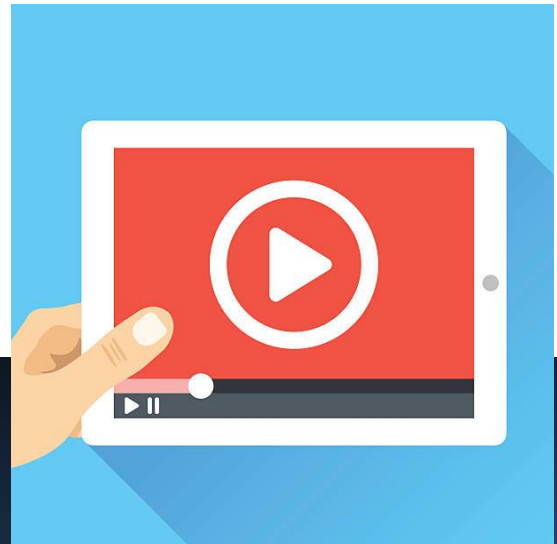


URINARY TRACT INTRODUCTION

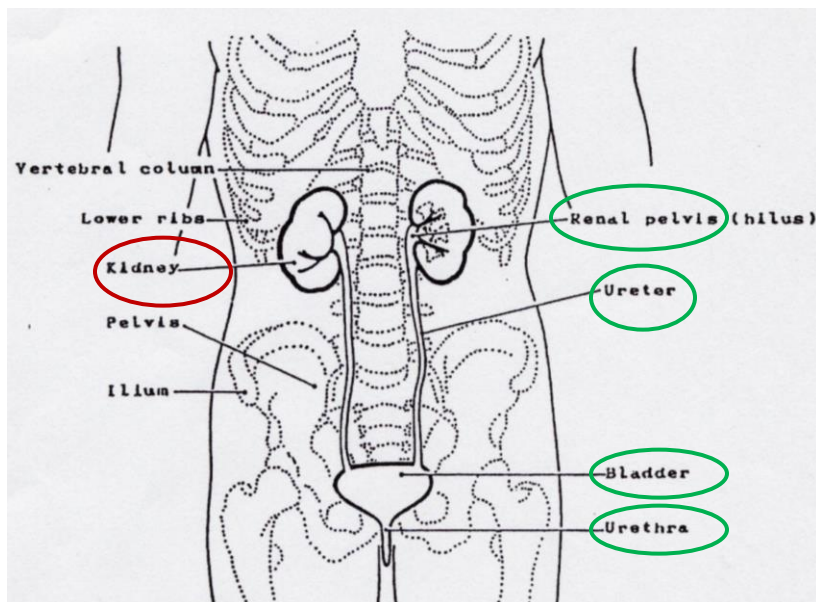
Presented by Melissa Riddle, ODS-C
SHRI Video Training Series | Iowa Cancer Registry
March 2025



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The Urinary Tract System



2

2

Urinary Tract System

Kidney

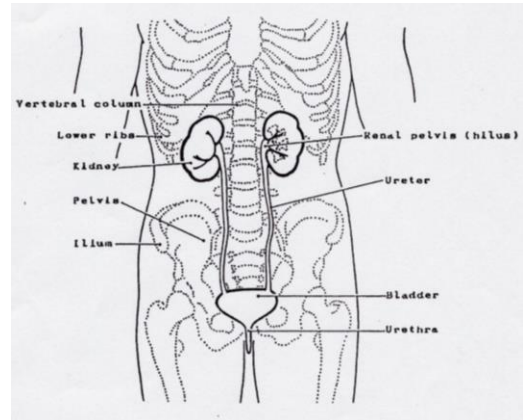
Kidney **parenchyma** (glandular part) C64.9

Kidney **Renal Pelvis** C65.9

Ureter C66.9

Bladder C67.9 (NOS)

Urethra C68.0



3

3

Bladder, Renal Pelvis, Ureter

- Definitions
 - **Upper** urinary tract:
 - kidney, renal pelvis and ureter
 - **Lower** urinary tract:
 - bladder, sphincter, urethra

Urinary tract (STR definition): **structures lined by urothelium**

Two different sections in STR manual:

- **KIDNEY C649 only**
- **URINARY: Renal Pelvis, Ureter, Bladder and Other Urinary**
 - C659, C669, C670-C679, C680-C689

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Urinary Tract

Renal pelvis, ureter, bladder, urethra, prostatic urethra in males

- Structures lined by transitional epithelium
- Tumor cells may shed and implant in structures lower in the tract causing multifocal tumors
- Transitional epithelium: preferred term is now urothelial/transitional cells
- Expandable (stretchable) epithelium with layered appearance- Bladder

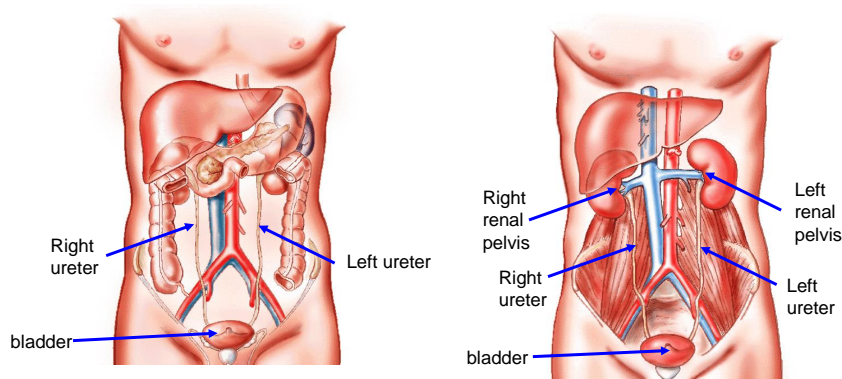
Kidney parenchyma (body)- glandular

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Anatomy

Bladder, Renal Pelvis, Ureters



Organs from front

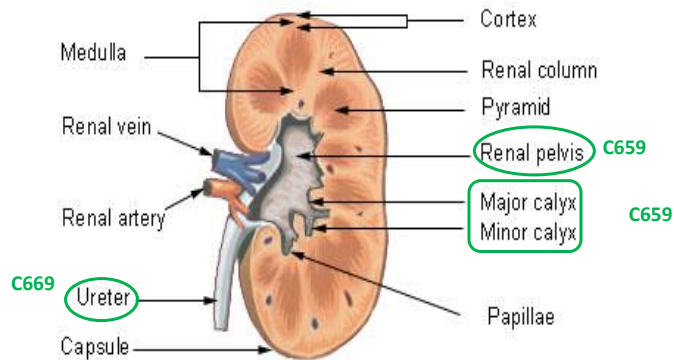
Organs from front
with anterior organs
removed

6

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Upper Urinary Tract

Frontal section through the Kidney

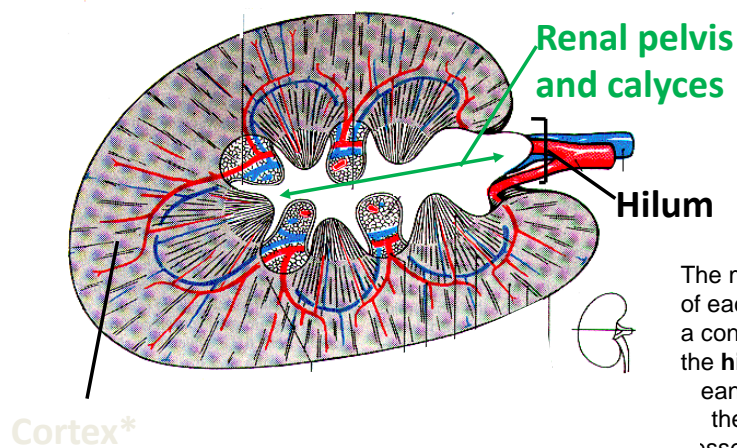


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Cross Section at Hilum

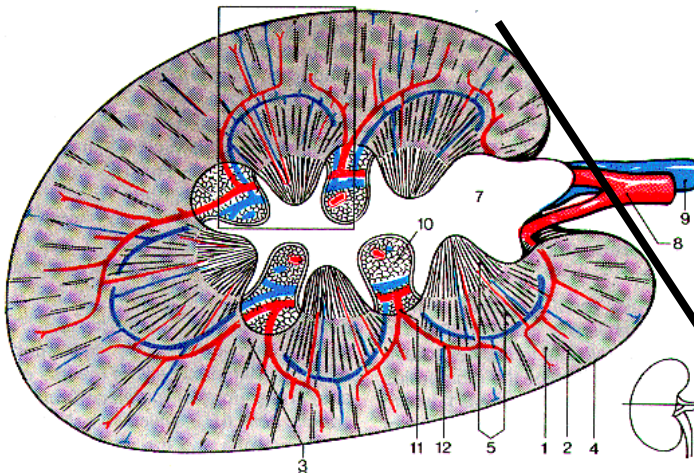


The medial (inner) side of each kidney presents a concave notch called the **hilum**, (or hilus) means "depression" and is the place where the blood vessels enter the organ.

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Renal Sinus



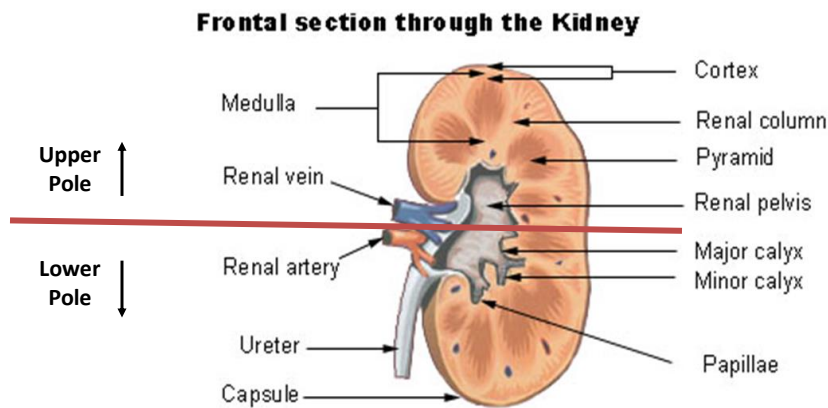
Renal Sinus: space outside the kidney and renal pelvis, but within a line drawn from the medial edge of the upper pole to the medial edge of the lower pole.

While the pelvis falls within this region, the term refers to the fatty tissue only, not to the collecting system structures.

9

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Kidney Parenchyma

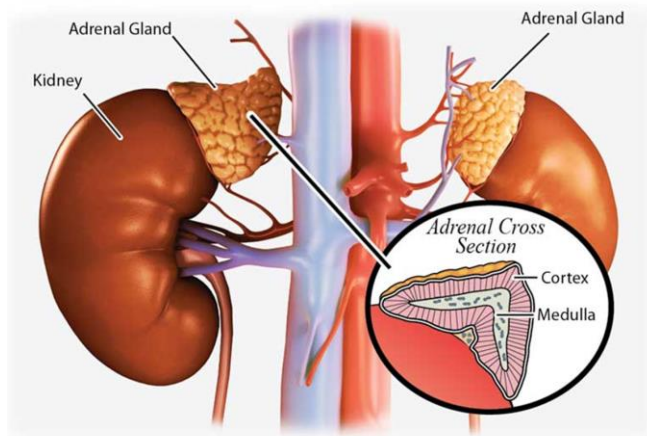


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Adrenal Glands

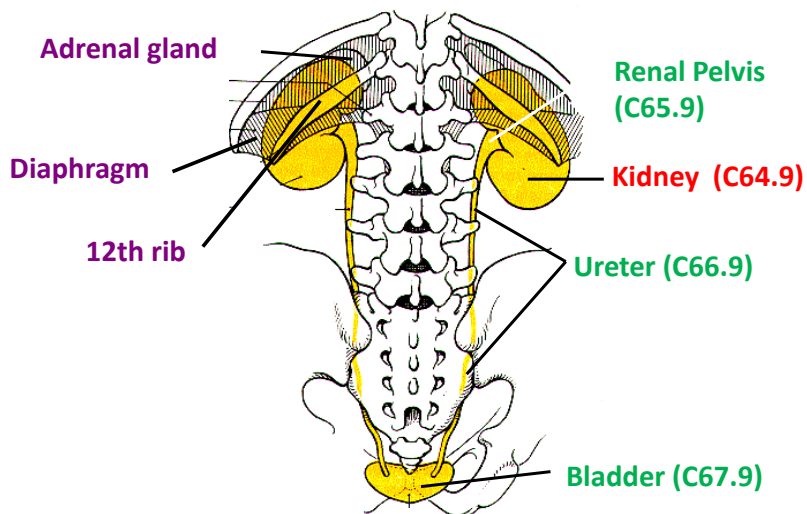


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Renal Pelvis, Ureters, Bladder



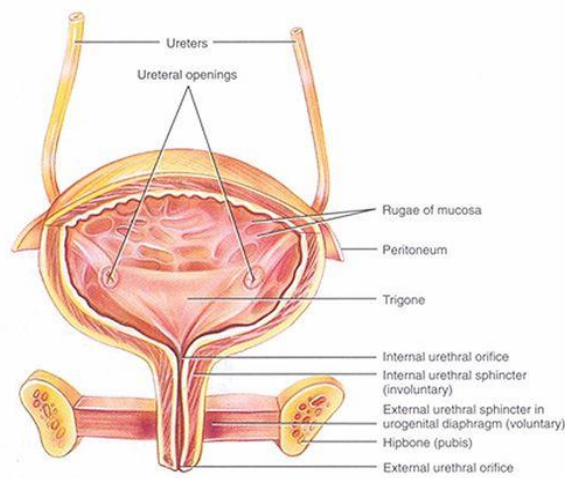
Source: Color Atlas and Textbook of Human Anatomy

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Bladder and Ureters

Lower
Urinary Tract
FEMALE



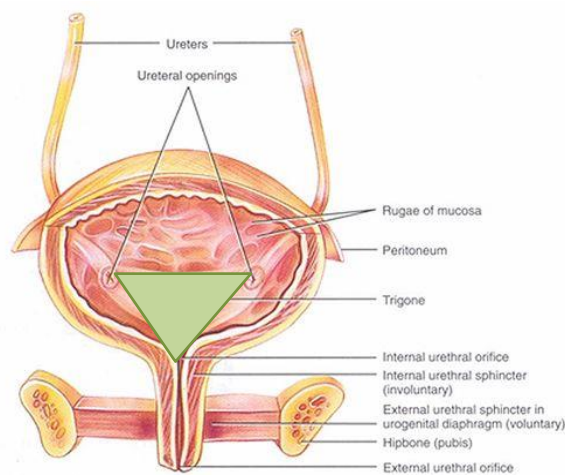
Source: www.jyi.org/volumes/volume6/issue7/images/shobab_bladder1.jpg.
Courtesy of Gerard J. Tortora (1999) Principles of Human Anatomy (eight edition) John Wiley & Sons Inc. , New York

13

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Bladder and Ureters

Lower
Urinary Tract
FEMALE



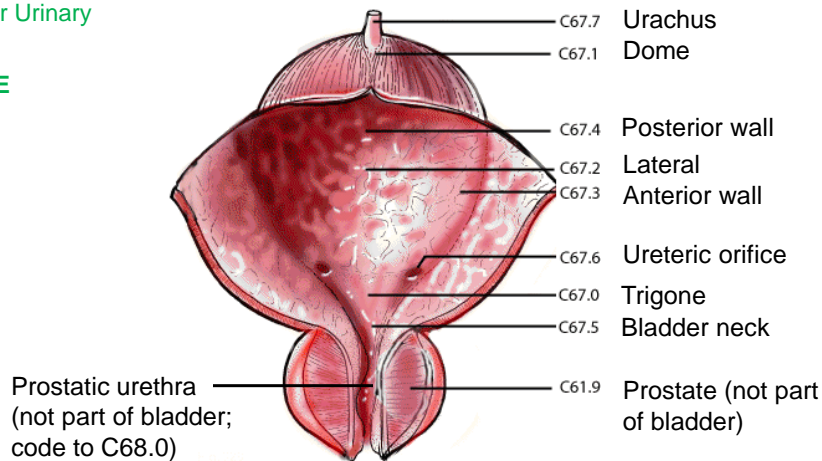
Source: www.jyi.org/volumes/volume6/issue7/images/shobab_bladder1.jpg.
Courtesy of Gerard J. Tortora (1999) Principles of Human Anatomy (eight edition) John Wiley & Sons Inc. , New York

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Bladder Anatomy with ICD-O-3 Codes

Lower Urinary
Tract
MALE

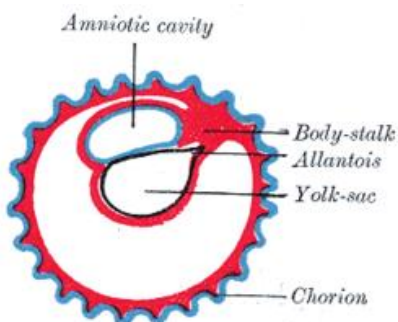


Source: UICC *TNM-interactive*, Wiley-Liss, 1998

15

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Bladder Trivia



- The **urachus** is an embryological canal connecting the [urinary bladder](#) of the fetus with the [allantois](#), a structure that contributes to the formation of the umbilical cord. The lumen (inside) of the urachus is normally obliterated during embryonic development, transforming the urachus into a solid cord, a **functionless remnant**. The urachus lies in the [space of Retzius](#), between the transversalis fascia anteriorly and the [peritoneum](#) posteriorly.

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Primary Site codes

• Table 1 in Solid Tumor Rules | Urinary Schema

Site Term and code	Synonyms
Bladder, anterior wall C673	-
Bladder, dome C671	Roof Vault Vertex
Bladder, lateral wall C672	Lateral to ureteral orifice Left wall Right wall Sidewall
Bladder neck C675	Internal urethral orifice Vesical neck
Bladder NOS C679	Lateral posterior wall (no hyphen)
Bladder, overlapping lesion C678	Fundus Lateral-posterior wall (hyphen)
Bladder, posterior wall C674	-

Site Term and code	Synonyms
Bladder, trigone C670	Base of bladder Below interureteric crest Below interureteric field Below interureteric ridge Floor of bladder
Bladder, urachus C677	Mid umbilical ligament Urachal remnant
Bladder, ureteric orifice C676	Just above ureteric orifice
Overlapping lesion of urinary organs C688	-
Paraurethral gland C681	-
Renal pelvis C659	Pelvis of kidney Pelviureteric junction Renal calyces Renal calyx
Ureter C669	-
Urethra C680	Cowper gland Prostatic utricle Urethral gland
Urinary system NOS C689	-

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Urinary Tract Histologies

Renal Pelvis, Ureter, Bladder and other Urinary

- **Urothelial carcinoma (transitional cell carcinoma, "TCC")**
 - 90% of all urinary tract cancers
 - Papillary urothelial carcinoma (papillary transitional cell carcinoma, "Pap TCC")
- **Squamous cell carcinoma**
 - 10% of renal pelvis tumors, 5% of bladder tumors
- **Adenocarcinoma**
 - Very rare in renal pelvis, ureters
 - < 1% of urinary tract tumors
 - Most likely a primary in kidney parenchyma with extension into renal pelvis or ureter

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Definitions

Papillary vs. Non-papillary urothelial (Flat Carcinoma)

Gross descriptions of tumor architecture or structure; not specific histologies

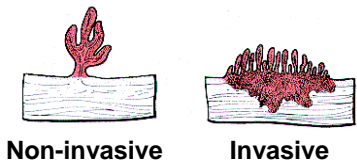
- Both apply to transitional cell/urothelial carcinoma

Papillary tumor

Warty growth projecting from the wall

On a stalk

- Non-invasive papillary urothelial ca (in situ)
- Invasive papillary urothelial ca



Non-papillary urothelial: (Flat tumor)

Originates within mucosa

Does not project from the wall

- Non-invasive CIS
- Invasive urothelial ca



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Grade Table 19

Grade 19

Grade ID 19-Clinical Grade Instructions

Schema ID#	Schema ID Name	AJCC ID	AJCC Chapter
00610	Kidney Renal Pelvis	61.1	Renal Pelvis and Ureter: Urothelial Carcinomas
00610	Kidney Renal Pelvis	61.2	Renal Pelvis and Ureter: Squamous Cell Carcinoma and Adenocarcinoma
00620	Bladder	62.1	Urinary Bladder: Urothelial Carcinomas
00620	Bladder	62.2	Urinary Bladder: Squamous Cell Carcinoma and Adenocarcinoma
00631	Urethra	63.1	Urothelial Male Penile Urethra and Female Urethra
00631	Urethra	63.2	Squamous Male Penile Urethra and Female Urethra
00633	Urethra-Prostatic	63.3	Prostatic Urethra: Urothelial Carcinomas
00633	Urethra-Prostatic	63.4	Prostatic Urethra: Squamous Cell Carcinoma and Adenocarcinoma

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Grade Table 19

Use these codes for adenoca and squamous cell carcinoma: 1, 2, 3, 9

Code	Grade Description
1	G1: Well Diff
2	G2: Mod Diff
3	G3: Poorly Diff, undiff, anaplastic

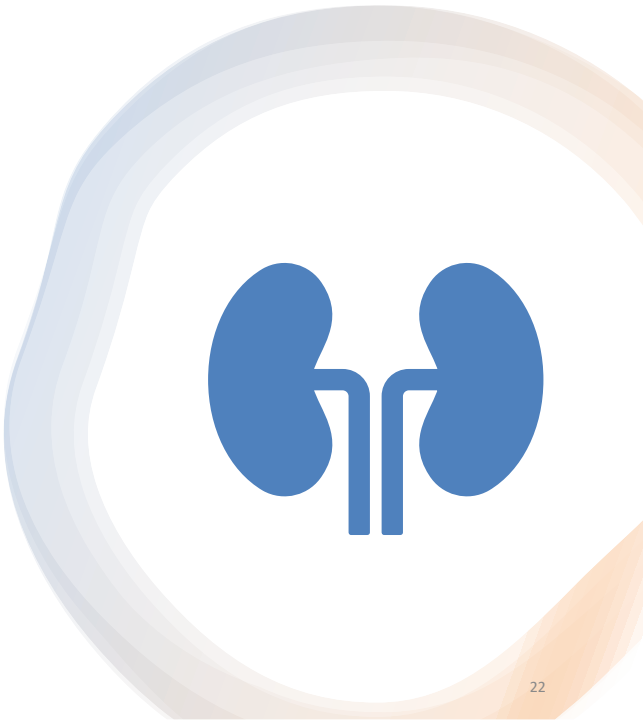
Use these codes for urothelial cancers, L, H, 9

L	LG: Low-grade
H	HG: High-grade
9	Grade cannot be assessed (GX); unknown

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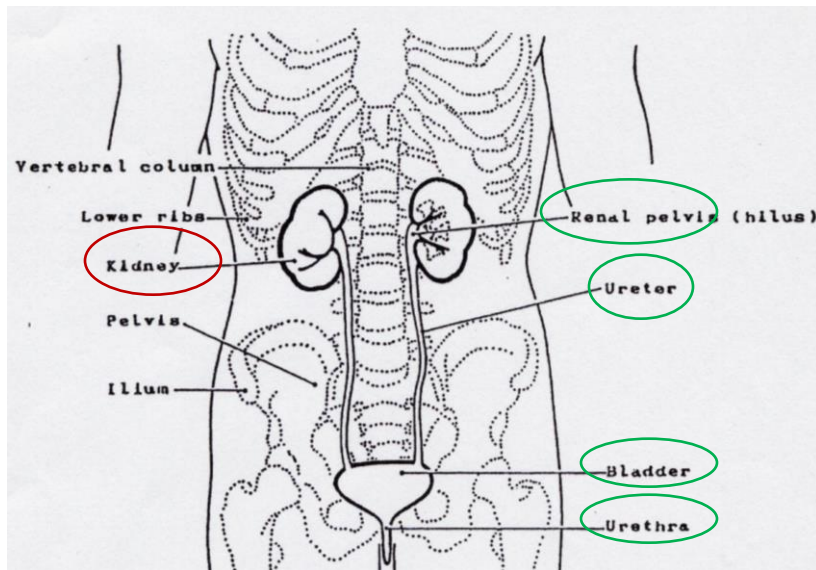
KIDNEY



22

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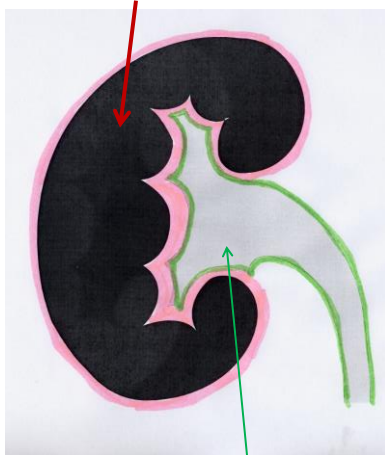
KIDNEY- parenchyma



23

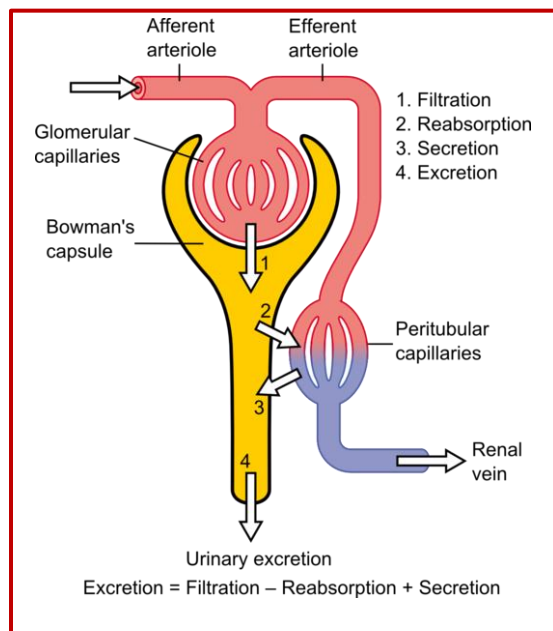
23

Kidney- parenchyma



Renal Pelvis

Filtration

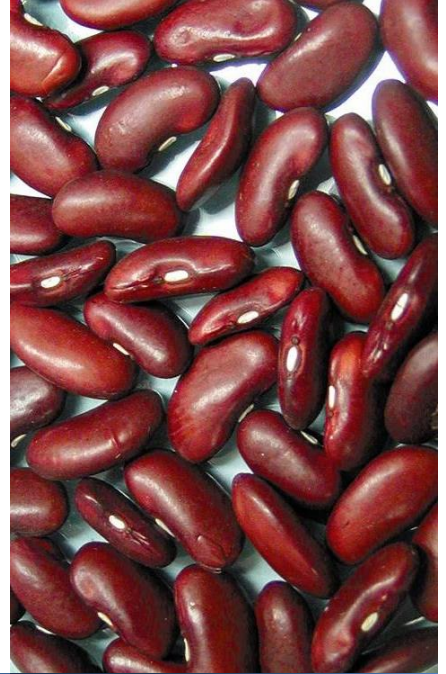


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Kidney Parenchyma

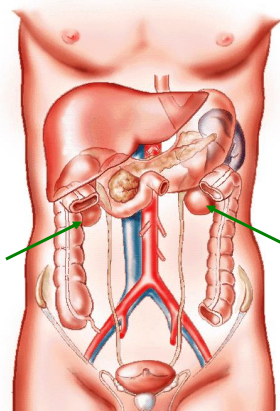
- Bilateral organs
- Bean shaped
- 4" long, 2" wide, 1.5" thick
- Weight: up to 10 ounces
- 3% of all adult cancers
- 85% are **Renal cell carcinoma (adenocarcinoma)** or subtype/variants of RCC
 - ccRCC 8310 most common s/v



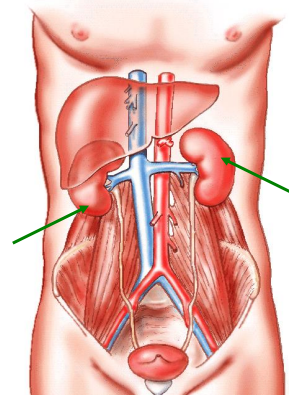
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Kidneys—Anterior View



Kidneys from front



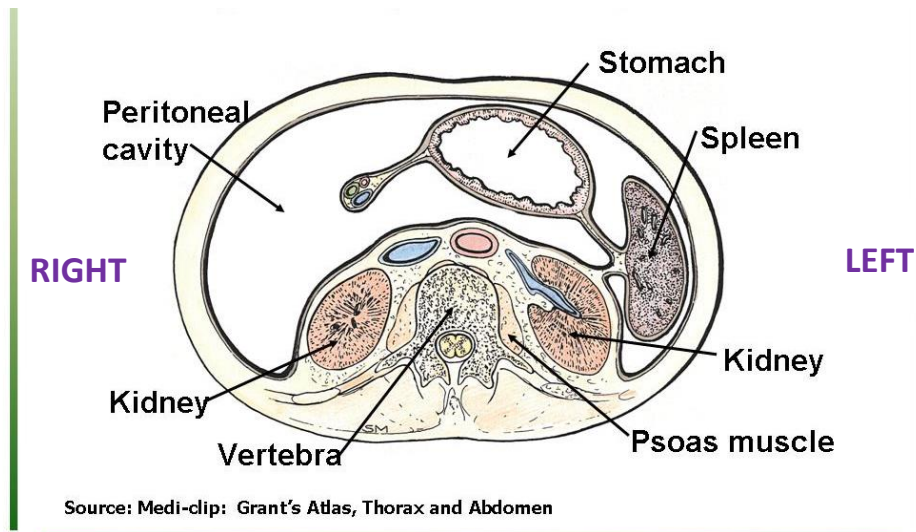
Kidneys from front
with anterior organs
removed

Source: Medi-clip: Grant's Atlas, Thorax and Abdomen

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Kidneys in Retro-peritoneum

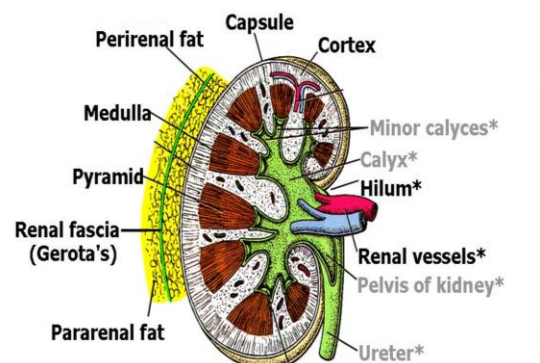


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Kidney Anatomy

- **Parenchyma**
 - Functional part of the kidney
 - Responsible for filtering blood and excreting waste in the form of urine
 - Includes the cortex and renal medulla:
 - (Renal) **Cortex** – where the filtering units begin
 - (Renal) **Medulla** – innermost part of kidney; urine formation and concentration; made up of renal pyramids
- **Capsule**
 - Tough fibrous layer surrounding the kidney
- **Gerota's Fascia**
 - Connective tissue (collagen) surrounding kidneys and adrenal glands



* not part of kidney parenchyma

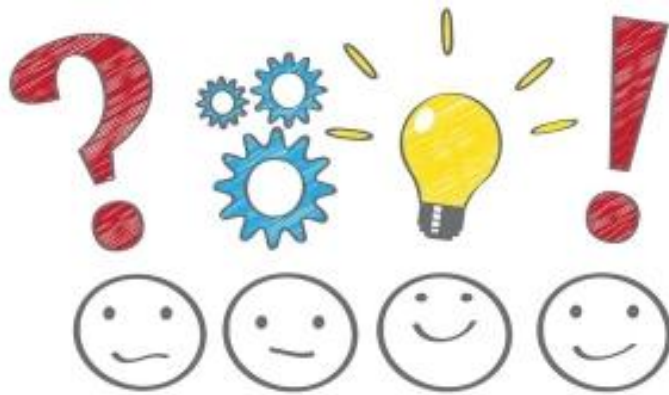
Source: Snell, Clinical Anatomy for Medical Students

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Questions?

melissa-riddle@uiowa.edu



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