

## General myology, muscles of the back and upper extremity I

### Active locomotor system

Active part of locomotor system

App. 600 muscles (1/3 of weight, ♂ 35%, ♀ 32%)

Postural system

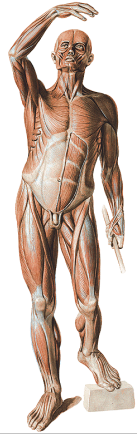
Sensitive system (position of body)

Thermoregulation

Blood and lymphatic circulation

Verbal and nonverbal communication

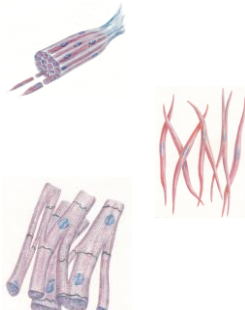
Logistic system (breathing, food intake)



### Muscle tissue

Muscle tissue is characterized by the ability to contract when stimulated.

1. Skeletal muscle: long, multinucleate cells with visible striations, voluntary muscle
2. Smooth muscle: short, cylindrical cells, involuntary muscle; e.g. digestive tract, walls of blood vessels
3. Cardiac (heart) muscle: short, branched, striated cells, with one nucleus at the center of each cell, joined to their neighbors by intercalated discs, involuntary muscle



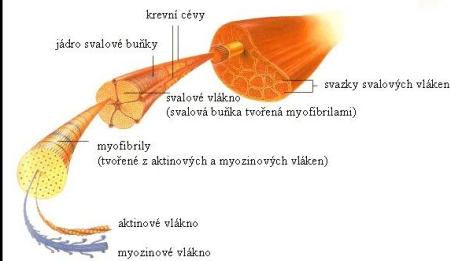
Čihák, 2001

### Morphology of the skeletal muscles

Striated muscular fibers- endomysium

primary and secondary muscular bundles - perimysium internum

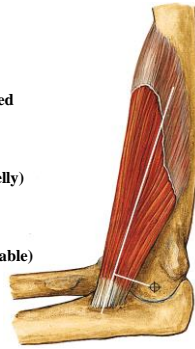
Surface - perimysium externum – fascia propria musculi



**Composition of skeletal muscles**



- fascia** (covering of muscle)
- tendo, aponeurosis** - tendon
- origo** - origin (beginning) - fixed
- caput musculi**
- venter musculi** (muscular belly)
- cauda musculi**
- insertio** - attachment (moveable)

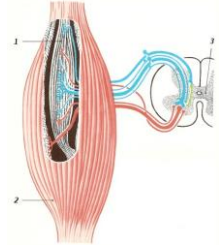
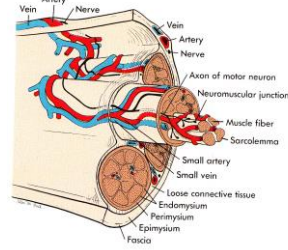


**Vascularization and innervation of the skeletal muscle**

**Hilus** - nerves and vessels

**sensory innervation** - muscle and tendon spindles

**motor innervation**

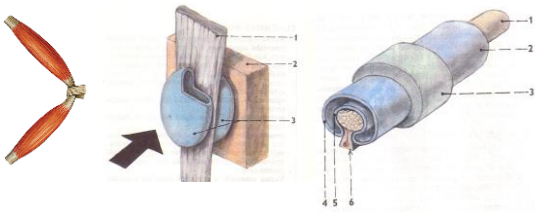


**Special apparatus**

**Fascia** - osteofascial septa, compartments

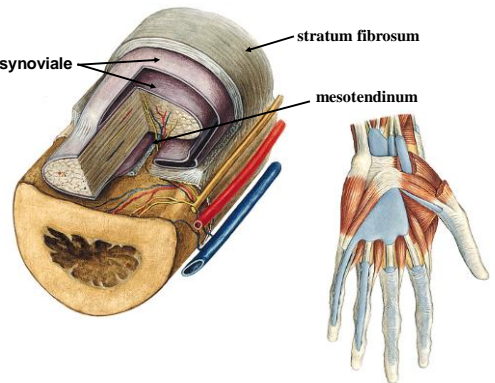
**Trochleae musculares, sesamoid bones, bursae synoviales**

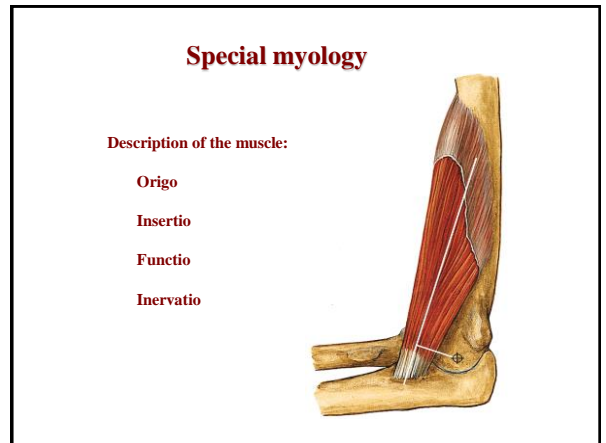
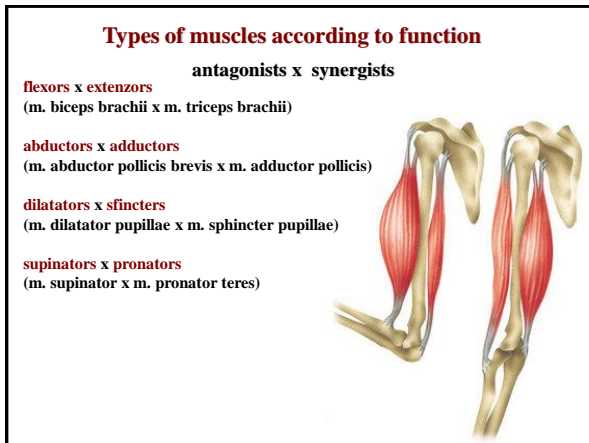
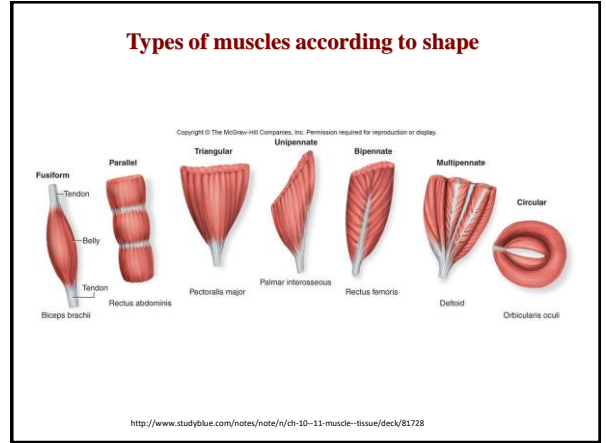
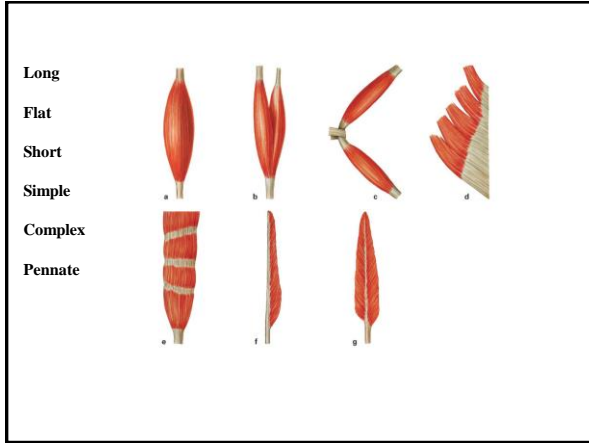
**Vaginae tendinum** - stratum fibrosum, stratum synoviale, mesotendineum



**Vagina synovialis**

**stratum synoviale**      **stratum fibrosum**  
**mesotendineum**





### Musculi dorsi

#### Heterochtonous muscles

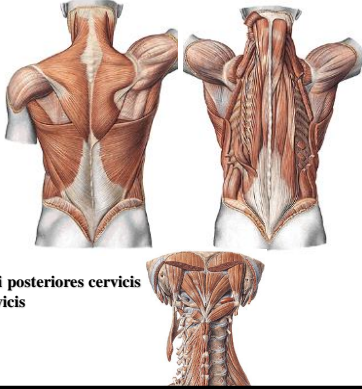
Spinohumeral muscles  
Spinocostal muscles

#### Autochthonous muscles

Spinotransversal system  
Sakrospinal system  
Spinospinal system  
Transversospinal system

#### Short dorsal muscles

Musculi nuchae profundi  
Musculi intertransversarii posteriores cervicis  
Musculi interspinales cervicis



### Spinohumeral muscles

#### Musculus trapezius

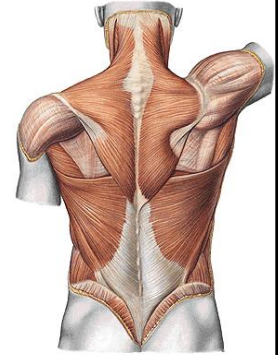
**o:** protuberantia occipitalis ext., lig. nuchae, procc. spinosi of all Th vertebrae

**i:** clavicula, acromion, spina scapulae

**f:** bilateral contraction – extension of the head, pulls scapula medially

unilateral contraction – lateroflexion of the head and spine

**i:** n. accessorius (n. XI), plexus cervicalis



#### Musculus latissimus dorsi

**o:** fascia thoracolumbalis - procc. spinosi of caudal Th and all L vertebrae, os sacrum, crista iliaca, caudal ribs

**i:** crista tuberculi minoris

**f:** extension, adduction and pronation of arm

**i:** n. thoracodorsalis

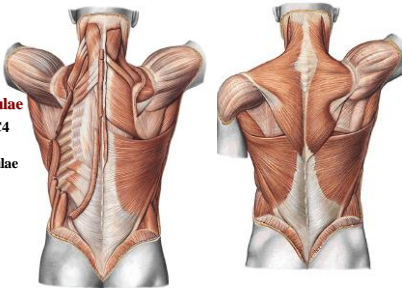
#### Musculus levator scapulae

**o:** procc. transversi C1-C4

**i:** angulus superior scapulae

**f:** elevation of scapula

**i:** n. dorsalis scapulae



#### Musculus rhomboideus minor

**o:** procc. spinosi C6-C7

**i:** margo medialis scapulae

**f:** pulls scapula mediocranially

**i:** n. dorsalis scapulae

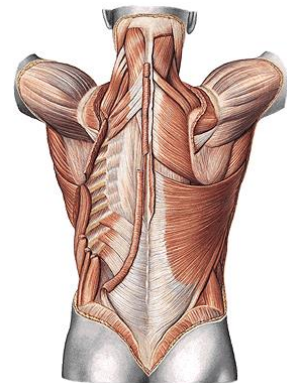
#### Musculus rhomboideus major

**o:** procc. spinosi Th1-4

**i:** margo medialis scapulae

**f:** pulls scapula mediocranially

**i:** n. dorsalis scapulae



### Spinocostal muscles

#### Musculus serratus posterior superior

**o:** procc. spinosi of caudal C and cranial Th vertebrae

**i:** 2. - 5. rib

**f:** elevates the ribs (inspiration)

**i:** nn. intercostales

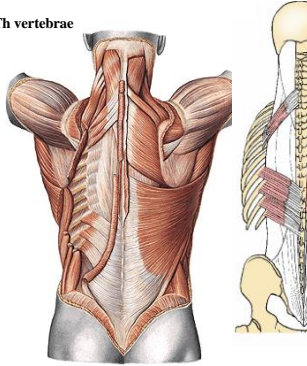
#### Musculus serratus posterior inferior

**o:** procc. spinosi of caudal Th and cranial L vertebrae

**i:** four caudal ribs

**f:** depresses the ribs (expiration)

**i:** nn. intercostales



### Autochthonous muscles –spinotransversal system

#### Musculus splenius capitis

**o:** procc. spinosi of caudal C and cranial Th vertebrae

**i:** linea nuchae sup., proc. mastoideus

**f:** extension, lateroflexion, ipsilateral rotation

**i:** rr. dorsales nervorum spinalium

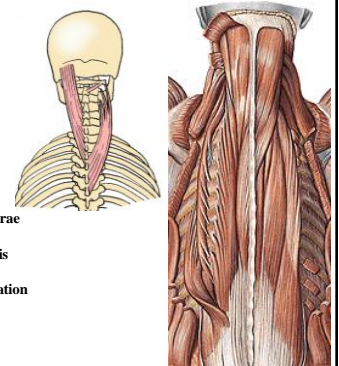
#### Musculus splenius cervicis

**o:** procc. spinosi of cranial Th vertebrae

**i:** proc. transversi of the atlas and axis

**f:** extension, lateroflexion, ipsilateral rotation

**i:** rr. dorsales nervorum spinalium



### Sacrospinal system

#### Musculus erector spinae

**o:** procc. Spinosi of L vertebrae, os sacrum, crista iliaca and cranial Th vertebrae

#### Musculus longissimus dorsi et cervicis

**i:** med. – procc. accesorii L and transversi Th and C vertebrae

lat. – procc. costarii L vertebrae and ribs

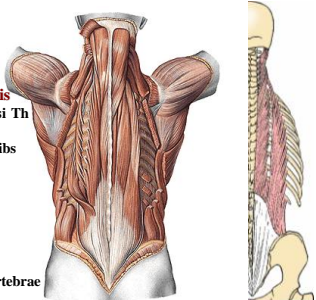
#### Musculus longissimus capitis

**o:** proc. trans. C4-Th5

**i:** processus mastoideus

#### Musculus iliocostalis

**i:** ribs and procc. Transversi of the C vertebrae



### Spinospinal system

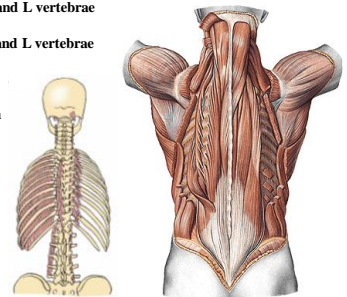
#### Musculus spinalis thoracis et cervicis

**o:** procc. Spinosi of caudal C, Th and L vertebrae

**i:** procc. Spinosi of cranial C, Th and L vertebrae

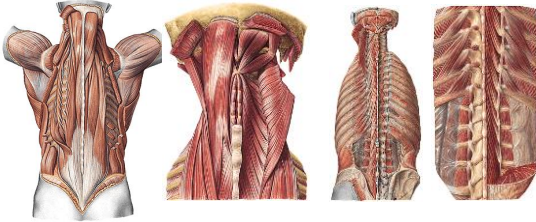
**f:** extension, lateroflexion

**i:** rr. dorsales nervorum spinalium



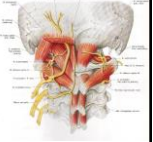
### Transversospinal system

1. M. semispinalis thoracis et cervicis
2. M. semispinalis capitis
3. Mm. multifidi



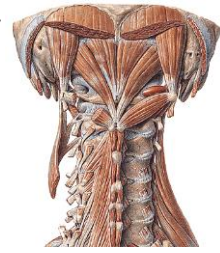
### V. Short muscles of the back

1. Mm. interspinales cervicis
2. Mm. intertransversarii posteriores cervicis



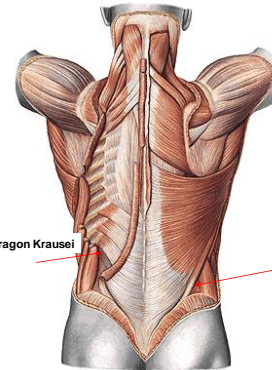
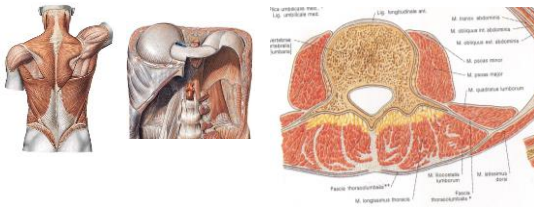
3. Mm. nuchae profundi
  - a) M. rectus capitis posterior minor
  - b) M. rectus capitis posterior major
  - c) M. obliquus capitis superior
  - d) M. obliquus capitis inferior

Trigonum suboccipitale



### Fasciae of the back

- Fascia dorsalis superficialis
- Fascia nuchae
- Fascia thoracolumbalis
- Aponeurosis lumbalis

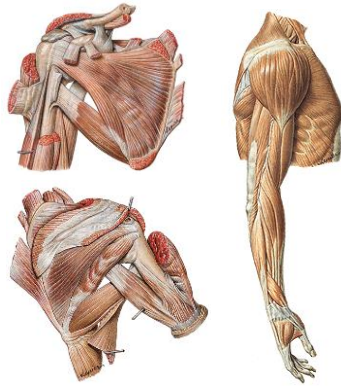


Tetrakon Krausei

Trigonum lumbale (Petiti)

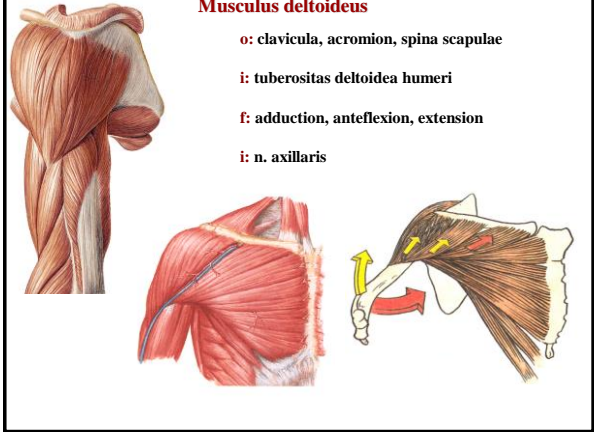
**Musculi humeri**

- Musculus deltoideus
- Musculus supraspinatus
- Musculus infraspinatus
- Musculus teres minor
- Musculus teres major
- Musculus subscapularis



**Musculus deltoideus**

- o:** clavícula, acromion, spina scapulae
- i:** tuberositas deltoidea humeri
- f:** adduction, anteflexion, extension
- i:** n. axillaris



**Musculus supraspinatus**

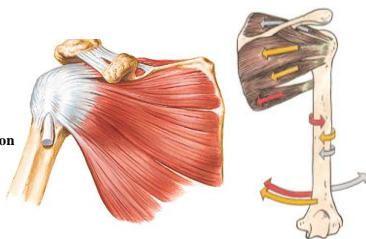
- o:** fossa supraspinata
- i:** tuberculum majus humeri
- f:** abduction, humeral supination
- i:** n. suprascapularis

**Musculus infraspinatus**

- o:** fossa infraspinata
- i:** tuberculum majus humeri
- f:** abduction, humeral supination
- i:** n. suprascapularis

**Musculus teres minor**

- o:** margo lat. scapulae
- i:** tuberculum majus humeri
- f:** humeral supination, adduction
- i:** n. axillaris

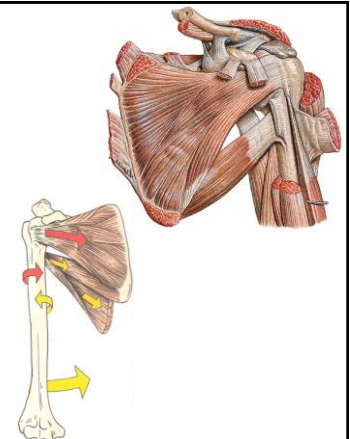


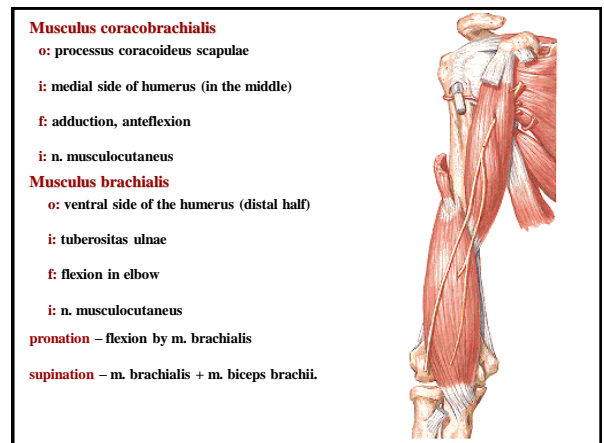
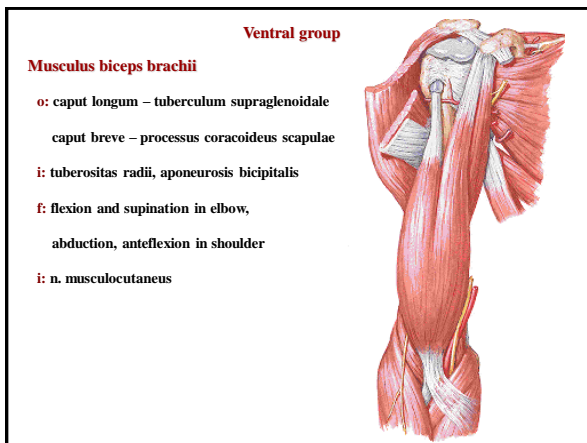
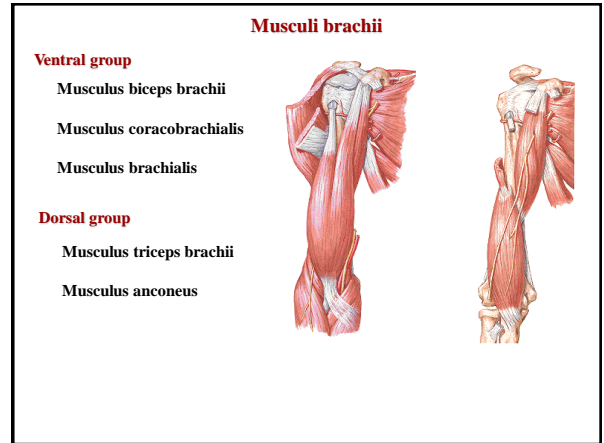
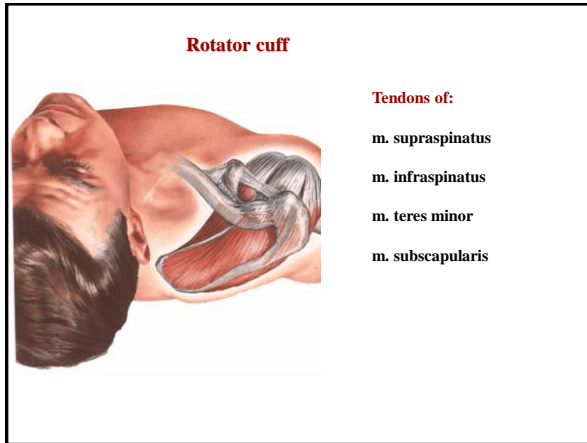
**Musculus subscapularis**

- o:** fossa subscapularis
- i:** tuberculum minus humeri
- f:** pronation
- i:** n. subscapularis

**Musculus teres major**

- o:** angulus inferior scapulae
- i:** crista tuberculi minoris
- f:** adductione, extension, pronation
- i:** n. suprascapularis







**Musculus triceps brachii**

**o:** caput longum – tuberculum infraglenoidale

caput mediale – prox sulcus n. radialis humeri

caput laterale – dist sulcus n. radialis humeri

**i:** olecranon ulnae

**f:** adduction and extension in shoulder j.,  
Extension of the forearm

**i:** n. radialis

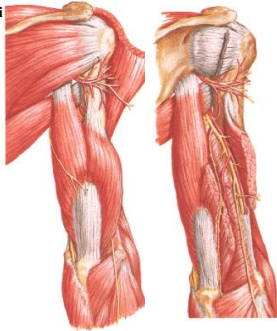
**Musculus anconeus**

**o:** epicondylus lateralis humeri

**i:** olecranon ulnae

**f:** extension of the forearm

**i:** n. radialis

**Foramen humerotricipitale**

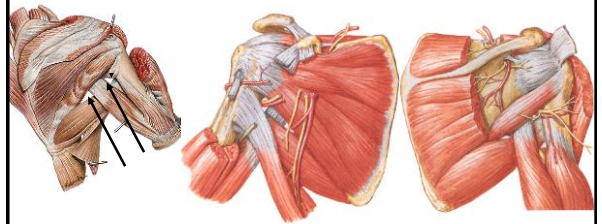
**boarders:** m. teres major et minor, caput longum m. tricipitis brachii, humerus

**content:** n. axillaris, a. circumflexa humeri posterior

**Foramen omotricipitale**

**boarders:** m. teres major et minor, caput longum m. tricipitis brachii

**content:** a. circumflexa scapulae

**Fossa axillaris****Ventral wall:**

Tendon of the m. pectoralis major

**Dorsal wall:**

m. latissimus dorsi and m. teres major

**Medial wall:**

Chest and m. serratus anterior

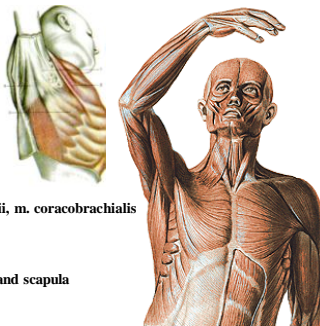
**Lateral wall:**

humerus, caput breve m. bicipitis brachii, m. coracobrachialis

**Base** - fascia axillaris

**apex** - 1. rib, lateral part of the clavicle and scapula

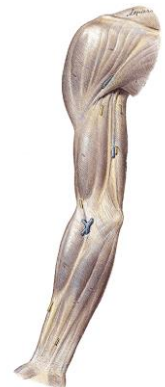
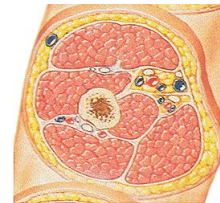
**Content:** plexus brachialis, a. axillaris

**Fascia brachii**

septum intermusculare mediale et laterale

sulcus bicipitalis medialis et lateralis  
(vasa brachialia, n. medianus, n. ulnaris)

hiatus basilicus



## References

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