- Nephrotic syndrome (NS)

Increase BM permeability

Clinical Manifestations: Massive proteinuria , Hypoalbuminemia , Edema ,Hyperlipidemia , Lipiduria

	Minimal change disease	Focal segmental glomerulosclerosis	Membranous glomerulonephritis
	Non immune complex		**Immune complex (type III)**
Most common in	**Children**	**Old**	**Adult**
Cause of NS	**primary**	**primary**	**primary**
LM	**Appear normal**	**1. obliteration of capillary Lumina** **2. increased mesangial matrix** **3. hyalinosis**	**Thickening of the capillary wall** **Sliver stain:GMB spike**
EM	**diffuse (effacement)of podocyte foot process**	***effacement of epithelial foot process**	**Sub epithelial deposition of immune complex (cause the thickening of BM)**
IF	_	Trapping of **IgM** and complement (**C3**) in GMB and podocytes.	Granular deposits in Loop pattern of(IgG&C3) along GBM
Prognosis	**Responds well to corticosteroid therapy**	**Responds to corticosteroid is poor** **And 50% of patient develop end stage kidney disease**	**Does not usually respond to corticosteroid**
Comment	-	- May be primary or secondary : **1-Primary** (idiopathic). **2-Secondary to other disease.**	***MGN caused by SLE ,and association sometime include hepatitis B, syphilis and drugs (penicillamin ,captopril)**

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	Diabetic nephropathy	Renal amyloidosis
Causes of NS	**Systemic**	**Systemic**
LM	**Will be either :** ***diffuse glomerulsclerosis: increase in mesangial matrix and mesangial cell** ***Nodular glomeulosclerosis :nodular accumulation of mesangial matrix called (kimmelstiel Wilson nodules)** ***Arteriolar hyalinization. (detect the disease)** ***Tubulointerstitial fibrosis.**	Massive amyloid deposits are present in glomeruli and arterioles "hyalinization of blood vessels.-" **Polarized light with Special stain of amyloid (Congo Red) :** tubular involvement with amyloid is verified by apple-green birefringence**.**
EM	**Increase in thickness of GBM**	**characteristic fibrils appearance**
Note	**Most important cause**	**Two type of amyloid** **1 Amyloid AA :chronic inflammatory condition (reactive protein)like(TB,rheumatoid arthritis)** **2 Amyloid AL :tumors affect plasma cells,immunoglobin will effected (multiple myloma)**

Nephritic syndrome

The diseases that cause nephritic syndrome have in common proliferation cells within the glomeruli, accompanied with inflammatory reaction.

-Clinical manifestations : oliguria ,azotemia, Hematuria with dysmorphic red cell and RBC cast and hypertension.

	Poststreptococcal GN	Alport syndrome	IgA Nephropathy
Allso called	**Acute proliferative GN**	**hereditary nephritis**	**Berger disease**
Most effect	**Children**	**Children (especially male)**	
LM	**Neutrophil within capillaries . proliferation of glomeruli (mesangial& epithelial cells)**		Mesangial widening.
EM	**Dense subepithelial (hump)**	**Irregular BM thickening**	Ideposition of IgA within mesangium.
IF	**Granular deposition of IgG & C3 (lumpy bumpy)**		dense deposition of IgA
Comment	**Prognosis**: Complete recovery in children, but some of them develop rapidly progressive crescentic GN or chronic renal disease In Adult depends on severity (worse than children)	**Caused by mutation in gene for (α-5 chain) which form collagen IV which important of GBM and cause structural abnormality**	**Immune complex**

Rapid progressive GN :
also called crescentic GN
clinical features of nephritic syndrome
formation of crescent between bowman's capsule & glomerulus tuff

	Anti-glomerular BM	Pauci immune GN	Immune complex mediated
Also called	Good posture syndrome	Wegener granulomatosis	
	Immune complex	Non Immune complex	
Pathogenesis	Formation of antibody which direct against glomerular & pulmonary alveolar BM	+ive ANCA serum	Complication of any immune complex like ▪ Post streptococcal GN. ▪ SLE. ▪ IgA nephropathy. ▪ Henoch-Schonlein purpura
LM	Characterized by formation of crescent		
IF	Linear deposition of IgG & c3		granular deposition

Membranoproliferative GN
Can be Nephrotic or Nephritic syndrome
Is marked by replication of GBM into 2 layer due to expansion of mesangial matrix
Disease occurs in two forms :
1)type I:LM: tram track appearance EM: accumulation of immune complex
2) type II Dense Deposit Disease: EM :irregular electron dense material