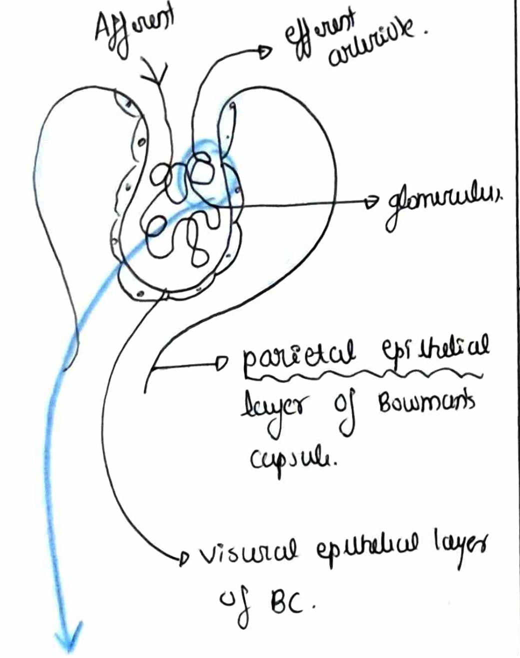
Renal System



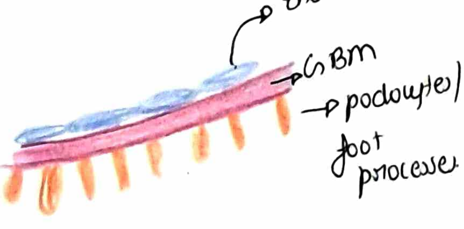
Filtration Membrane.

- lining of Blood vessel – Endothelial cells.
- Visceral epithelium + Basement membrane.

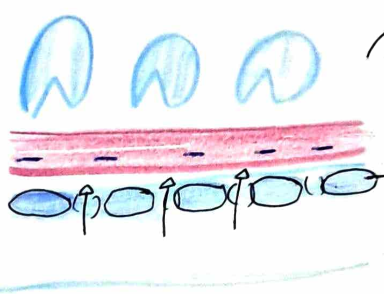
(1) Glomerulus Basement membrane +

(2) foot process. / processes of podocytes

Black and white mc → Electron mc from the ...



is, Trilaminar
↓
filtration membrane.



also, why is basement membrane negatively charged?

Cause it has many proteins →
- Type IV collagen
- laminin
- Heparan sulfate
- other glycoproteins.

(-)ve charge overall.

most common collagen in BM? (5)
→ Type IV

mc protein in Bm?
→ Laminin

Basement membrane is (3) like a floor right?
so it's made of
Type four Collagen → Type IV.

(1) fenestrated Endothelial cells.

→ why fenestrations?
for filtration (4)

70 – 100 nm. (2)
↓
Low molecular weight albumin, transferrin. are actually smaller than fenestration...

- why don't they go out?
↓
Cause they are (-) charged 4.
Basement membrane is also (-), so they don't get filtered out...

Nephrotic Syndrome

OMG protein uria.

- Massive proteinuria
- Lipiduria.
- hypoalbuminemia.
- Edema.
- Thrombotic events.

Nephritic Syndrome.

mild proteinuria.

HTN

Oliguria.

Hematuria.

Azotemia.

H O H A

↑ blood Urea Nitrogen

- Nephrotic → frothy {protein & lipid}
- Nephritic → Cola Coloured urine {hematuria}

Nephritic syndrome.

M/c : Pediatrics → PSGN

M/c : Adults → IgA nephropathy / Berger's disease

M/c → all over word / overall → IgA nephropathy

- > 3.5 g protein / 24 hour urine output.
  - 24 hr ? not single sample.

- Massive proteinuria.

- since massive proteinuria.
  - ↓ hypoalbuminemia.
  - ↓ Edema.

- Edema → mc cause → Na⁺-water retention ✓ and mc cause → hypoalbuminemia

- why thrombotic event ?
  - ↓ due to urine loss of.
  - Anti Thrombin III

POST-STREPTOCOCCAL GLOMERULONEPHRITIS

- AKA ?
- Strain ? Group A β hemolytic streptococcus.
  - strain → 12, 4, 1
  - Incubation prd 1-4 wks

Clinical feature ?

- sore throat.
  - followed by cola coloured urine after a timeline,
  - Cause of ↓ HS III
    - ↓ takes 10-14 days (2 wks)

ie, Sore throat → after 2 weeks.
- ↓ Cola coloured urine.
- {Hematuria.

Blood test? ① Antibody → Anti DNase B {pyogenes}
→ ASO

② Transient hypocomplimentemia.

few weeks ↓ specially C_3.

- for few weeks, compliment protein {C3} will go down
- for unknow reason: C_4 Normal Lvl.
- why so? there is activation of Compliment proteins. by Ag-Ab Immune complex formation.

GROSS?

Flea Bitten kidney.

light microscopy?

- rarely other bacteria {staph} can also cause it
- so other name: Post infectious GN.
- also, there is proliferation.

↓

acute proliferative GN

- ↑ Endothelial cells
- ↑ Mesangial cells {macrophage}
- ↑ Neutrophils
- overall → hypercellular glomerulus.

AKA? . Post infectious Glomerulonephritis
. acute proliferative glomerulonephritis.

Immuno flourescence?

- there is Ag-Ab → Immune complex.

Ic → get deposited below the visural epithelium. ie, podocytes.

↕

Subepithelial Humps.

↓

on Electron microscopy.

IF?

Ic → deposits are seen as areas of increased glow.

↓

there is shine, dark, shine, dark.

⇓

STARRY SKY appearance on IF

↓

PSGN

Starry sky.

Light m/c → Burkitt's

IF → PSGN.

Treatment?

- Usually self limiting {~ 6 wk normal}
- ~ 1% ⇒ progressive & chronic.

Ig A Nephropathy.

BERGER'S DISEASE.

- B**e**rger – V**a**sculitis } Don't mix up
- B**u**rger – K**i**dney }
- m/c in adults and world wide too..

How it happens?

- It's associated with infections... it could be. Resp, GIT etc...

↓ in here, after infection,

our bodies make a different IgA

↓

IgA_1 Galactose different

See... many people get streptococcus, GI, resp infections.. they all don't make such IgA_1...

only some people do! why?

there is genetic reason

- due to genetic reason... Some individuals produce. IgA_1 .... only in such patients. there is this disease.

- IgA_1 → is alien to body

↓

acts like an antigen

↓

Ab are produced against IgA_1

↓

Ag – Ab Complex. deposition.

↓

mesangial deposition.

in Bergers disease deposition occurs in between ie, mesangial cells

Bergers → mesangial deposition.

Clinical presentation?

Sore throat.

Adult → 2-3 days

↓

recurrent hematuria.

Bergers

Sore throat

pediatric → 10-14 days

↓

hematuria.

PSGN

- see, in both there is sore throat is followed by hematuria.

How to differentiate?

- Age based
- onset duration based.

- IgA vasculitis.
  ↓
  Henoch schonlein purpura.
  - P - purpuric rash.
  - A - abd. pain.
  - A - arthralgia.
  - R - renal (hematuria) pain.

- IgA nephropathy. Berger's disease. → only kidney involved.

Microscopy?

- IgA, deposits in area. in between loops/tubules.

Mesangium

- macrophages
- amyloid deposition first pick.
- IgA/ Berger's disease

Composition? of Crescentic

- F - fibrin
- L - Leucocytes.
- A -
- P - parietal epithelial (m/c). & visceral epithelial

Prognosis?

↑ number of crescent → poor prognosis.

RPGN - Type?

① RPGN

treatment.

- treat infection

But if it progresses, →

Rapidly Progressive Glomerulo Nephritis. (RPGN)

- AKA? CRESCENTRIC GN
  ↓
  Sickle / Haymoon / Crescent deposit around glomerules.