	Features	Origin & Location	Predisposing factors	Genetic Abnormalities	Clinical Features/course	Histological Appearance
Renal Cell Carcinomas						
Classified based on Molecular origin into: **1.Clear Cell Carcinoma** **2. Papillary Renal cell Carcinoma** **3.Chromophobe Renal Carcinoma**	-More common in **males (2:1).** -Represents 2-3% of all cancers in Adults. -All forms of RCC have **familial and sporadic cases.** -Affects People in the **6^{th}-7^{th} decade of life.**	**Origin:** **Renal Tubular Epithelial cells.** **Location**: **Cortex**	1. Smoking 2. Hypertension 3. Obesity 4. Occupational exposure to **cadmium** (batteries). **5. Chronic Dialysis and acquired polycystic disease.**		-**Painless hematuria (50% of cases)** -**Palpable abdominal mass.** -**Paraneoplastic syndrome:** Hypercalcemia Hypertension Cushing Syndrome Feminization or masculinization. -**Metastasis**: to the lungs and bones. -**Vascular events:** **Invasion of the Renal Vein → Dilation and thrombosis.**	

Clear Cell Carcinoma	-**Most common type of RCC** (70-80% of cases) -VHL disease is a type of familial Clear Cell Carcinoma.			**Mutation:** **VHL gene (Von Hippel-Lindau) on Chromosome 3.**		**LM:** **Shows clear/granular cytoplasm (Hence, the name).**
Papillary Renal Cell Carcinoma	-10-15% of cases of RCC.	**Origin**: **Proximal tubular epithelial cells.** -**Multifocal** (Multiple masses in one kidney) or **bilateral** (Multiple masses in both kidneys)		- **MET Protooncogene on Chromosome 7** (mutation) Extra copies of this gene → Over activation of MET proto-oncogene → Excessive cell growth		- **Growth pattern**: Shows formation of **papillae** (Finger like projections)
Chromophobe Renal Carcinoma	-**Least common form of RCC** (5%). -Good prognosis	**Origin**: **Intercalated cells of the collecting ducts.**		-**Multiple losses of entire chromosomes** (1,2,6,10,13,17,21) → **extreme Hypoploidy**		-Tumor cells **appear less clear** than those of Clear Cell Carcinoma. "Chromophobe": cells stain less readily.

Transitional Cell Carcinomas (Urothelial tumors) **Types:** 1. Benign Papilloma 2. Papillary Urothelial Neoplasms of Low Grade 3. Papillary Urothelial Carcinoma of High Grade					
Papillary Urothelial Neoplasms of Low Grade	-**Recurrence is common.** -**Rarely invasive, only involve the mucosa.**	**Location**: **Urinary bladder**		Most prevalent symptom: **Painless hematuria.** -Dx by **cystoscopy**, **follow-up every six months is needed to ensure there's no recurrence.**	-**Well differentiated**- very similar to urothelial cells. -**Papillary**: finger like projections. -Fibrovascular course lined with urothelium with low grade neoplasms.

Bladder Cancers						
	-**No familial cases, only sporadic.** -5% of cases involve **Squamous cell carcinoma**. (Associated with bladder stones, chronic inflammation, and schistosomiasis) -More common in **males** than females, 3:1 ratio.		**1. Beta naphthylamine** **2. Chronic cystitis** **3. Smoking** **4. Schistosomiasis** 5. **Cyclophosphamide**		- **Painless hematuria** **Treatment**: 1. Transurethral resection. 2. BCG injection: Granulomatous inflammation immune response against tumor cells. 3. Advanced cases: Chemo and radical cystectomy. -**Follow-up for recurrence** using cystoscopy and urine cytologic studies for the rest of the patient's life.	

Renal childhood tumors						
Wilms Tumors	-**Familial or sporadic.** -**Familial: Autosomal dominant.**	**Origin**: **Embryonic primitive cells (Mesoderm)**		Genetic abnormality in 2 genes: **WT-1 and WT-2.**	-**Gross appearance: Pale white in color.** -**Treatment**: Chemotherapy and surgery.	-Shows attempt to **grow primitive glomerular, tubular structures.** -**Blue cell tumor**: **Nests and sheets of dark blue cells are formed, with adjacent normal renal parenchyma.**