

## Guide to post mortem macro description

### Organs:

Order to follow within organ descriptions:

1. size
2. surface
3. color
4. consistency
5. inner contents
6. special structure.

Order to follow in organ complexes (neck-, abdominal-, pelvic):

1. circulation
2. respiration
3. digestion
4. urinary tract
5. others (genital, endocrin..)

### Heart:

#### Normal:

The heart is 300-350 g (depending on the body weight). The pericardium is smooth, shiny, glistening. The pericardial fat tissue is of usual amount.

The description of the chambers follows the course of the blood flow.

Right side: The right atrium is normal in diameter, it is free, and the inner surface is smooth. The foramen ovale is closed. The auricle is free. The circumference of the tricuspid valve is normal (130 mm), the cusps are thin, membranous, freely movable, the chordae tendinae are thin, thread-like. The right ventricle is normal in diameter, the lumen is free, and the inner surface is smooth. The right ventricular myocardium is normal in thickness (3-5 mm). The circumference of the pulmonary valve is normal (80 mm), the cusps are thin, membranous, freely movable. The pulmonary trunk is normal in diameter, the lumen is free, and the inner surface is ivory.

Left side: The left atrium is normal in diameter, it is free, and the inner surface is smooth. The auricle is free. The diameter of the bicuspid valve is normal (105 mm), the cusps are thin, membranous, freely movable, the chordae tendinae are thin, thread-like. The papillary muscles are cylindrical. The left ventricle is normal in diameter, the lumen is free, and the inner surface is smooth. The left ventricular myocardium is normal in thickness (10-14 mm). The circumference of the aortic valve is normal (65 mm), the cusps are thin, membranous, and freely movable. The aorta is normal in diameter, the lumen is free, and the inner surface is ivory. The diameter of the circumflex=CX / anterior descending=LAD / right coronary=RCA is normal, the lumen is free. The inner surface is ivory. The cut surface of the myocardium is reddish-brown, the consistency is rubbery, and the muscle structure is preserved.

#### Common alterations:

*Adipose infiltration:* the pericardial fat is increased in amount, penetrates deeply between the muscle strands. (Usually seen in the anterior wall of the right ventricle.)

*Hypoxic parenchymal degeneration:* the muscle is light brown, muscle structure is indistinct, and the consistency is flaccid.

*Atherosclerosis* (aorta, coronaries): there are numerous...mm sized (confluent) yellowish/ butter yellow, firm/calcified/ulcerated plaques (with thrombosis on/hemorrhage in the plaques) on the inner surface. (These cause a ..% narrowing of the lumen.)

*Myocardial infarction* (acute, more than 24 hrs old): on the cut surface of the ...(area: anterior wall, etc.) of the myocardium there is a ... cm sized mainly subendocardial /transmural asymmetrical /map like, clay-yellow/reddish area with hemorrhagic edges.

Optional: There is a grayish easily removable material on the pericardium of this area (acute fibrinous pericarditis)

There is a ...sized thrombus on the endocardium of this area (mural thrombosis-rare).

*Myocardial infarction* (old): on the cut surface of the..area of the myocardium there is a .. cm sized whitish scar tissue. (

Optional: The lumen is dilated, the wall is thin (aneurysm)

*Acute endocarditis*: Infective: large, smooth, grayish-yellowish thrombi on the valves (=vegetation). Valve destruction is common. Non infective: small, grayish thrombi on the edge of the valves (=sterile vegetation). No valve destruction.

*Chronic endocarditis (rheumatic)*: the....valves are thickened, destruated, calcified, not movable, the valve is stenotic.

## **Lung :**

### **Normal:**

The right and left lung together is 700 g. The pleura is smooth, shiny and glistening. The cut surface is reddish, the consistency is elastic, and the air bubbles can be felt. Pressing the cut surface results in a small amount of deep red bubbly/frothy fluid. The arteries are normal in diameter, the lumen is free. The inner surface is ivory. The bronchi are normal in diameter (which means, the lumen of a single bronchus is detectable not more than the 2/3 of the hilus-pleura distance), the lumen is free, and the mucosa is grayish-white/pale.

### **Common alterations:**

*Atelectasis*: the ... area(s) of the lung is/are collapsed, the consistency is muscle-like.

*Edema*: the lungs are heavy, the consistency is firm elastic, large amount of bubbly/frothy fluid can be pressed out of the cut surface.

*Emphysema*: the parenchyma is light red, the consistency is soft.

Optional: There are ... number, ...cm sized air filled bullae in the periphery of the lobe (bullous emphysema).

*Lung infarct*: There is a wedge-shaped, subpleural... cm sized firm, deep red area on the cut surface. There is a grayish white, easily removable layer on the pleural side of the infarction.

*Lobar pneumonia*: the ... lobe is homogenously grayish-red; the consistency is like that of the liver. The parenchyma is friable/fragile.

*Bronchopneumonia*: the ... area of the lung is deep red with yellowish foci(=pus), the parenchyma is friable/fragile. Pus can be pressed out of this cut surface.

*Lung abscess*: there is a ... cm roundish cavity in the parenchyma partly filled with thick, yellowish pus.

*Primary lung tumor Central*: there is an asymmetrically infiltrating, grayish-white, firm tissue mass in connection with one of the main bronchi.

Peripheral: there is an asymmetrically infiltrating, grayish-white, firm foreign tissue in the periphery of the lung. Generally there is no visible connection with any bronchi. The pleural surface is retracted .

*Metastatic lung tumor*: there are multiple ... to ... cm roundish grayish-white foreign tissue nodules in the parenchyma.

*Acute purulent bronchitis*: the mucosa is bright red, the lumen contains a large amount of mucinous-purulent secretion.

*Bronchiectasis*: the lumen is dilated, the bronchi can be dissected up until the pleura.

*Pulmonarsclerosis*: on the inner surface of the arteries there are ... number, ... mm sized yellowish plaques.

*Pulmonary embolism*: the lumen of the primary/secondary/tertiary artery is occluded by a grayish-redish embolus, with rubbery consistency and dull surface.

## **Spleen:**

### **Normal:**

The spleen is 150 g. The surface is smooth, shiny and glistening. The capsule is thin, it can be wrinkled. The cut surface is deep red, the consistency is normal, there is no /minimal amount of scrape-off.

### **Common alterations:**

*Hyaline spleen (chronic perisplenitis)*: thick, confluent plaques thicken the capsule.

*Acute congestion*: Slightly enlarged, capsule is tight, not wrinkleable, moderate scrape-off.

*Chronic congestion*: The spleen is enlarged, parenchyma is firm, fibrotic, no scrape-off.

*Uremia, brain hemorrhage, and autolysis*: the size of the spleen is normal, the parenchyma is soft, and there is a large amount of scrape-off.

*Sepsis*: the spleen is enlarged, the parenchyma is soft, and there is a large amount of scrape-off.

*Lymphoma/leukemia infiltration*: the spleen is greatly enlarged. Optional: There are multiple 0,5-1 mm, white nodules diffusely in the parenchyma.

## **Kidney:**

### **Normal:**

The kidneys are normal in size (300 g together). The fibrous capsule is easily removed, the surface is smooth / bears signs of fetal lobulation. The cut surface is reddish-brown, the border between the cortex and medulla is sharp. The cortex is normal in thickness (5-10 mm), the medulla is preserved. The calyces and the pyelon is free, normal in diameter, the mucosa is pale. The ureters are free, normal in diameter, the mucosa is pale.

### **Common alterations:**

*Congestion*: on the surface the stellate veins are visible, the parenchyma is deep red.

*Kidney stone*: there are ... number... cm coral-shaped stones filling the calyces. At that area the mucosa is thickened and porcelain white/bright red.

*Anemic infarction*: Acute: on the cut surface there is a wedge shaped clay-yellow area with deep red/hemorrhagic border. Old: there are one/few/multiple deep, stellar shaped indentations on the surface, the parenchyma is thin, replaced by scar tissue.

*Nephrosclerosis* (consequence of either chronic vascular or glomerular disorder): surface is granulated, few small/ 1-2 mm thin walled cysts filled with yellowish, clear fluid, cortex is uneven in thickness, generally thin.

*Acute pyelonephritis*: The parenchyma is deep red, the cortex-medulla border is undefined, there are multiple small yellowish patches (=microabscesses).

*Chronic pyelonephritis*: There are numerous flat, roundish / asymmetrical indentations on the surface, in the corresponding calyx the mucosa is thickened, porcelain white, the parenchyma is thin, replaced by scar tissue.

*Shock kidney*: The surface is pale, the cortex is pale (widened), and the medulla is deep red.

*Primary tumor* (clear cell carcinoma): There is a ... cm large, round, well circumscribed, yellowish tissue with necrotic / hemorrhagic areas.

## **Brain:**

### **Normal:**

The brain is 1200-1250 g. The meninges are translucent, the gyri and the sulci are normal. The brain arteries have membranous wall, their lumen is free. On cut surface the cortex is normal in thickness (5 mm), the brain tissue is soft, the structure is preserved. The hemispheres are symmetrical. The ventricles are normal in diameter, filled with water-clear cerebrospinal fluid.

### **Common alterations:**

*Brain edema*: the meninges are edematous, hyperemic, the gyri are flattened, wide, the sulci are narrow and shallow. The blood spots dissipate. The tissue has a soft consistency. There is a significant impression on the cerebellar tonsillae (=cerebellar herniation).

*Emolition /infarct*: Acute: there is a ... cm irregular area, where the tissue is semi-fluid/ very soft. The hemispheres are asymmetrical. There is hemorrhage on the edge of the lesion. Old: there is a ... cm roundish, cystic cavity, filled with soft, yellowish mass/transparent fluid in the... area.

*Brain hemorrhage*: Parenchymatous: there is a ... cm roundish area in the central region that is filled with coagulated blood. (The blood continues in the ventricles.)

Subarachnoidal: there is superficial bleeding on the basal area of the cerebellum-pons-cerebrum, covered by pia mater. Epidural: there is .... cm hematoma between the skull and the dura mater. Subdural: there is .... cm hematoma between the dura mater and the pia mater.

*Primary brain tumor*: there is a ...large poorly circumscribed soft grayish-yellowish mass in the white substance of the cerebrum. The hemispheres are asymmetrical.

*Metastatic brain tumor*: there are multiple well circumscribed nodules in the cerebrum/cerebellum.

*Meningioma (benign tumor of the meninges)*: there is a ... cm firm, grayish-white nodule in connection with the meninges/dura in the ... region, which causes an impression in the underlying brain tissue. On cut surface it is made up of whorly strands of grayish-white tissue.

## **Intestines:**

### **Normal:**

The small intestines are normal in diameter, there is normal intestinal content in the lumen. The wall is normal in thickness, the rugae are preserved, and the mucosa is pale. The serosa is smooth, shiny and glistening.

The large intestines are normal in diameter, the lumen contains lumps of faeces. The rugae are preserved, the mucosa is pale. The serosa is smooth, shiny and glistening. The appendix is ... cm long, the structure is preserved.

### **Common alterations:**

*Meckel diverticulum:* there is a ... cm pouch in the ileum, covered by shiny serosa

*Diverticulosis:* there are multiple small mucosal pouches containing impacted faeces in the (sigmoid) colon.

*Acute appendicitis:* the serosa of the appendix is hyperemic/bright red. (There is a perforation on the appendix; an easily removable, thin grayish layer/pus/coagulated blood covers the serosa.

*Sessile polyp:* there is a ... cm roundish (villous), grayish-brown outgrowth of the mucosa.

*Pedunculated polyp:* there is a ... cm round outgrowth of the mucosa, that has a ... mm stem/stalk.

*Ulcerative colitis:* (The lumen is dilated.) the mucosa has large, shallow, ulcerated areas. There are polypoid mucosal outgrowths on the edges of the ulcers (pseudo polyps).

*Crohn's disease:* the lumen is narrow, the wall is thickened, fibrotic. The mucosa is hyperemic, deep longitudinal fissures result in a cobblestone appearance. (There are fistulas connecting to intraabdominal abscesses and / or other intestinal loops.)

*Colorectal carcinoma:* on the mucosa there is an exulcerated/polypoid (cauliflower-like)... cm long segment that has raised edges, that cause no / partial/ complete obstruction of the lumen. On the cut surface there is a grayish-white tissue infiltrating the wall of the bowel, it involves / does not involve the serosal and the perirectal / pericolic fat tissue.

## Organ complexes:

**Neck complex:** (aorta and branches, larynx, trachea, esophagus, thyroid gland)

### Normal:

The aorta is normal in diameter, the lumen is free, and the inner surface is ivory. The carotids are normal in diameter, the lumens are free, and the inner surfaces are ivory. The bifurcation is free.

The larynx is normal in diameter, the lumen is free. The vocal cords are normal. The trachea is free, normal in diameter, the mucosa is pale.

The esophagus is normal in diameter, the lumen is free, the mucosa is pale.

The thyroid is normal in size (~20 g, not weighed routinely), the cut surface is reddish-brown, glandular, has a colloid shine. The parathyroids are not visible.

### Common alterations:

#### Aorta:

*Atherosclerosis:* see above.

#### Larynx:

*Inflammation* (laringitis/tracheitis): the mucosa is red. Optional: fibrinous/purulent exudation.

*Intubation decubitus:* there are... number deep ulcers penetrating to the level of/destroying the cartilage. The surrounding mucosa is hyperemic.

*Larynx primary tumor:* Papilloma: there is one/multiple papillary ... cm growth on the mucosal surface. Carcinoma: there is a ... cm exulcerated area with raised edges in the area of (vocal cords, etc.) on the right/left side. On cut surface firm, grayish-white tissue infiltrates the wall, involving/ not involving the cartilage underneath.

#### Esophagus:

*Varicosity:* at the lower third of the esophagus, dilated, tortuous veins are visible through the mucosa. Optional: One of the veins has ruptured, this area is covered with blood clots.

*GERD (gastro-esophageal reflux disease):* there are confluent reddish patches on the mucosa in the lower third of the esophagus.

#### Thyroid:

*Diffuse goiter:* both lobes are enlarged.

*Nodular goiter:* the lobes are enlarged, consist of nodules of various size, separated by strands of grayish-white connective tissue. The nodules have a colloid shine, some have calcified/fibrotic/hemorrhagic areas, and some are cystic (=colloid cyst).

*Adenoma:* solitary, encapsulated nodule.

*Carcinoma (papillary):* poorly circumscribed-infiltrative, very hard, gray mass.

Optional: small foci of calcification.

**Liver complex:**

(aorta, vena cava inferior, stomach, duodenum, bile ducts, gallbladder, pancreas, adrenals, liver)

**Normal:**

The aorta is normal in diameter, the lumen is free, and the inner surface is ivory. The orifices of the larger branches are free.

The inferior vena cava is normal in diameter, the lumen is free, and the inner surface is pearly. The hepatic veins are free.

Both adrenals are normal in size (combined ~10 g, not weighed routinely), have 1-2 mm thick sulfur yellow-brownish cortex and a gray medulla.

The stomach is normal in diameter, the wall is normal in thickness, the lumen contains small amount of partly digested food. The rugae are preserved, the mucosa is pale. The pylorus is normal in diameter.

The duodenum is normal in diameter, the lumen is free, the mucosa is bile colored.

The bile ducts are normal in diameter, the lumen is free, the mucosa is yellowish green. The gallbladder is normal in diameter, contains bile. The mucosa is velvety, bile colored.

The pancreas is normal in size, reddish gray, glandular.

The liver is 1500 g; the surface is smooth, shiny, glistening. The edge is sharp. The cut surface is reddish-brown, lobular.

**Common alterations:****Aorta:**

*Atherosclerosis:* see above.

*Atherosclerotic aneurysm:* the lumen of the aorta is dilated (generally between the level of the a. renalis and the bifurcation), Saccular: the dilatation is spherical in shape and involve only a portion of the vessel wall. Fusiform: the dilatation affect the total circumference. Optional: the layers of the wall are separated, coagulated blood fills the space between them (dissected aneurysm).

*Leriche-syndrome:* below the levels of the renal arteries multiple ulcerated plaques cover the surface. There is thrombus formation on the plaques, which completely occludes/severely narrows the lumen of (the aorta) both iliacs.

*Mural thrombosis (generally associated with aneurysm):* there is a layered/... cm large thrombus attached to the inner surface.

*Budd-Chiari syndrome:* the lumens of the hepatic veins are occluded by thrombi.

**Adrenal glands:**

*Cortical hyperplasia:* the cortex of the adrenals is nodular/uniformly thickened.

*Adenoma:* in the ... adrenal there is a ... cm, round, sulfur yellow nodule, that is in connection with the cortex.

*Phaeochromocytoma:* there is a ... cm, soft, grayish brown tumor in connection with the medulla.

*Metastasis:* necrotic, firm, grayish tumor mass, often destructs the whole gland.

**Stomach:**

*Erosion:* on the mucosa there are multiple, small, shallow cavities, the base are covered by partly digested (coffee-like) blood.

*Peptic ulcer:* Acute: there is a ... cm big, roundish, deep cavity (generally in the antrum-pylorus region). The base of the ulcer is covered by digested blood (coffee-like). Chronic: the base of the ulcer is lined by mucosa, the wall is fibrotic.

*Carcinoma: Intestinal type:* on the mucosa there is a ... cm asymmetrical ulcerated area with raised edges / asymmetrical polypoid outgrowth into the lumen. *Diffuse type:* the wall is firm, thickened (=linitis plastica). On cut surface there is a grayish white tissue involving the whole thickness of the wall. Sometimes no visible ulcer is present.

**Biliary tract:**

*Cholelithiasis:* there is a ... mm mixed / cholesterol/ pigment stone causing total / partial obstruction of the lumen. The duct proximal to the obstruction is dilated.

*Cholecystolithiasis:* there is a ... mm mixed / cholesterol/ pigment stone in the lumen.

*Cholesterosis:* there is a golden yellow, filamentous pattern on the mucosa.

*Carcinoma:* the wall of the gallbladder is thickened by grayish white tissue, which extends continually to the liver.

**Pancreas:**

*Acute pancreatitis:* the pancreas is swollen, has many foci of chalk white material (fat necrosis).

*Acute hemorrhagic pancreatitis:* the pancreas is swollen, has many foci of chalk white material (fat necrosis), there are many confluent foci of hemorrhage in the parenchyma.

*Chronic pancreatitis:* the pancreas is smaller, the consistency is firm, yellowish gray. Optional: pseudocyst: in the pancreas there are ... cm round cavity filled with yellowish fluid / necrotic material.

*Carcinoma:* there is a poorly circumscribed/infiltrative, firm, grayish-white area in the head/body/tail of the pancreas.

**Liver:**

*Chronic congestion:* the liver is enlarged, the edges are rounded, and the cut surface has a nutmeg pattern.

*Fatty degeneration:* the liver is enlarged, the edges are rounded, the cut surface is soft, yellow.

*Cirrhosis:* the liver is small / enlarged, the surface is uneven. On the cut surface the whole parenchyma consists of 2-3 mm (=micronodular) or 1-2 cm (=macronodular) nodules. The consistency is firm, the cut surface is yellowish / greenish.

*Hepatocellular carcinoma* (generally in cirrhotic liver): there is a large/ there are many ... cm light brown / greenish, partly hemorrhagic nodule in the parenchyma. The edge is lobulated, the consistency is soft.

*Hepatic metastasis:* there are ... number ... cm, well-circumscribed, partly confluent, firm, grayish-white nodules (with necrotic center) in the parenchyma.



**Pelvis:**

(rectum, bladder, ureters, uterus, fallopian tubes, ovaries/prostate)

**Normal:**

The rectum is normal in diameter, the lumen contains feces. The mucosa is pale.

The bladder is normal in size, filled with clear, yellowish fluid, the mucosa is pale.

The ureters are normal in diameter, the lumens are free, and the mucosa is pale.

Female genital tract corresponds to age in size and development. The vagina is normal in diameter, the lumen is free, and the mucosa is grayish white. The uterus is normal in size, the surface of the exocervix is smooth, pale, the external orifice of the cervical canal is round/ fissure-like/ stellate shaped. The endometrium and myometrium are normal in thickness, the myometrium is rubbery. The fallopian tubes are thin; the ovaries are of normal size (3 x 2 x 1,5 cm). The cut surface is yellowish-white, corpora lutei or albicantes can be seen.

Male genital tract: The prostate is normal in size, the cut surface is yellowish-white, has a glandular structure, the consistency is muscle-like.

**Common alterations:****Rectum:**

*Polyp, carcinoma:* see above.

*Hemorrhoids:* dilated, polypoid veins, filled by thrombi.

**Urinary bladder:**

*Acute urocystitis:* the mucosa is reddish, the lumen contains murky, yellowish fluid. (catheter: there are multiple, circumscribed, 2-3 mm hemorrhages on the mucosa of the trigone / posterior wall.

*Carcinoma:* there is a ... cm sized papillary (partly necrotic, partly hemorrhagic) outgrowth from the mucosa.

**Uterus:**

*Carcinoma of the cervix:* there is a ... cm large polypoid / exophytic outgrowth on the cervix, the surface is exulcerated. The cut surface is grayish-white, the tumor invades the tissue of the portio.

*Uterine leiomyoma:* there is a submucosal/intramural/subserosal ... cm grayish-white, firm nodule in the uterus. The cut surface has a whorly appearance.

*Endometrial carcinoma:* the endometrium is thickened, there are polypoid projections in the lumen. On the cut surface grayish-white tissue invades the wall of the uterus.

**Fallopian tubes/ovaries:**

*Hydrosalpinx:* the lumen of the fallopian tube is dilated, filled with clear fluid.

*Pyosalpinx:* the lumen of the fallopian tube is dilated, filled with pus.

*Ovarian cyst:* there are ... number, ... cm large cavities with thin wall in the ovary, containing clear / yellowish / brownish fluid.

*Cystic tumor of the ovary:* there is/are ... number unilocular / multilocular cysts in the ... ovary/ both ovaries. (There are papillary projections in the lumen and/or on the outer surface of the cysty.) The cysts contain serous / mucinous fluid.

**Prostate:**

*Nodular hyperplasia:* the prostate is enlarged, on cut surface the parenchyma is made up of ... cm elastic nodules.

*Adenocarcinoma of the prostate:* the ... side of the prostate is asymmetrically enlarged. There is a poorly circumscribed, homogenous, firm, grayish-white tissue infiltrating the surrounding soft tissues.

