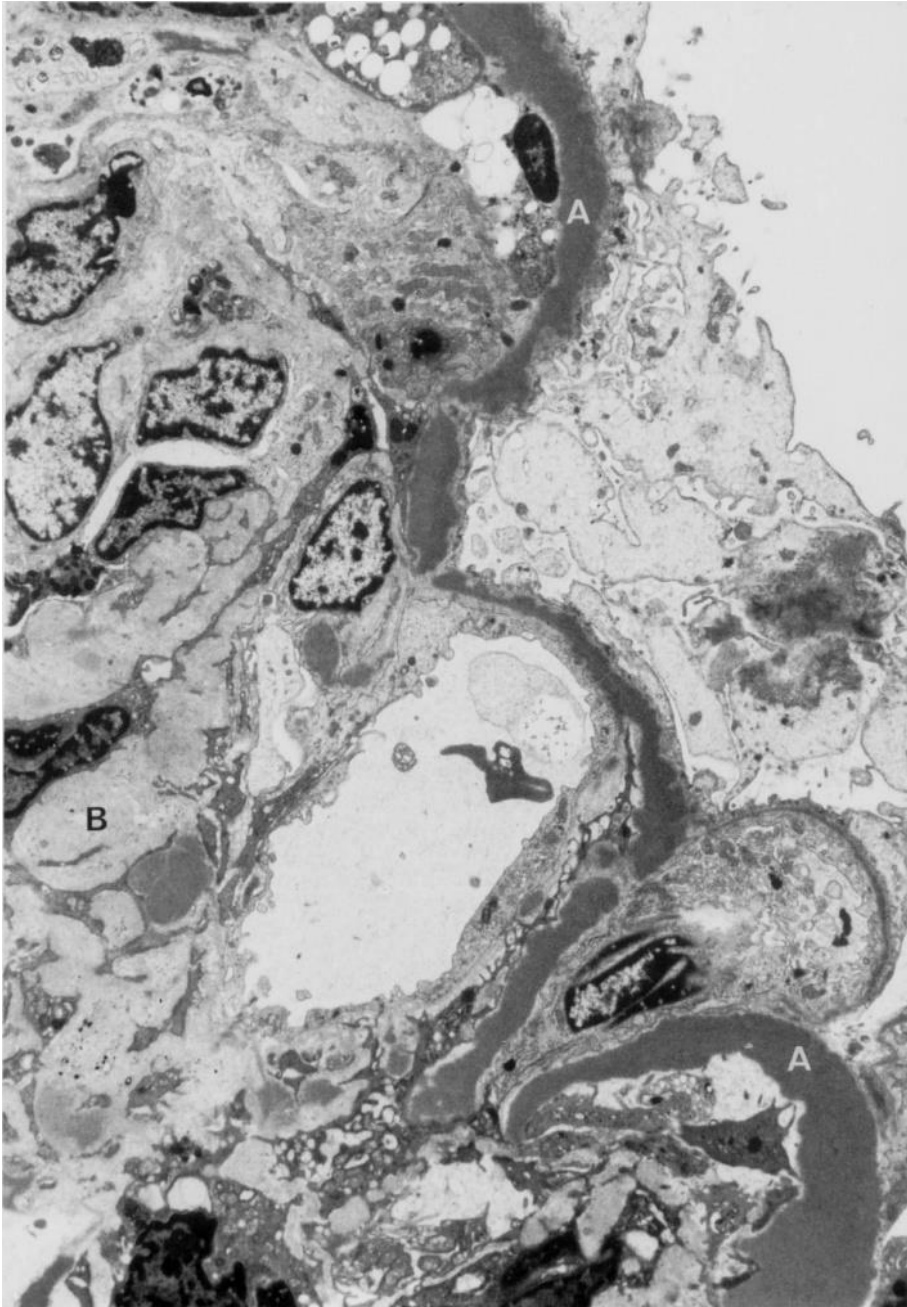


Membranous nephropathy

Electron-dense deposits

Q3) What condition is now recognized as a subtype of C3 glomerulopathy (C3G) and shows typically “sausage-shaped” homogenous densities (A) within the basement membrane.





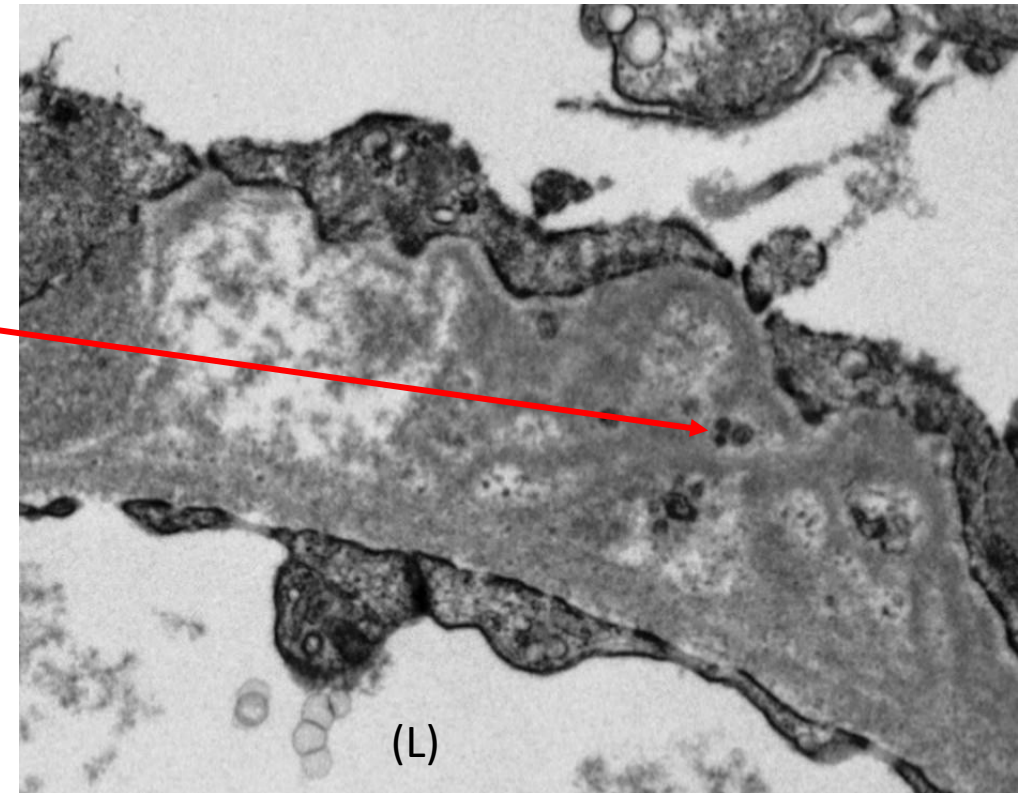
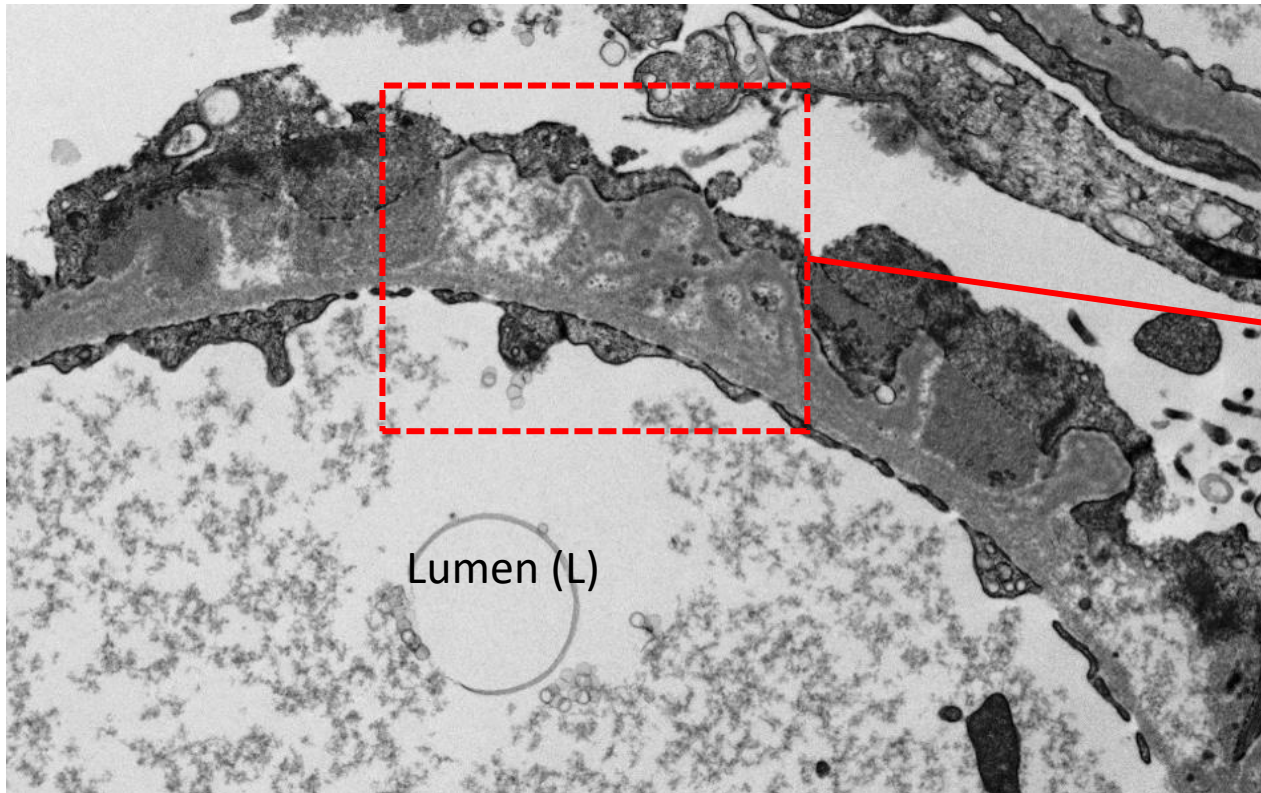
Electron-dense deposits

Q3) What condition is now recognized as a subtype of C3 glomerulopathy (C3G) and shows typically “sausage-shaped” homogenous densities within the lamina densa.

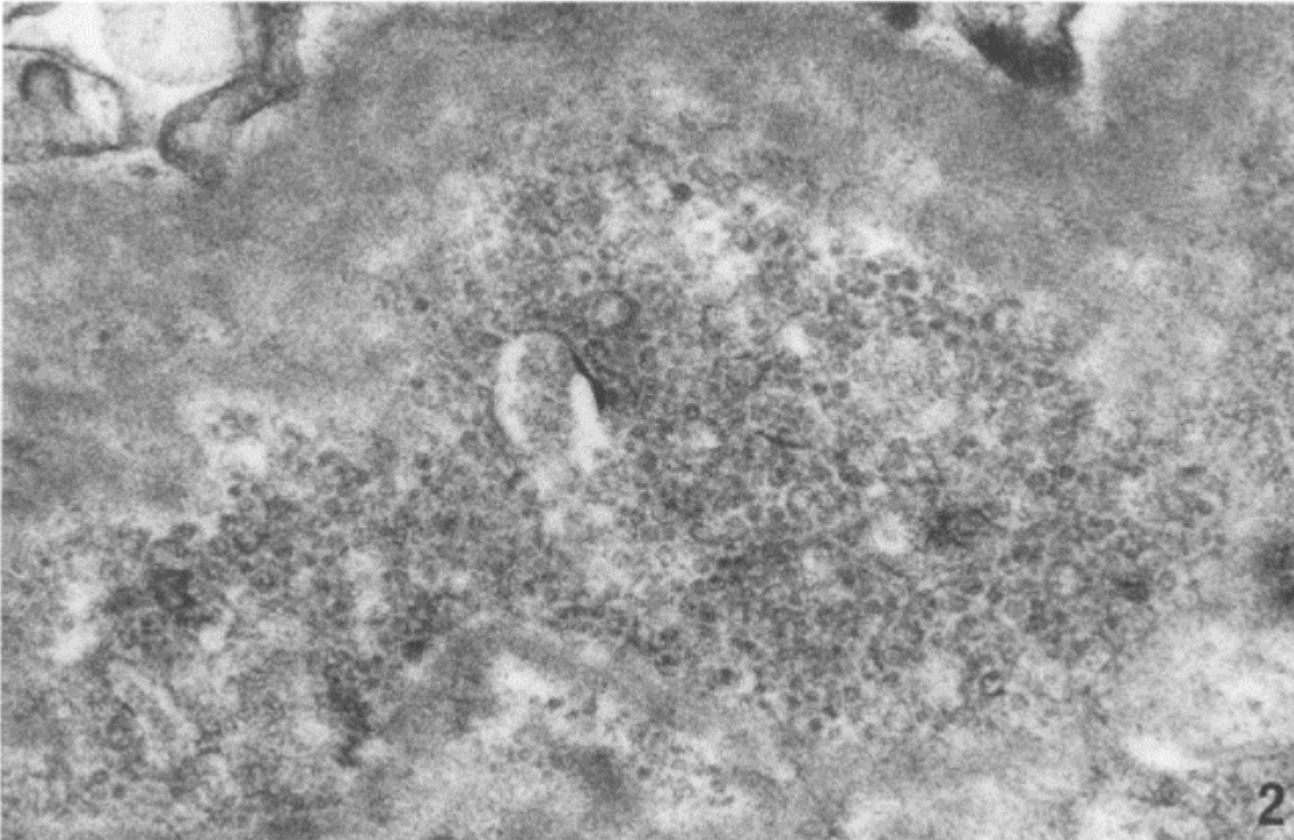
A3) Dense-Deposit Disease

Electron-dense deposits

Membranous nephropathy



Spherical Microparticles

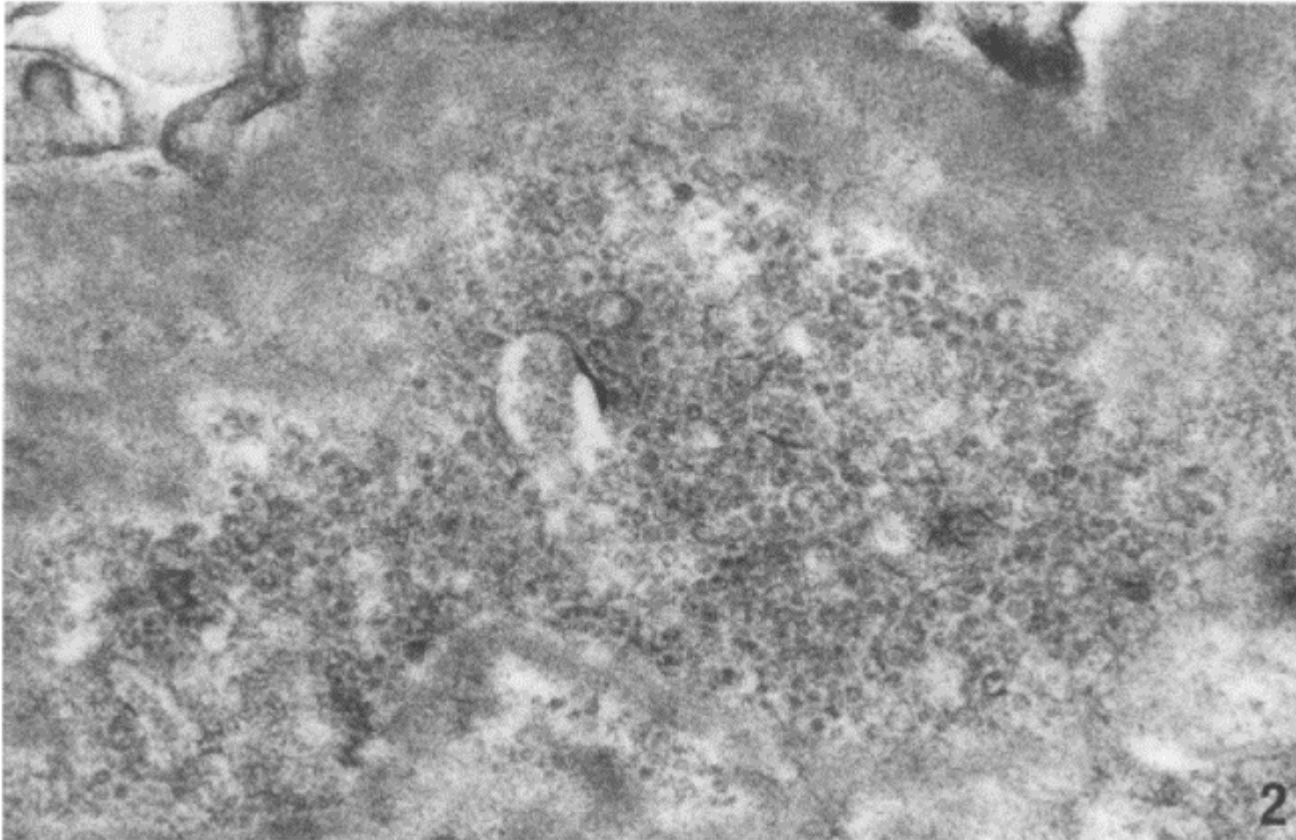


Q4a) What do the spherical microparticles in the kidney represent?

Q4b) Burkholder et al., (1973) reports “the highest incidence of spherical microparticles in which renal pathologies?

PLATE 14.2 [page 648](#). [Read more at page 647-650 :](#)

Spherical Microparticles



Q4a) What do the spherical microparticles in the kidney represent?

A4a) In the kidney these particles represent cell debris or a cellular reaction to injury manifested by a discharge of these particles from the cell (Ghadially 1997).

Q4b) Burkholder et al., (1973) reports “the highest incidence of spherical microparticles in which renal pathologies?

PLATE 14.2 [page 648](#). [Read more at page 647-650](#) :

Spherical Microparticles

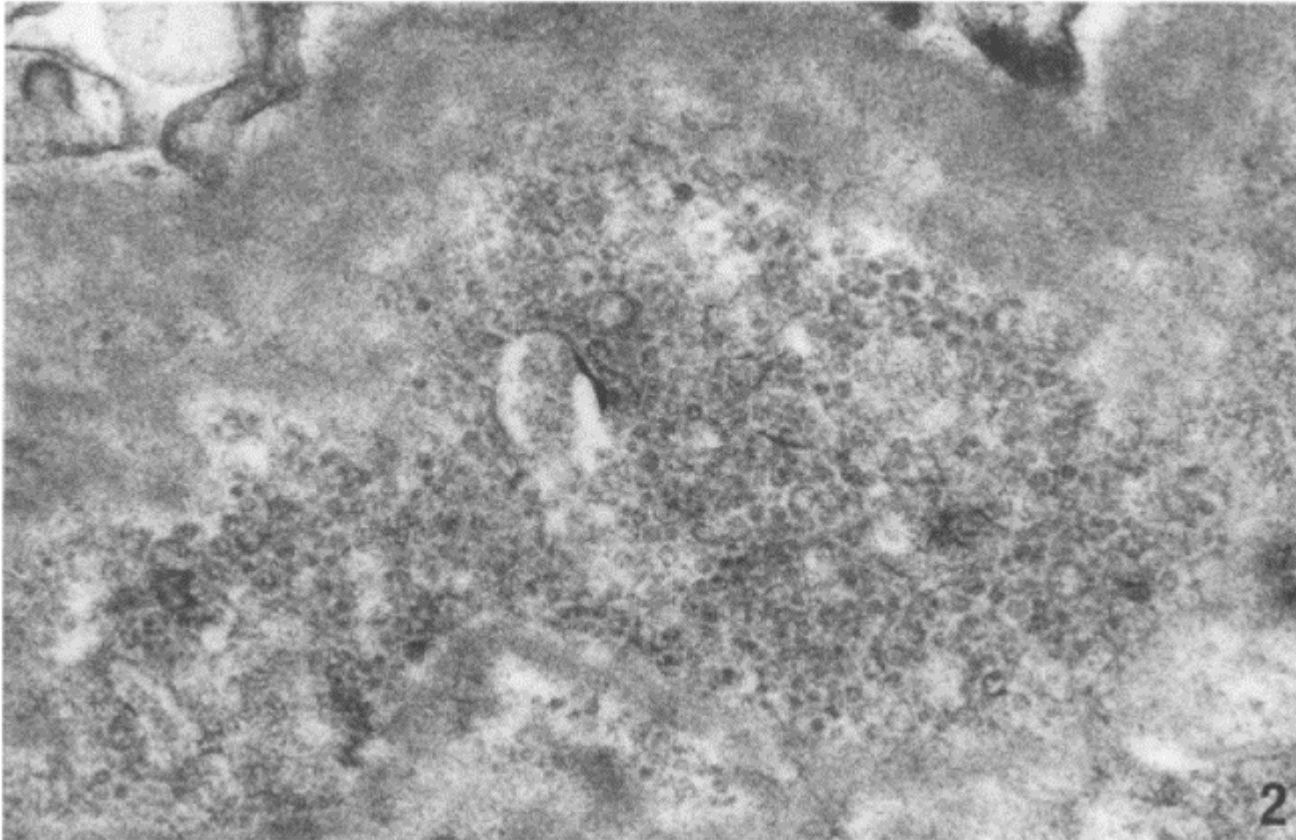


PLATE 14.2 *page 648. Read more at page 647-650 :*

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Q4b) Burkholder et al., (1973) reports “the highest incidence of spherical microparticles in which renal pathologies?

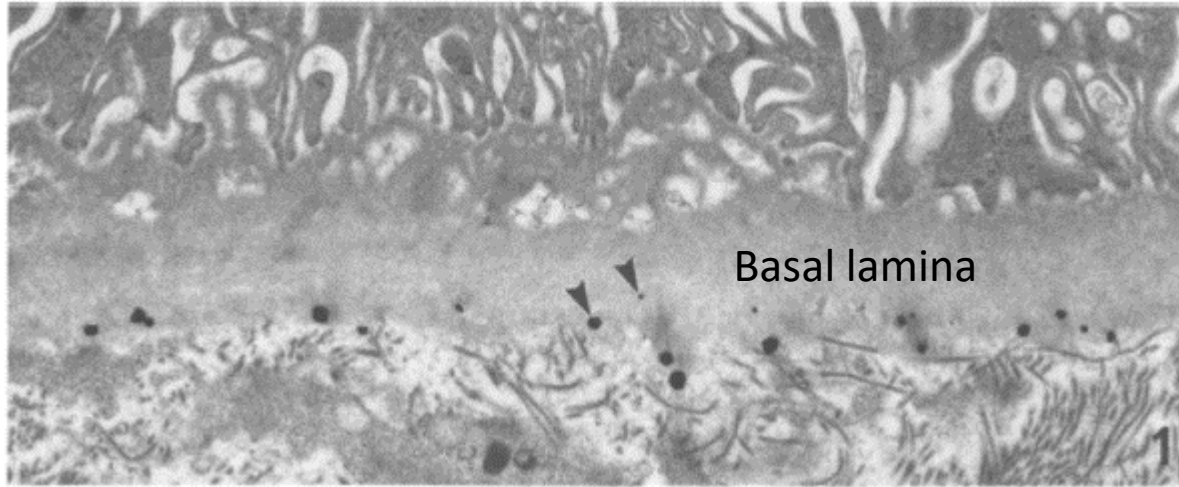
A4b) Membranous glomerulonephropathy, lupus nephropathy and focal sclerosing glomerulonephropathy.



Argyria

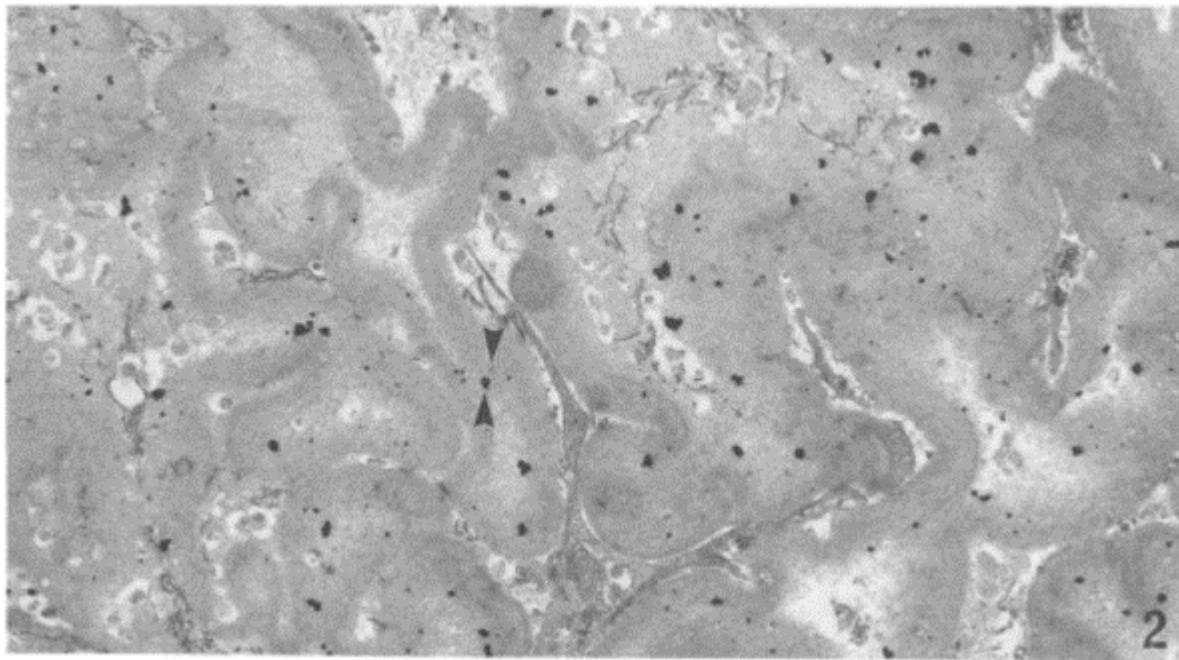
Silver deposition
following systemic absorption

Mota, L., Dinis-Oliveira, R.J. 2021. Clinical and Forensic Aspects of Argyria. J. Clin. Med. 10:3390.



Basal lamina

Basal lamina of kidney tubule



Basal lamina of a sclerosed glomerulus

Argyria

- Renal biopsy
- 63-year-old [South Dakota ranch hand]
- Gum ulcers secondary to ill-fitting dentures.
- Treatment: painted his gums with silver nitrate for several years

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Cell Membrane and Coat

Linda Moran and Heather Brooks

Pages 629-663

Thank you



