

## REGIONAL ANATOMY OF THE ABDOMEN

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### Borders of the abdomen



**Cranial border:**

**superficial:**

proc. xiphoideus – arcus costarum –  
pro. spinosus Th<sub>12</sub>

**deep:**

diaphragm

**Caudal border:**

**superficial:**

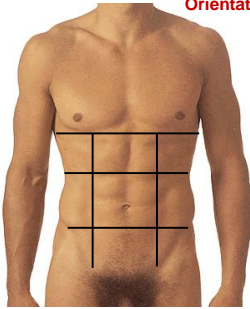
crista iliaca - spina iliaca ant. sup. - sulcus  
inguinalis

**deep:**

Pelvic inlet



### Orientation lines



**transverse:**

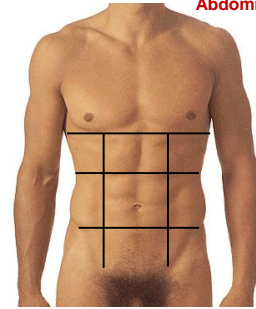
linea xifisternalis  
linea subcostalis  
linea bispinalis (spinae iliace ant.  
sup.)

**vertical:**

Lateral margine of m. rectus  
abdominis



### Abdominal regions



Transverse lines border:

**epigastrium**

between linea xifisternalis and linea subcostalis

**Mesogastrium**

between linea subcostalis and linea bispinalis

**hypogastrium**

below linea bispinalis

Vertical lines define:

**epigastrium**

reg. epigastrica, regiones hypochondriacae

**mesogastrium**

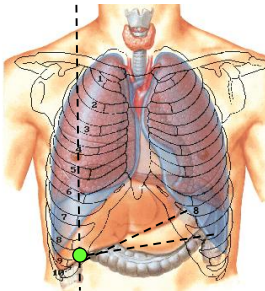
reg. umbilicalis, regiones laterales

**hypogastrium**

reg. pubica, regiones inguinales



### Projection of organs onto abdominal wall



**Gallbladder:**

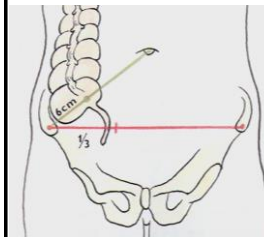
Murphy's point

**Stomach:**

Triangle of Labbé



### Projection of organs onto abdominal wall



Projection of the appendix:

Monro's line

MacBurney's point – 6 cm from spina iliaca ant. sup.

positio pelvina:

Point of Lanz



### Projection of organs onto abdominal wall

**Spleen:**  
axis alongside 10th rib  
posterior pole 4 cm from Th 10  
does not cross linea costoarticularis

**Papilla duodeni major:**  
right umbilicoaxillary line  
**Desjardin's point** – 6cm from navel

### Morphology of the abdominal wall

**Skin**  
**Subcutaneous tissue**  
panniculus adiposus  
**Fascia of Camper**  
vv. subcutaneae abd.  
v. thocacoepigastrica  
v. paraumbilicales (v. portae)  
a., v. circumflexa ilium spf.  
a., v. epigastrica spf.  
**Scarpa's fascia** (connected with fascia lata)  
**Fatty tissue**  
**Fascia abdominis spf.**  
**Abdominal muscles (ant. + lat. group)**

### Morphology of the abdominal wall

**Skin innervation:**  
nn. intercostales (rr. cutanei)  
n. subcostalis  
n. iliohypogastricus  
n. ilioinguinalis

**Muscles:**  
**Ventral group**  
m. rectus abdominis (nn. intercostales)  
m. pyramidalis (nn. intercostales)  
**Lateral group**  
m. obliquus ext. abd. (nn. intercostales)  
m. obliquus int. abd. (n. iliohypogastricus, n. ilioinguinalis)  
m. transversus abd. (n. iliohypogastricus, n. ilioinguinalis)

### Diaphragm – superior wall of the abdominal cavity

**origo:**  
pars sternalis: proc. xiphoideus, vagina m. recti abdominis  
pars costalis: apertura thoracis inf.  
pars lumbalis: crus mediale et laterale  
    crus mediale – lig. arcuatum medianum  
    (fig. longitudinale ant. L<sub>1</sub>-L<sub>4</sub> – hiatus aorticus)  
    crus laterale – lig. arcuatum mediale et laterale  
    (spine – proc. costarius L<sub>1</sub> – 12th rib)  
**trigonum sternocostale et lumbocostale**

**insertio:**  
centrum tendineum  
foramen venae cavae inf., hiatus oesophageus  
**f:** main respiratory muscle  
**i:** n. phrenicus

### Penetration of structures through the diaphragm

**trigonum sternocostale**  
a. + v. epigastrica sup. (a. thoracica int.)  
**hiatus aorticus**  
aorta  
ductus thoracicus  
**hiatus oesophageus**  
oesophagus  
plexus oesophageus (n. vagus dx. + sin.)  
**foramen v. cavae inf.**  
v. cava inf.  
**between lig. arcuatum medianum and mediale**  
v. azygos (dx.)  
v. hemiazygos (sin.)  
nn. splanchnici  
tr. sympathicus

**i:** n. phrenicus; **Supply:** a. phrenica sup. + inf., a. musculophrenica

### anterior abdominal wall – vagina m. recti abdominis

Created by aponeuroses of the abdominal muscles (lat. group)

**Upper 3/4**      **Lower 1/4**

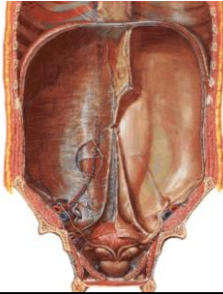
**Anteriorly:**  
aponeurosis of m. obliquus ext. abd.,  
ant. sheath of m. obliquus int. abd. aponeurosis

**Posteriorly:**  
posterior sheath of m. obliquus int. abd. aponeurosis  
aponeurosis of m. transversus abdominis  
fascia transversalis

**anteriorly:**  
aponeurosis of m. obliquus ext. abd.,  
aponeurosis of m. obliquus int. abd.  
aponeurosis of m. transversus abdominis

**Posteriorly:**  
fascia transversalis

### Anterior abdominal wall – deep layer

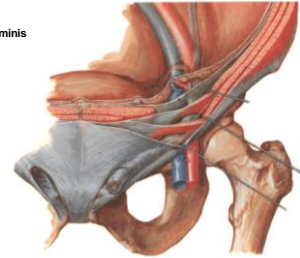


- Plica umbilicalis mediana** (peritoneal fold)  
lig. umbilicale medianum (obliterated urachus)
- Plicae umbilicales mediales** (peritoneal folds)  
lig. umbilicale mediale (obliterated aa. umbilicales)
- Plicae umbilicales laterales** (peritoneal folds)  
lig. interfoveolare  
vasa epigastrica inferiora
- Fossae supravesicales** (fossae paravesicales)  
(between plica umbilicalis mediana and med.)
- Fossa inguinalis med.**  
(between plica umbilicalis med. and lat.)
- Fossa inguinalis lat.**  
(laterally from plica umbilicalis lat.)

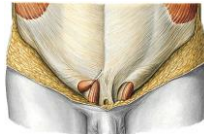
### Canalis inguinalis

Canal in lateral group of abdominal muscles (4 cm)

- Anterior wall:**  
aponeurosis of m. obliquus ext. abdominis
- Superior wall:**  
m. obliquus internus abdominis and m. transversus abdominis
- Inferior wall:**  
lig. inguinale
- Posterior wall:**  
fascia transversalis
- Content:**
  - ♀ lig. teres uteri
  - ♂ funiculus spermaticus
  - r. genitalis n. genitofemoralis – med.
  - n. ilioinguinalis – lat.



**Anterior wall: aponeurosis of musculus obliquus ext. abdominis**



- Anulus inguinalis superficialis**
- crus mediale
- crus laterale
- fibrae intercrurales

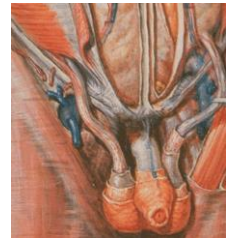
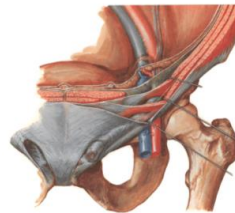
**Inferior wall: lig. inguinale**



- tuberculum pubicum – spina iliaca ant.sup.  
(margine of m. obliquus ext. abdominis)

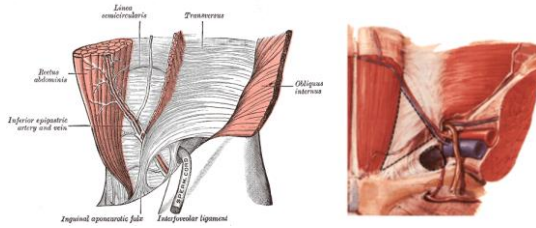
### Superior wall of canalis inguinalis:

margine of musculus obliquus int. abdominis and m. transversus abdominis



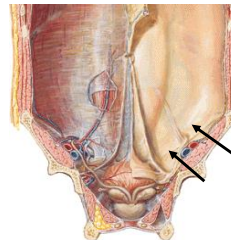
### Posterior wall of canalis inguinalis: fascia transversalis

- falx inguinalis
- lig. interfoveolare
- anulus inguinalis profundus



### Posterior wall of canalis inguinalis + peritoneum

- Fossa inguinalis medialis**  
(falx inguinalis – lig. interfoveolare)  
against anulus inguinalis spf.  
**DIRECT HERNIAE**
- Fossa inguinalis lateralis**  
(laterally from lig. interfoveolare)  
against anulus inguinalis prof.  
**INDIRECT HERNIAE**



**Cavitas peritonealis**

Peritoneum parietale et viscerale (mesenterium)

P – cavitas peritonealis (liquor peritonei)

A – spatium praeperitoneale

R – spatium retroperitoneale

S – spatium subperitoneale (infra-)

**Cavitas peritonealis**

mesocolon transversum - pars supramesocolica et inframesocolica

**Mesocolon transversum:**  
hilus renalis dx. – pars desc. duodeni – caput pancreatis – inferior margine of corpus et cauda pancreatis – hilus renalis sin.

**Pars supramesocolica cavitatis peritonealis**

**Borders:** superior – diaphragm; inferior – mesocolon transversum

**Content:**  
liver and gallbladder  
esophagus, stomach, pars sup. et pars desc. duodeni  
pancreas (except for inferior part of the head)  
lien

**Blood supply:**  
tr. coeliacus  
v. portae

**Innervation:**  
vegetative plexuses  
(plexus aorticus abd. – vagus, tr. sympaticus)

**Pars supramesocolica cavitatis peritonealis – bursa omentalis**

**Ventral wall:**  
omentum minus  
paries post. ventriculi  
lig. gastrocolicum

**Inferior wall:**  
colon and mesocolon trans.

**Superior wall:** hepar

**Posterior wall:**  
parietal peritoneum  
diaphragma

**Recessus:**  
superior (oesophageus)  
inferior (v omentum majus)  
sinister (lienalis)

**Foramen epiploicum:**  
lig. hepatoduodenale, plica hepatorenalis  
lobus quadratus, bulbus duodeni

**Pars supramesocolica cavitatis peritonealis – peritoneal folds of liver**

**Lig. falciforme hepatis**  
**Lig. teres hepatis**  
Lig. coronarium dx., sin.  
Lig. triangulare dx., sin.

**Omentum minus**  
Lig. hepatoduodenale  
Lig. hepatogastricum  
(Lig. hepatoesophageum)  
Plica hepatorenalis

**Pars supramesocolica cavitatis peritonealis – peritoneal folds of stomach**

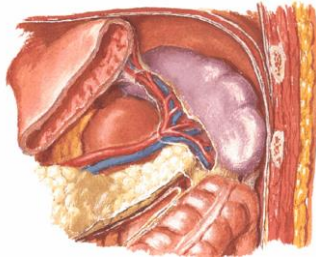
**Omentum minus**  
lig. hepatoduodenale  
lig. hepatogastricum  
lig. hepatoesophageum

**Omentum majus**  
lig. gastrocolicum  
**Lig. gastrolienale**  
(lig. gastrosplenicum)



**Pars supramesocolica cavitatis peritonealis – peritoneal folds of spleen**

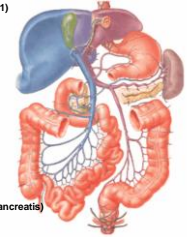
- Lig. gastrosplenale  
(gastrosplenicum)
- Lig. phrenicosplenale  
(phrenicosplenicum)
- Plica splenorenalis
- Plica pancreaticolienalis
- Lig. phrenicocolicum



**Pars supramesocolica cavitatis peritonealis – blood supply**

**TRUNCUS COELIACUS (T12-L1)**

- a. gastrica sin.
- a. hepatica communis
  - a. hepatica propria
  - a. gastroduodenalis
- a. lienalis
  - rr. pancreatici
  - a. gastroepiploica sin.
  - aa. gastricae breves
  - rr. lienales



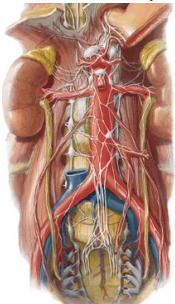
**VENA PORTAE (behind caput pancreatis)**

- v. mesenterica sup.
- v. lienalis (mesenterica inf., gastrica sin., gastrica dx.)



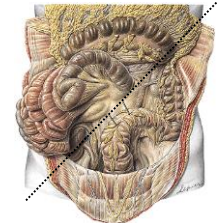
**Pars supramesocolica cavitatis peritonealis – innervation**

- Plexus aorticus abdominalis**
- Vegetative plexuses:**
  - parasympathicus – n. vagus
  - sympathicus – branches of truncus sympathicus (n. splanchnicus major et minor)
- Plexus coeliacus**  
(ggi coeliacum dx. sin.)
- Secondary plexuses around organs**
  - plexus gastrici
  - plexus lienalis
  - plexus hepaticus
  - plexus duodenalis
  - plexus pancreaticus



**Pars inframesocolica cavitatis peritonealis**

- Divided by radix mesenterii to **pars inframesocolica dextra et sinistra**
- Radix mesenterii:** flexura duodenojejunalis - art. sacroiliaca dx.



**Pars inframesocolica dextra cavitatis peritonealis**

**Content:**

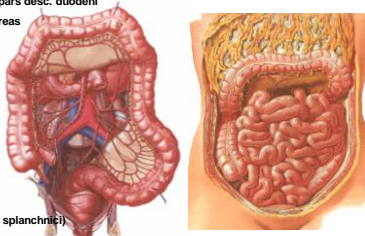
- duodenum from caudal part of pars desc. duodeni
- caudal part of the head of pancreas
- jejunum, ileum
- caecum + appendix
- colon ascendens
- colon transversum

**Blood supply:**

- a. mesenterica sup.
- v. mesenterica sup. (v. portae)

**Innervation:**

- plexus mesentericus sup.
- (n. vagus, tr. sympathicus – nn. splanchnici)



**Pars inframesocolica sinistra cavitatis peritonealis**

**Content:**

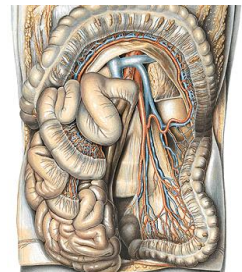
- colon descendens
- colon sigmoideum

**Blood supply:**

- a. mesenterica inf.
- v. portae

**Innervation:**

- plexus mesentericus inf.
- (sacral parasympathicus, tr. sympathicus)



### Spatium retroperitoneale

**Borders:**

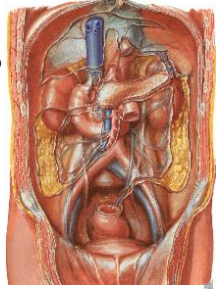
- cran. – diaphragma
- dors. – fascia transversalis  
(m. psoas major, m. quadratus lumborum, m. transversus abd.)
- ventr. – peritoneum parietale
- caud. – border of pelvis minor

**Primary retroperitoneal organs:**

- kidneys with their coverings, pelvis renalis, ureter
- gll. suprarenales
- aorta abdominalis, v. cava inf.

**Secondary retroperitoneal organs:**

- pancreas
- duodenum (except for pars sup.)
- caecum, colon asc., colon desc.



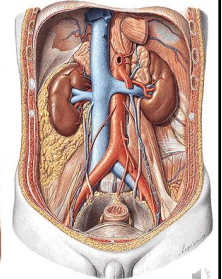
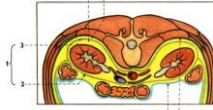
### Spatium retroperitoneale – kidneys

**Kidneys:**

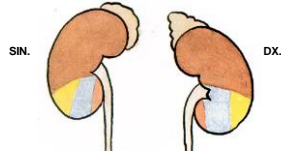
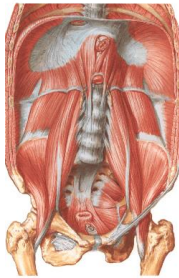
- between Th<sub>12</sub> to L<sub>2</sub> (right - ½ vertebra lower)
- suprarenal glands on the superior pole

**Kidney coverings:**

- Capsula adiposa
- Fascia renalis
- Lamina praerenalis
- Lamina retrorenalis



### Spatium retroperitoneale – kidney localization, dorsal side



- Diaphragm
- musculus transversus abd.
- musculus quadratus lumborum
- musculus psoas major

### Spatium retroperitoneale – kidney localization, ventral side

DX.



SIN.



- Facies: suprarenalis
- hepatica
- duodenalis
- colica
- jejunalis



- Facies: suprarenalis
- gastrica
- lienalis
- pancreatica
- colica
- jejunalis

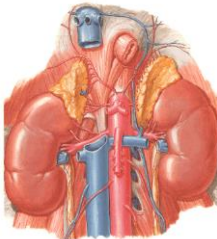
### Spatium retroperitoneale – blood supply

**Aorta abdominalis:**

- Parietal branches:**
- aa. phrenicae inf.
  - aa. lumbales
  - a. sacralis mediana

**Visceral unpaired branches:**

- tr. coeliacus Th<sub>12</sub>
  - a. mesenterica sup. L<sub>1</sub>
  - a. mesenterica inf. L<sub>3</sub>
- Visceral paired branches:**
- a. suprarenalis media
  - a. renalis
  - a. testicularis (ovarica)



**Vena cava inf.:**

- Parietal tributaries:**
- vv. phrenicae inf.
  - vv. lumbales
  - v. sacralis mediana
  - v. lumbalis asc.
  - (dx. v. azygos; sin. v. hemiazygos)

**Visceral tributaries:**

- vv. hepaticae
- v. suprarenalis dx.
- v. renalis dx.
- v. renalis sin. (v. suprarenalis sin.
- v. testicularis sin.)
- v. testicularis dx. (ovarica)

### Spatium retroperitoneale – visceral innervation

**Plexus aortic abdominalis**

- (around aorta abdominalis and all its branches)

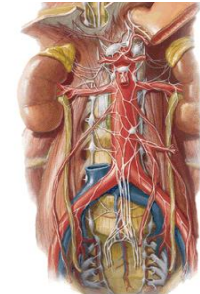
**plexus coeliacus (ggi coeliacum dx. sin.)**

- plexus gastrici, lienalis, hepaticus
- plexus duodenalis
- plexus pancreaticus

**plexus mesentericus superior**

- plexus mesentericus inferior
- plexus renalis et suprarenalis (plexus uretericus)
- plexus testicularis (ovaricus)
- plexus iliaci (plexus femoralis)

**Plexus hypogastricus sup. (n. praesacralis)**



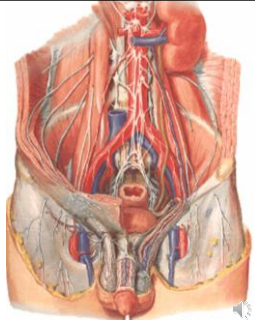
### Spatium retroperitoneale – innervation

#### Plexus lumbalis

(rami ventrales nervorum spinalium, Th<sub>2</sub>

- L<sub>2</sub>)

- n. iliohypogastricus
- n. ilioinguinalis
- n. cutaneus femoris lat.
- n. genitofemoralis
  - r. genitalis
  - r. femoralis
- n. femoralis
- n. obturatorius



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