1. Kidney
(for LS 1, LS 4, LS 5 and LS 9 only)

A. Marrow of the kidney, Medulla renis
B. Cortex of the kidney, Cortex renis
1. Renal vein, Vena renalis
2. Renal artery, Arteria renalis
3. Ureter
4. Pelvis of the kidney, Pelvis renalis
5. Calyces of the kidney, Calices renales
6. Renal papillae, Papillae renales
7. Renal pyramids, Pyramides renales
8. Collecting duct
9. Contort renal tubule II, Tubulus renalis contortus II
10. Loop of Henle
11. Contort renal tubule I, Tubulus renalis contortus I
12. Interlobular arteries, Aa. interlobulares
13. Interlobular veins, Vv. interlobulares
14. Afferent vessel, Vas afferens
15. Efferent vessel, Vas efferens
16. Arcuate arteries, Aa. arcuatae
16a Capillary network
17. Interlobular veins, Vv. interlobulares
18. Arcuate veins, Vv. arcuatae
19. Papillary ducts, Ductus papillares
20. Suprarenal gland, Glandula suprarenalis (for LS 1 only)

* not concerning LS 5 as the finer construction of the kidney is represented on the models LS 1, LS 4 and LS 9 only.

The kidney is a composite tubulous gland. It serves for the excretion of useless substances.

Structure:
At the surface it has a tough capsule which can be removed easily. Underneath it the cortex of the kidney, Cortex renis (B), is situated; it contains the urine forming organs. Next to the cortex is the marrow of the kidney, Medulla renis (A); it contains the urine secreting organs.

Blood-Vessels:
The renal artery, Arteria renalis (2), gives off main branches, which enter into the renal substance at the side of the renal pyramids, Pyramides renales (7). At the border between medulla and cortex they divide into the arcuate arteries, Arteriae arcuatae (16); they run parallel to the surface and give off the interlobular arteries, Arteriae interlobulares (13). Out of these arise fine short lateral branches, the afferent vessels (14); they dissolve into a vascular bundle, Glomerulus, however, become fused again and form the efferent vessels (15).

The efferent vessels flow over a capillary network (16a) into the interlobular veins, Venae interlobulares (17); the latter are branches of the arcuate veins, Venae arcuatae (18). The Venae arcuatae are main branches of the renal vein, Vena renalis (1).

The Urinary Tract:
The urine forming organs of the kidney are the corpuscles of the kidney (Corpuscula renis [12]). A corpuscle of the kidney consists of:

a) a vascular bundle, Glomerulus,
b) the glomerular capsule (Bowman's capsule = Capsula glomeruli).

It is a globular, sack-shaped intussusception of the end part of the uriniferous tubule, which encompasses the vascular bundle. The glomerular capsule consists of two parts: the inner layer, which rests on the glomerulus, and the outer layer, which forms a smooth hollow sphere. These two layers are separated from one another up to the neck of the glomerular capsule by a narrow space.

The uriniferous tubes are the urine secreting organs of the kidney. A uriniferous tube consists of the following sections:

1. Convoluted tubule (11)
2. Loop of Henle (10)
3. Collecting duct (8).

Numerous junctional tubules flow together into the collecting duct, which forms together with other collecting ducts great collecting ducts (or: papillary ducts, Ductus papillares (19), in the inner zone of the medulla. At the apex of the papilla they flow into the calyces of the kidney, Calices renales (5). They unite in the pelvis of the kidney, Pelvis renalis (4), from where the ureter (3) emerges.

The Function:
The urinary organs have the task to excrete the urine, that is the liquid and soluble excreta (excretions), from the blood and to push it out of the body. The blood, which flows through the vascular bundles, carries the metabolic products of the different organs of the body. The products, the nitrogenous substances in particular, diffuse through the inner layer of the glomerular capsule into the uriniferous tube. The in-
ner layer thus serves as a filter; in normal conditions it is impermeable to protein or sugar. The metabolic products are transformed by the parietal cells of the uriniferous tube into the final form of the urine. The urine is accumulated in the collecting ducts and in the renal calyces. From the renal pelvis it flows into the ureter, which, due to its smooth muscular structure, contracts downwards continuously and rhythmically spurting each time some drops of urine into the bladder, which becomes gradually filled in by this process.

If too little urine is excreted, as a result of a kidney disease, uraemia will arise.

2. Nephron
(for LS 6 and LS 9 only)
1. Corpuscle of the kidney with
Glomerulus and Bowman’s capsule
2. Main section
   a) Pars convoluta, Tubulis renalis
      contortus I
   b) Pars recta, descending limb (thick portion) of Henle’s loop
3. Section of transition: thin portion
   of Henle’s loop
4. Central section
   c) Pars recta, ascending limb (thick portion) of Henle’s loop
   d) Pars convoluta, Tubulis renalis
      contortus II, (convoluted tubule)
5. Connecting section and
6. Collecting tube are part of the
efferent urinary tract
7. Arcuate artery and vein, Arteria et
   Vena arcuata
8. Interlobular artery and vein, Arteria
   et Vena interlobularis
9. Afferent vessel, Vas afferens
10. Efferent vessel, Vas effereous
11. Capillary network

3. Kidney Corpuscle
(for LS 7 and LS 9 only)
We distinguish the Glomerulus (1) and the
Bowman’s capsule, Capsula glomeruli (2).
The corpuscle as a whole is globular. Its
transition into the renal tubules is fre-
quently narrower than the remaining con-
voluted section, and is, therefore, called
cervical portion, Collum (3). One distin-
guishes between a vascular pole (5) and
urinary pole (4). At the urinary pole the ur-
ine leaves the Bowman’s capsule through
the cervical portion of the renal tubule. At
the vascular pole the Glomerulus is joined to
the capsule; here the vessels enter and go
out. The afferent (entering) vessel, Vas af-
ferens (6), as well as the efferent (outgoing)
vessel, Vas effereous (7), are arteries and, the-
therefore, they are called Arteriola afferens
and Arteriola effereens. The urinary pole lies
usually exactly opposite to the vascular
pole. The Glomerulus is interposed between
the Arteriola afferens and the Arteriola effere-
ens as an arterial network. Its loops are capil-
laries in their structure. The Arteriola effere-
ens merges into the capillary network of the
cortex. The Arteriola afferens separates into
a quite great number of branches, forming
independent loops. Later they unite to the
Vas effereens. The individual entangled
loops (8) are separated from each other,
thus the Glomerulus shows deep indenta-
tions and has the appearance of being lobu-
lated. The entire surface of the loops is cov-
ered with epicytes. These epicytes (9)
constitute together the inner lamella of the
Bowman’s capsule. At the vascular pole the
inner lamella merges in that of the outer
wall: outer lamella (10) of the Bowman’s
capsule. In addition to a single-layered pa-
vement epithelium the outer lamella con-
sts of a tender transparent membrane. To-
wards the urinary pole the pavement cells
become taller and taller and form thus a
gradual transition to the tall cylindrical
cells of the convoluted section of the at-
tached uriniferous tubule.

1. Glomerulus
2. Bowman’s capsule, Capsula glomeruli
3. Cervical portion, Collum
4. Urinary pole
5. Vascular pole
6. Afferent vessel, Vas afferens
7. Efferent vessel, Vas effereens
8. Vascular loops
9. Epicytes (inner lamella)
10. Outer lamella

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