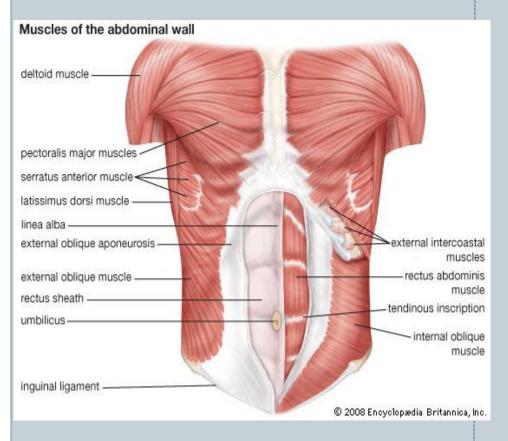
### Loci minores resistentiae preli abdominis

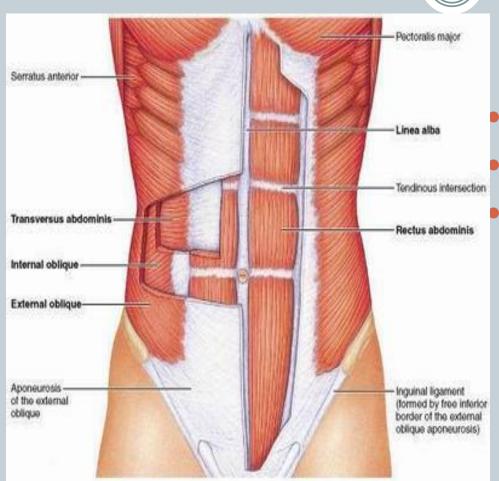
Anatomijas un histoloģijas katedra Profesore G.Knipše

### Prelum abdominale



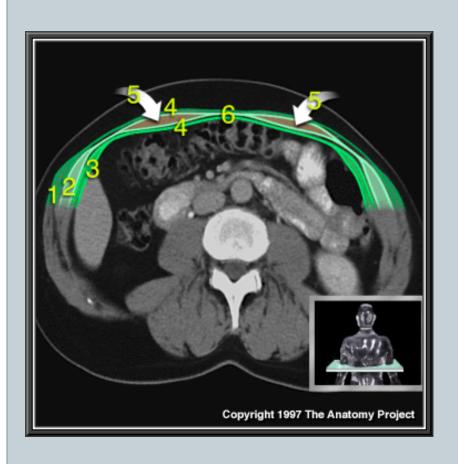
- M. rectus abdominis
- M. obliquus externus abdominis
- M. obliquus internus abdominis
- M. transversus abdominis

### Prelum abdominale



- Musculi
- Fascias
- *Aponeuroses*

### Prelum abdominale



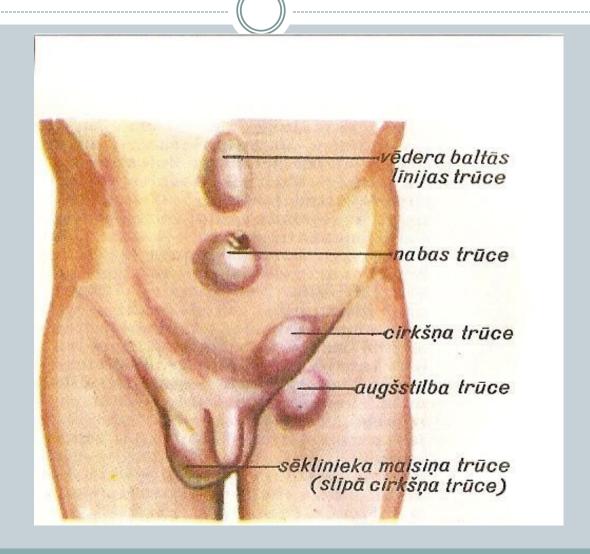
- M.obliguus externus abdominis
- M.obliguus internus abdominis
- M.transversus abdominis
- Vagina m.recti abdominis
- M.rectus abdominis
- Linea alba

### Sites of Weakness in the Abdominal Wall

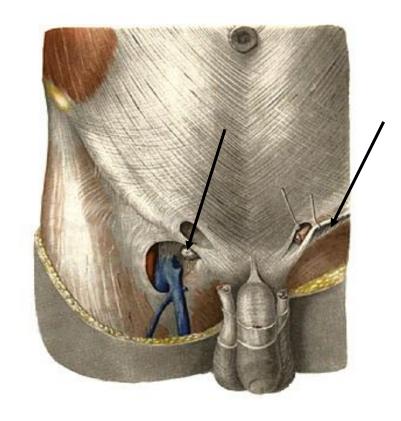
... are the sites at which hernias tend to develop.

- Canalis inguinalis 67%
- Anulus umbilicalis 9%
- Canalis femoralis 3%
- Linea alba 1%
- Trigonum lumbale

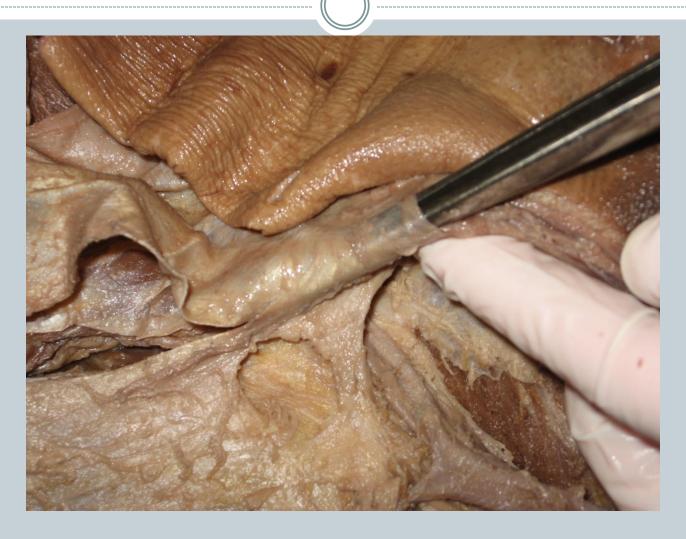
### Hernia



- inguinalis extends obliquely through the abdominal wall above lig. inguinale
- the length 4– 5 cm
- the diameter in female 0.5 cm in male 1.0 cm

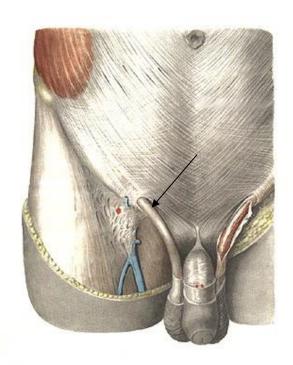


# Canalis inguinalis



## Canalis inguinalis gender diferences

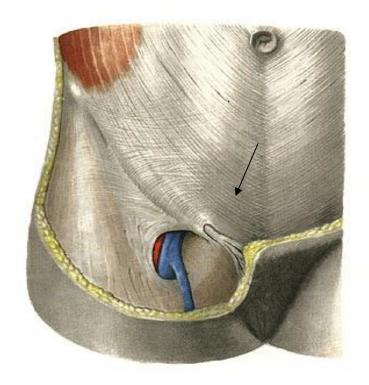
In the male funiculus spermaticus runs through canalis inguinalis



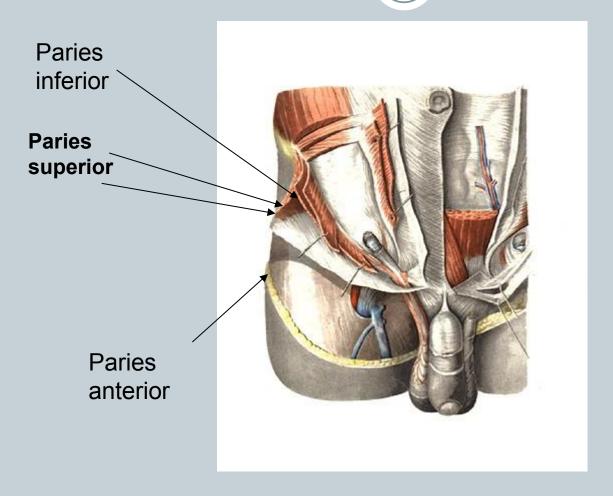
## Canalis inguinalis gender diferences

#### In the female

ligamentum teres uteri extends through canalis inguinalis



# Canalis inguinalis 4 walls:



## Canalis inguinalis

- Paries anterior aponeurosis m. obliqui externi abdominis 前壁 腱膜 m. 腹外斜肌
- Paries posterior fascia transversalis, peritoneum
- Paries superior m. obliquus internus abdominis,
   m. transversus abdominis lower margins
- Paries inferior lig. inguinale

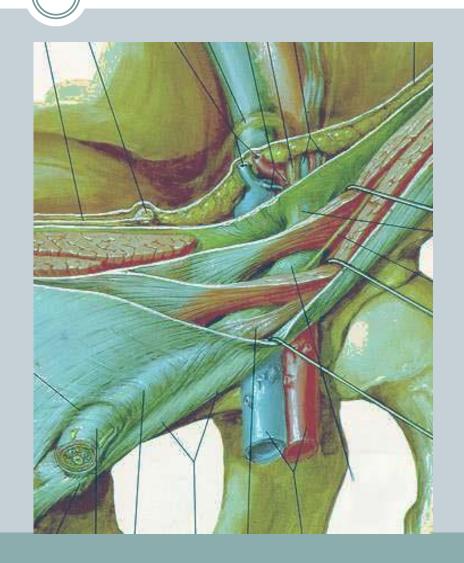
后壁 - 横筋膜、腹膜

上壁 - 腹部内斜肌, 腹横肌下缘

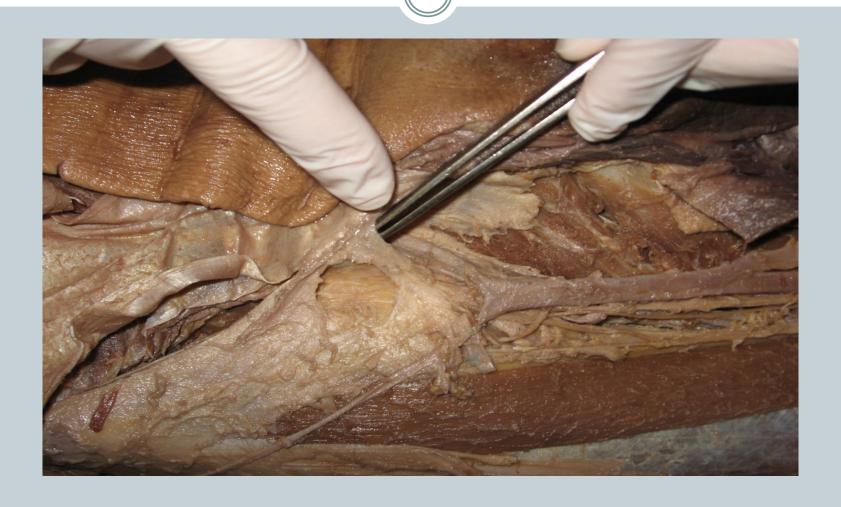
下壁——腹股沟韧带

## Canalis inguinalis openings

- Anulus inguinalis superficialis
- Anulus inguinalis profundus



## Anulus inguinalis superficialis

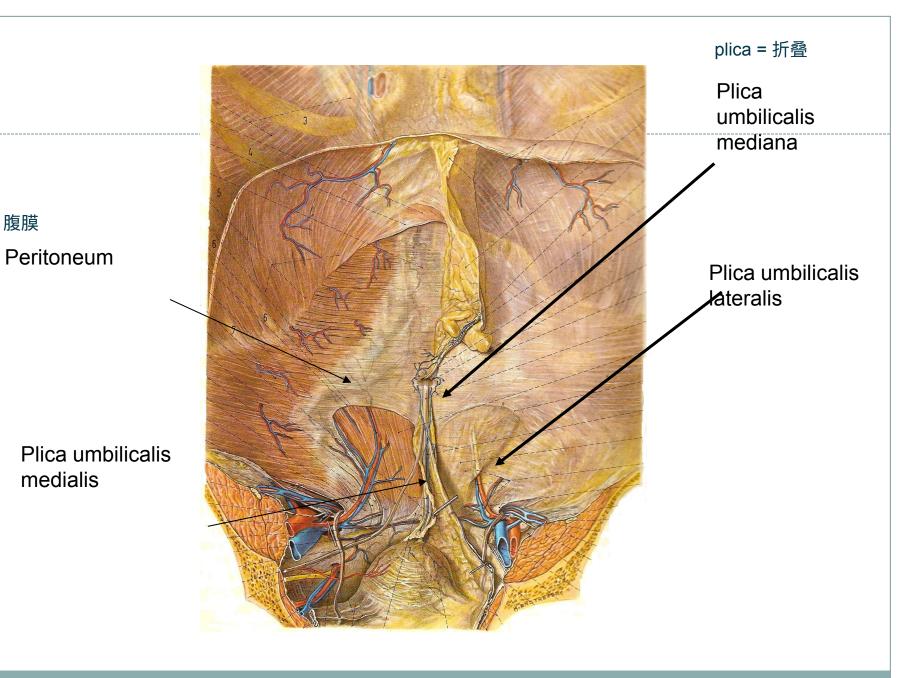


## Canalis inguinalis openings

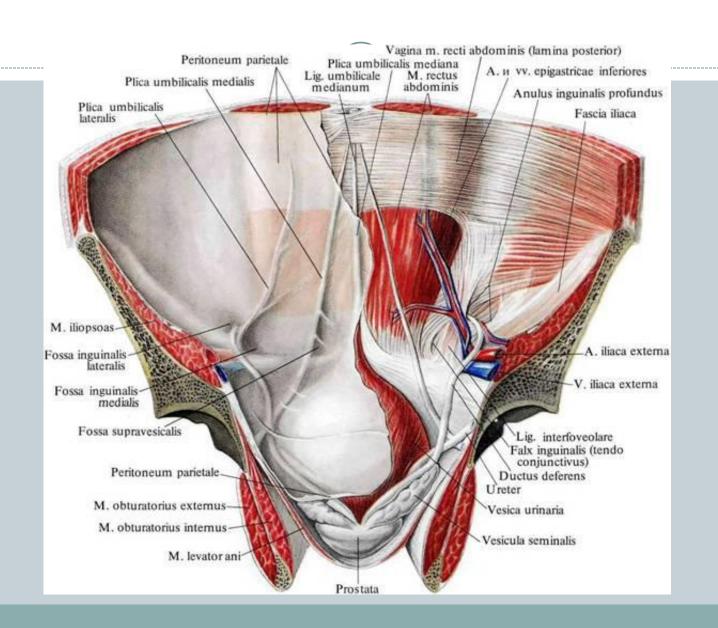
### Anulus inguinalis superficialis

- Margo superior crus mediale
- Margo inferior crus laterale
- Margo medialis lig. reflexum
- Margo lateralis fibrae intercrurales

### Anulus inguinalis profundus



腹膜



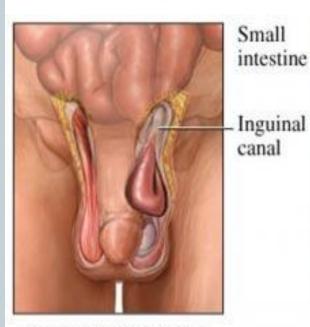
### Prelum abdominale (facies interna)

- Plica umbilicalis mediana; is formed by lig. umbilicale medianum
- Plica umbilicalis medialis; is formed by lig. umbilicale mediale
- Plica umbilicalis lateralis; is formed by a. et v. epigastrica inferior

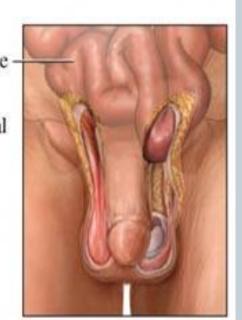
#### **Formationes:**

- Fossa supravesicalis dextra et sinistra
- Fossa inguinalis medialis dextra et sinistra
- Fossa inguinalis lateralis dextra et sinistra

# Hernia inguinalis



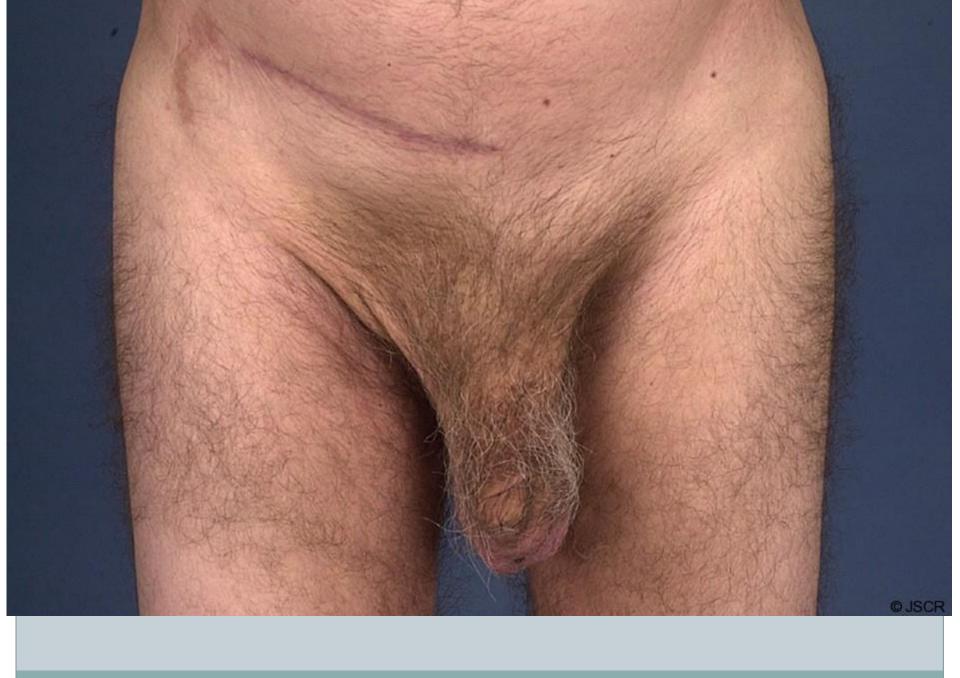
Direct inguinal hernia



Indirect inguinal hernia

# Hernia inguinalis





# Hernia inguinalis, scrotalis et umbilicalis





### Anulus umbilicalis

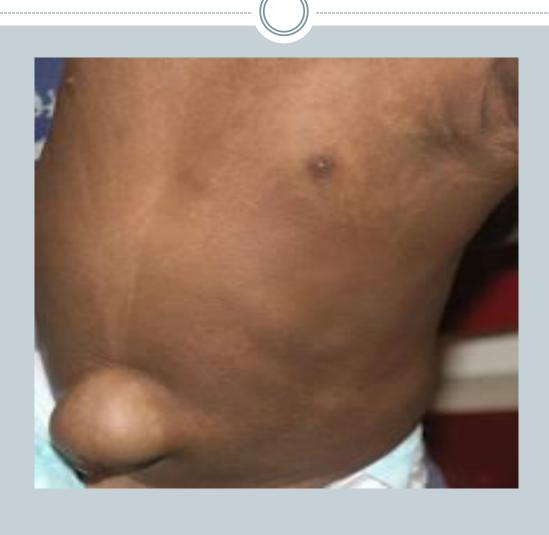
During embryonal period is anulus umbilicalis containing funiculus umbilicalis.

*Umbilicus s. umbo:* 

- fascia transversalis
- peritoneum
- fascia abdominalis propria
- subcutis
- cutis

## Hernia umbilicalis





## Hernia umbilicalis





## Hernia umbilicalis



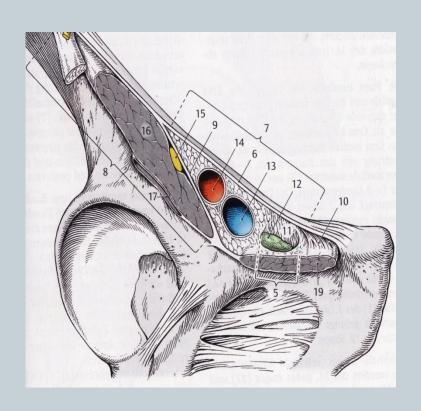
## Canalis femoralis

- not exsisting normaly,
- represents an additional possible site for herniation,
- lies below *lig. inguinale* in the medial corner of *lacuna vasorum*;
- hernia femoralis occur 3 times more often in women than in man

## Topography of the inguinal region

- Lacuna musculorum (m. iliopsoas et n. femoralis)
- Lacuna vasorum (a. et v. femoralis)
- Anulus femoralis:
   margo anterior lig. inguinale
   margo posterior lig. pectineale
   margo medialis lig. lacunare
   margo lateralis v. femoralis

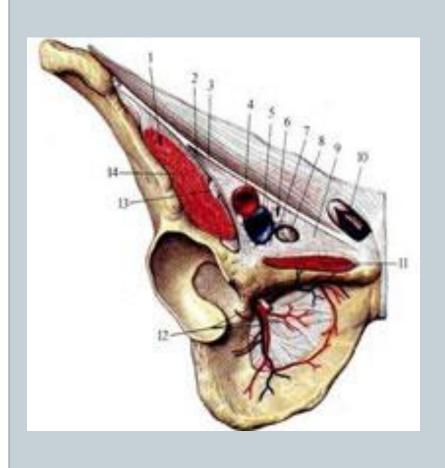
### Lacuna musculorum et vasorum

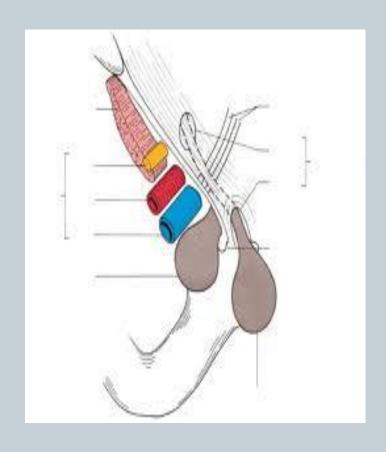


### • Anulus femoralis:

margo anterior — lig.
inguinale
margo posterior — lig.
pectineale
margo medialis — lig.
lacunare
margo lateralis — v.
femoralis

# Hernia inguinalis et femoralis localisation



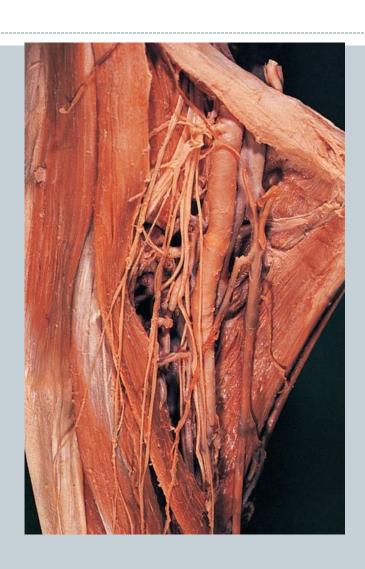


## Canalis femoralis walls

- Paries medialis m. pectineus
- Paries lateralis v. femoralis
- Paries anterior cornu superius fasciae latae

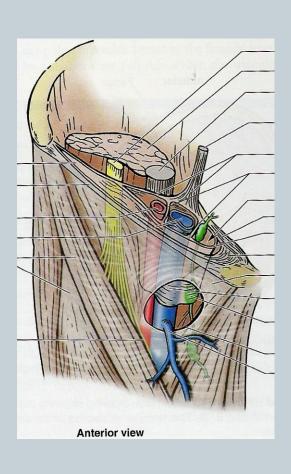
Superficial opening – *hiatus saphenus* is 2-3 cm below *lig. inguinale*, it is covered by *fascia cribrosa*.

## Canalis femoralis walls



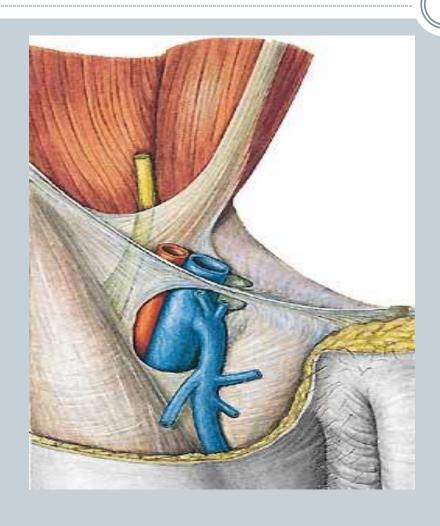
- •Paries medialis m. pectineus
- •Paries lateralis v. femoralis
- Paries anterior cornu superius fasciae latae

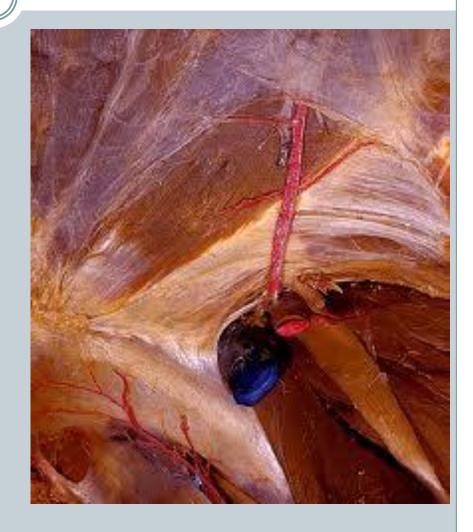
## Canalis femoralis



- Deep opening anulus femoralis is covered by nodus lymph. inguin. profundus, septum femorale, peritoneum
- Superficial opening –
   *hiatus saphenus* lies
   2-3 cm below *lig*.
   inguinale, it's covered by
   fascia cribrosa, what is
   bordered by cornu
   superius, cornu inferius
   et margo falciformis

# Hiatus saphenus

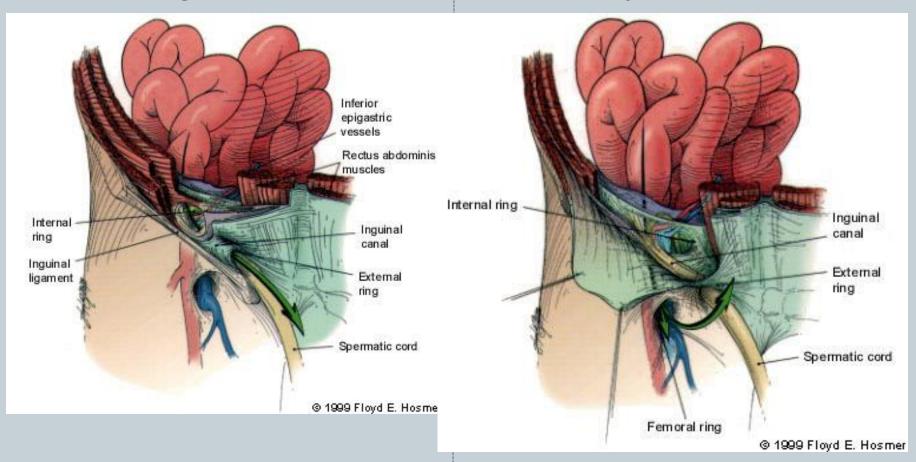




## Hernia inguinalis et femoralis topography

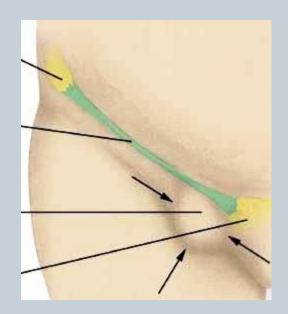
hernia inguinalis

Hernia femoralis

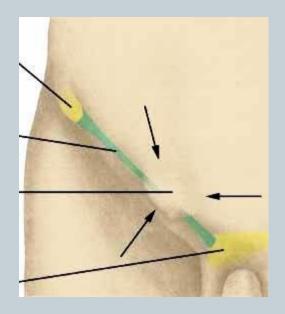


#### Hernia inguinalis et femoralis

- Hernia femoralis is harder to observe and diagnose than Hernia inguinalis
- Not easy to distinguish between Hernia femoralis and Hernia inguinalis
- Hernia femoralis lies more lateral and appears below lig. Inguinale

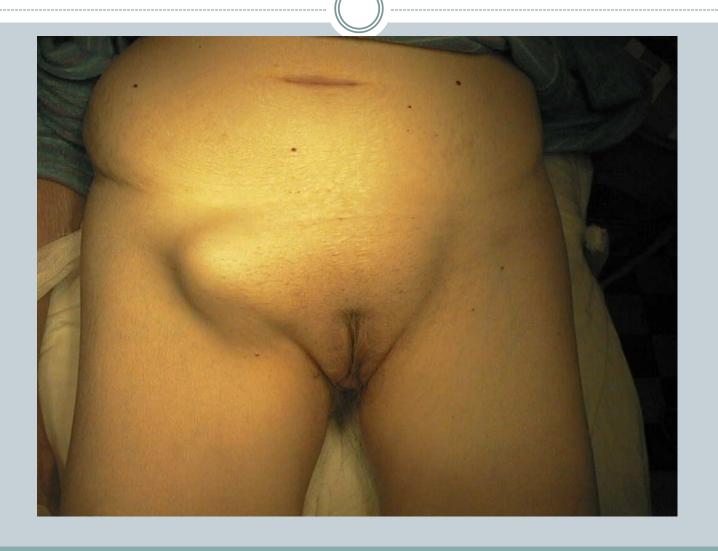


Hernia femoralis

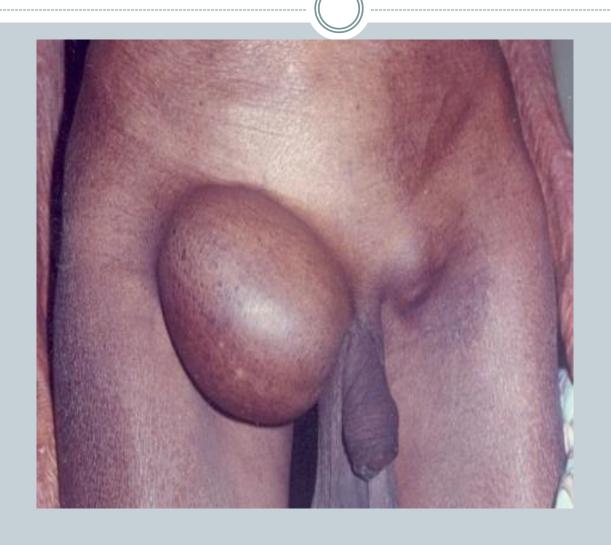


Hernia inguinalis

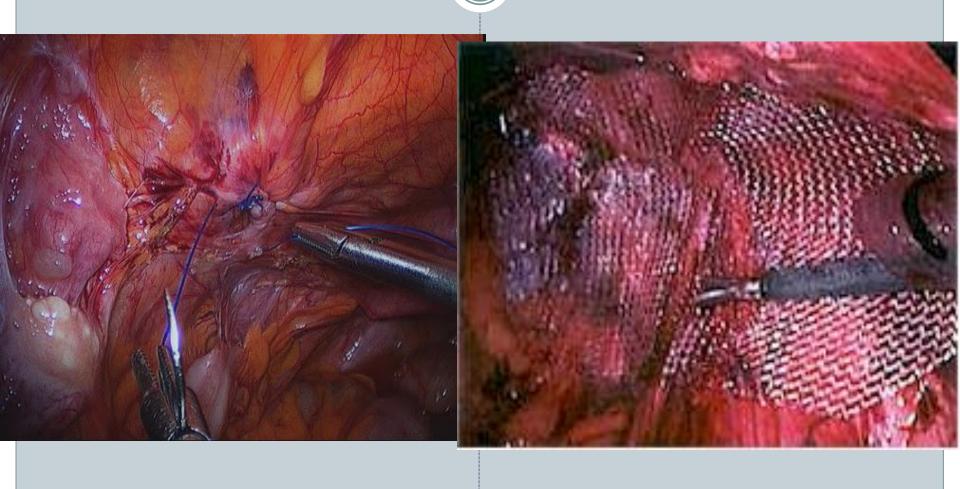
# $Hernia\ femoralis$



# Hernia femoralis bilateralis

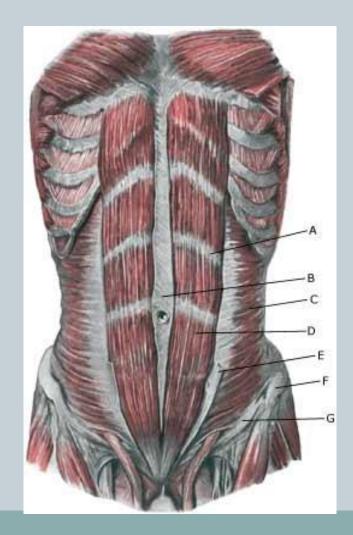


# Repositio herniae



#### Linea alba

- m. obliquus ext. abdominis
- m. obliquus int. abdominis
- m. transversus abdominis



#### Linea alba

#### Male:

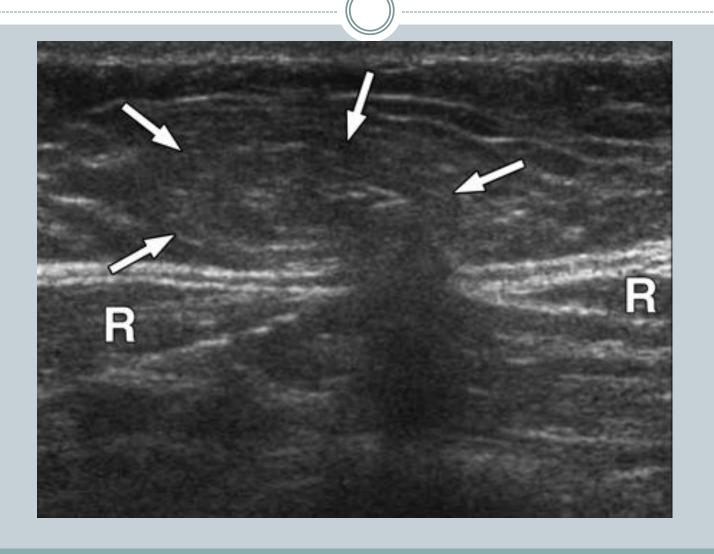
- above the umbilicus 2,8 cm
- below the umbilicus 2,5 cm

#### Female:

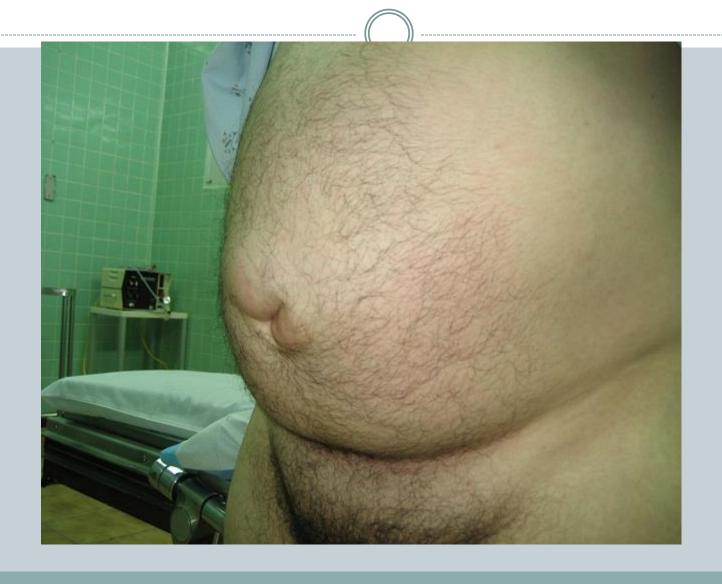
- above the umbilicus 5 cm
- blelow the umbilicus 1 cm

# 

# Hernia paraumbilicalis et lineae albae



## Hernia lineae albae



#### Hernia umbilicalis et lineae albae

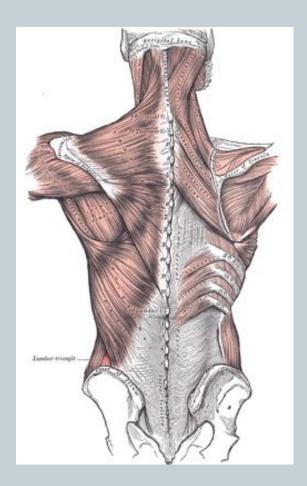


## Trigonum lumbale

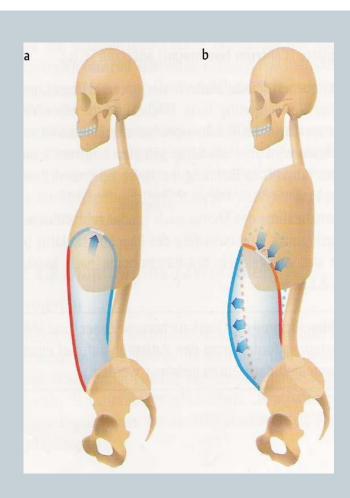
- Margo inferior crista iliaca
- Margo anterior m. obliquus abdominis externus
- Margo posterior m. latissimus dorsi

## Trigonum lumbale

- crista iliaca
- m. latissimus dorsi
- m.obliquus externus abdominis



## Diaphragma s. phren



- convex muscle which divides thorcic and abdominal region
- most important muscle for **inspiration**
- contraction: diaphragm moves downwards (thorax becomes bigger, abdomen becomes smaller)

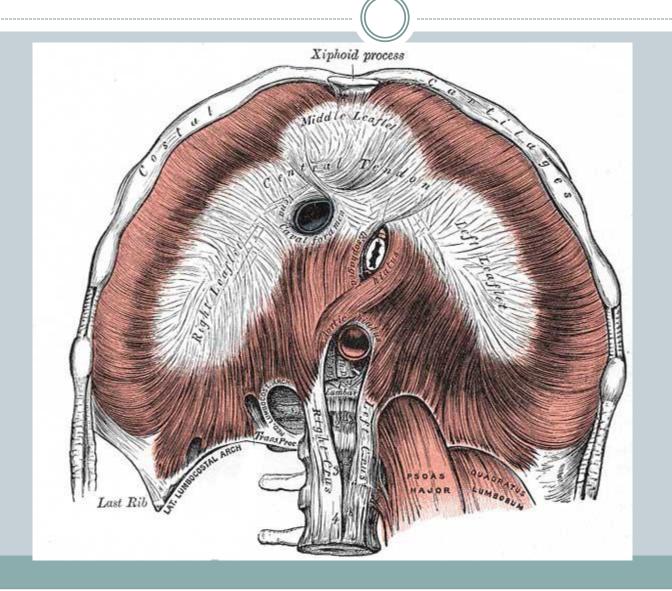
## Diaphragm

Diaphragm is the dome shaped muscle between thoracic and abdominal cavity

#### Places of projections:

- dexter costa IV
- sinister costa V

# Diaphragma



## Parts of diaphragm

- Pars muscularis peripherical
- Centrum tendineum central

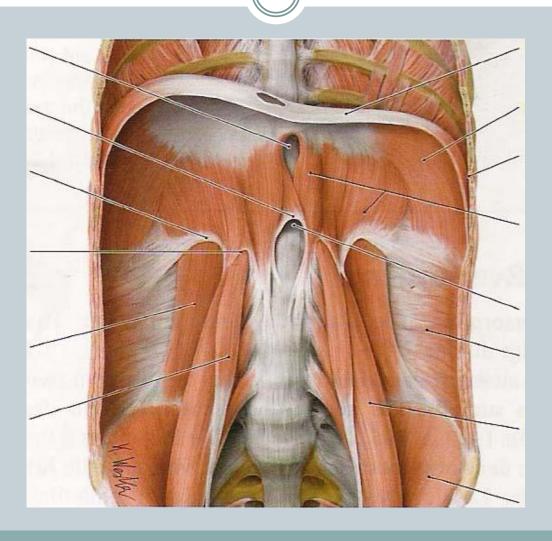
#### Pars muscularis parts:

- 1. Pars sternalis (o.- processus xiphoideus)
- **2. Pars costalis** (o. facies interna costarum VII-XII)
- 3. Pars lumbalis

#### Pars lumbalis

- Crus mediale dextrum (from vert. L I-IV) et sinistrum (from vert. L I-III)
- Crus intermedium dextrum et sinistrum (from vert. L II)
- **Crus laterale** dextrum et sinistrum (from lig. arcuatum mediale un lig. arcuatum laterale)

# Pars lumbalis diaphragmae



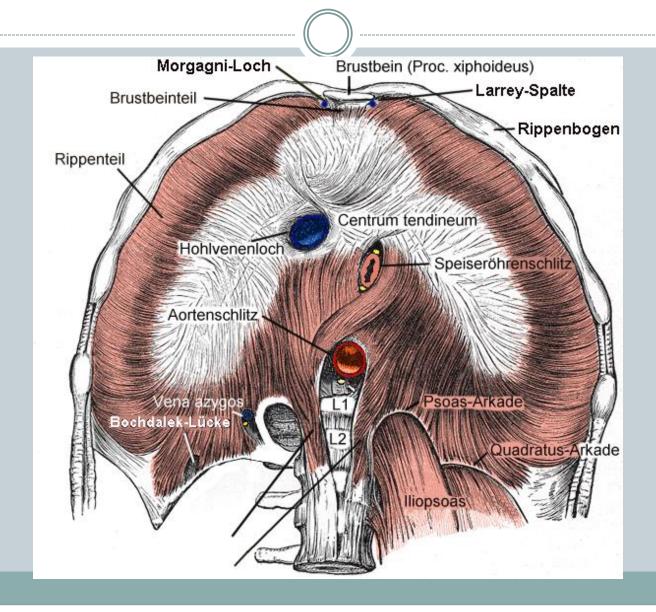
## Openings in the diaphragm

- Hiatus aorticus
- Hiatus oesophageus
- Foramen venae cavae

#### Spaces:

- Between crus mediale et crus intermedium (n. splanchnicus major et v. minor, v. azygos – right side and v. hemiazygos – left side).
- Between crus intermedium et crus laterale truncus sympathicus).

## Openings in the diaphragm



## Coverings of diaphragm

#### Superiorly:

- Fascia endothoracica 胸内筋膜
- Pleura diaphragmatica 隔胸膜

#### Inferiorly:

- Fascia diaphragmatica ( part of fascia subperitonealis )
- Peritoneum

# Sites of weakness of diaphragm

- **Trigonum sternocostale** dextrum et sinistrum (a. et v. epigastrica superior)
- Trigonum lumbocostale dextrum et sinistrum