Anatomy of the Arm

Your Ideas

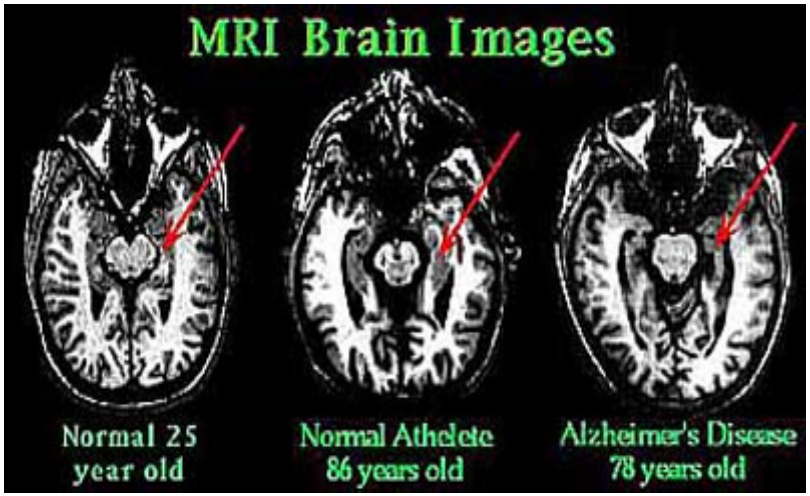
How can you find out or see inside the arm?
What imaging techniques can we use?

Imaging Techniques – X-ray

http://health.howstuffworks.com/x-ray.htm

http://web.kanazawa-u.ac.jp/~med23/NMC/PrepCase9912.html

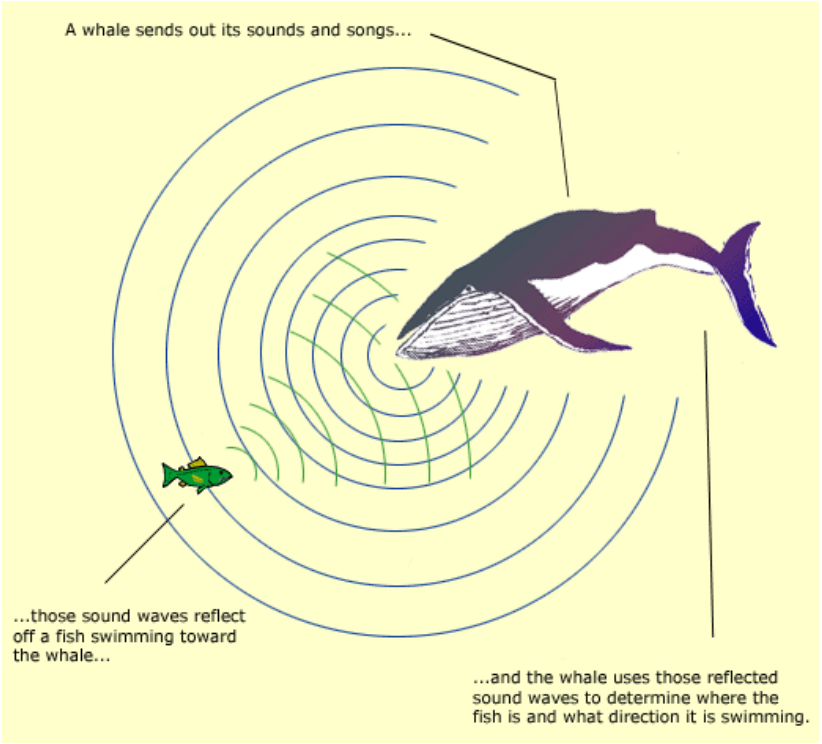
Imaging Techniques – MRI



http://electronics.howstuffworks.com/mri3.htm

http://electronics.howstuffworks.com/mri2.htm

Imaging Techniques – Sonar



http://www.ifokr.org/bri/photo-albums/20030903-ultrasounds/

http://www.exploratorium.edu/theworld/sonar/sonar.html

Generate Ideas

- How would you describe the position of the red heart with respect to the other body parts?
- Compare your answer to the person sitting next to you. Did you get the same answers?
- If not, how should we standardize the way we describe human anatomy so everyone will know exactly what you are referring to?

Anatomical Position

For everyone to understand each other when learning about the human body, we need to use a standard reference position:

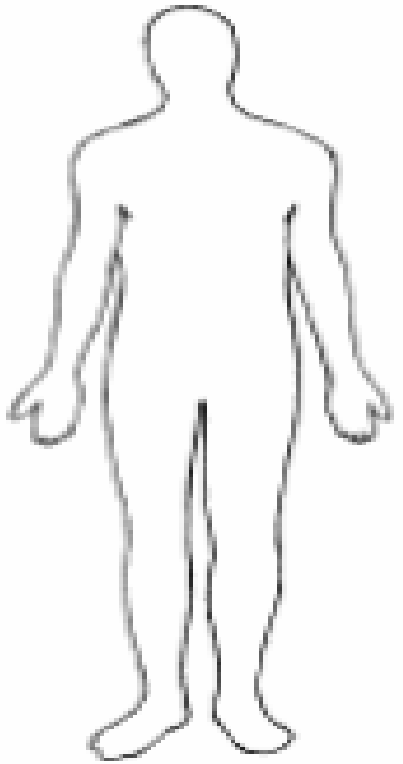
the anatomical position

It is a standard body position that everyone can recognize.

Anatomical Position

In anatomical position

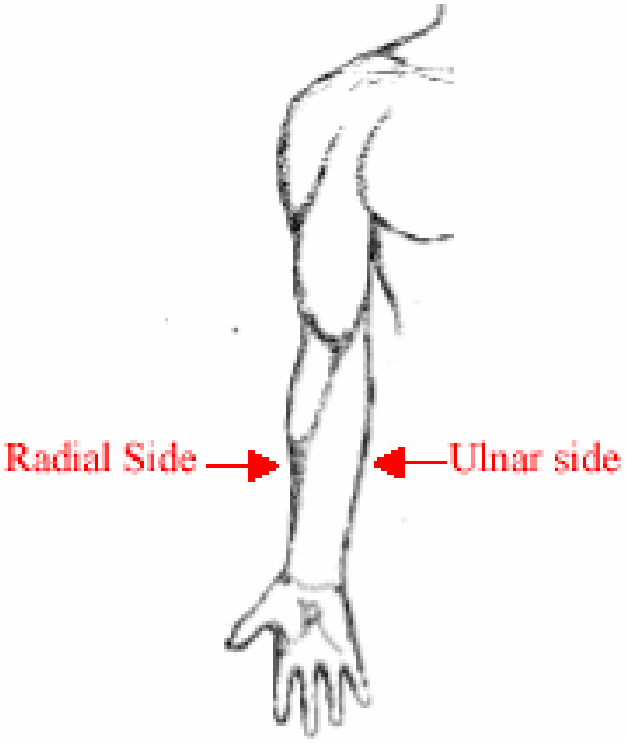
- person is standing straight up
- facing forward
- arms at the sides
- palms of the hands facing forward
- fingers and thumbs extended.



Anatomical Position

Anatomical Position of the Forearm

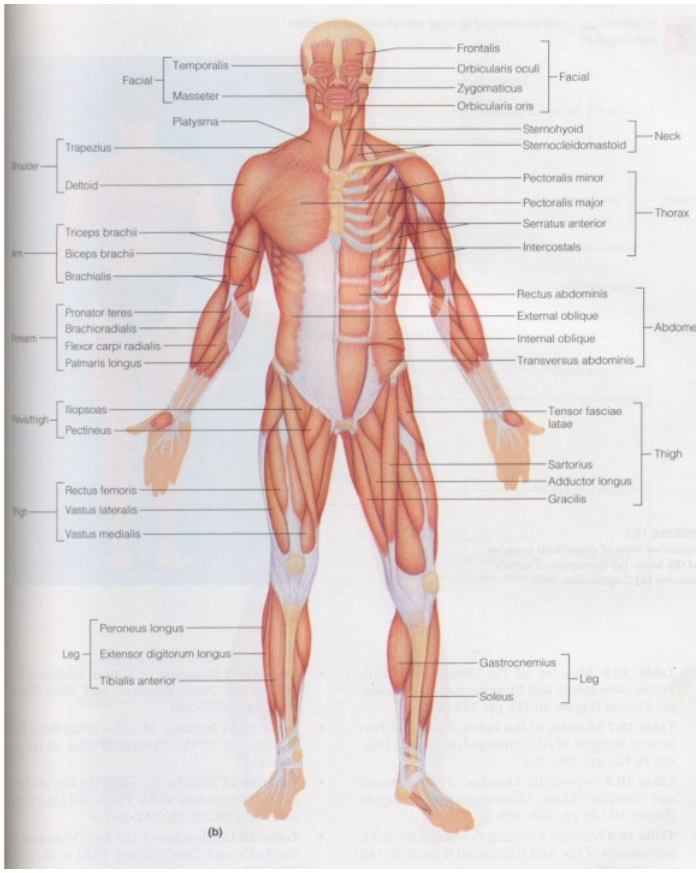
- The forearm is the part of your arm between your elbow and your wrist
- There are two sides to the forearm
  - Radial side – thumb side of your arm
  - Ulnar side – pinky finger side of your arm



Radial versus Ulnar

Anterior Side of the Body

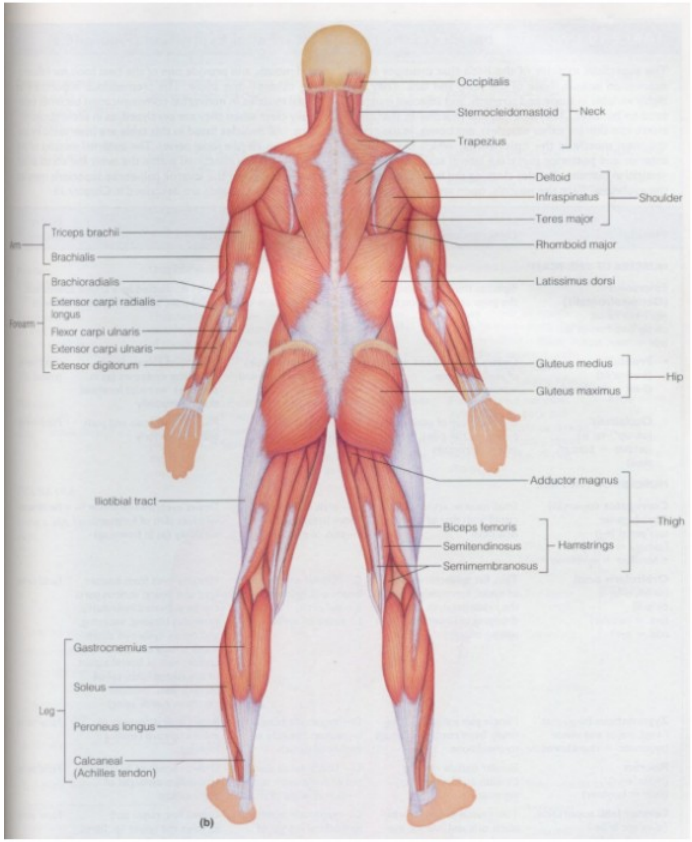
- The anterior side of the body is the front side
- When you look at a person face to face you are looking at their anterior side
- The anterior perspective is shown by this picture



asylumtraining.tripod.com/_musclemaps.htm

Posterior Side of the Body

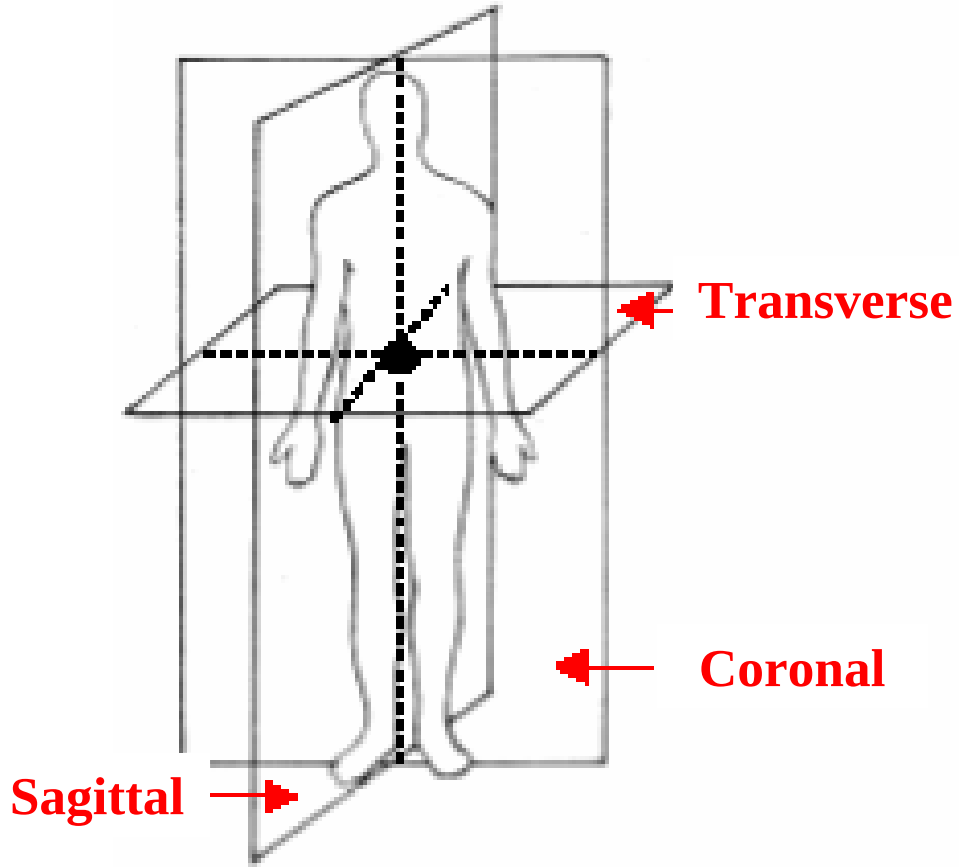
- The posterior side of the body is the back side
- When you stand behind someone in line you are facing their posterior side
- The posterior perspective is shown to the right



asylumtraining.tripod.com/_musclemaps.htm

Planes of the Body

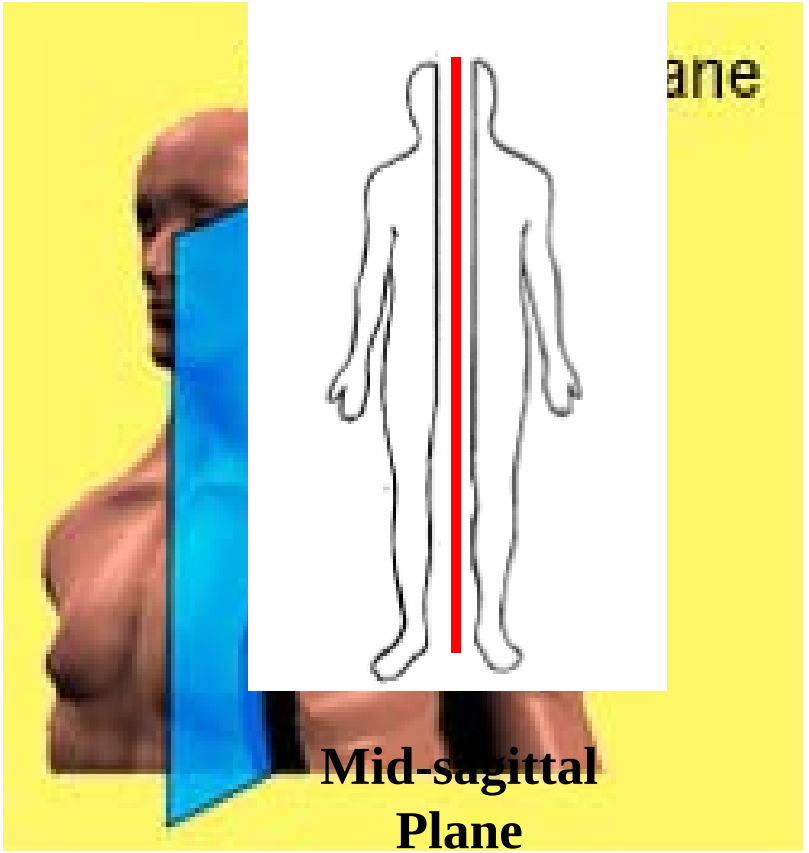
- There are three basic planes of reference through the body
  - Sagittal plane
  - Coronal plane
  - Transverse plane
- These planes are all at right angles or 90° to each other



Planes of the Body

Planes of the Body: Sagittal Plane

- Vertical plane that splits the body into left and right halves
- Best view: seen from the side of a person's body
- A mid-sagittal plane is a sagittal plane that divides the body equally straight down the middle



www.tech.nite.go.jp/.../ referencedbintro.html

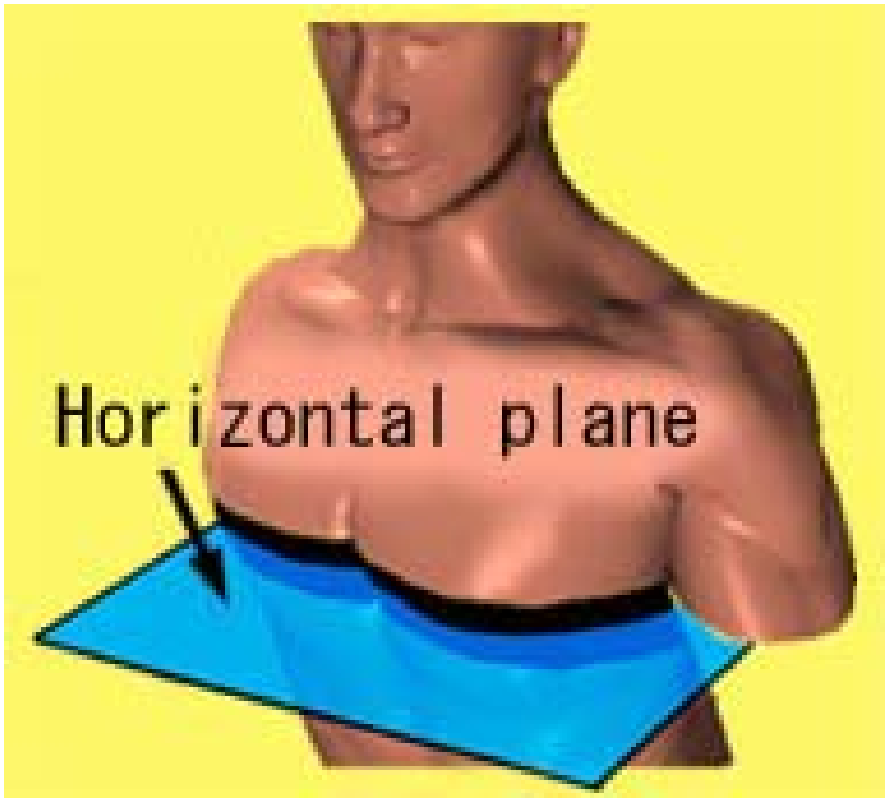
Planes of the Body: Coronal Plane

- Vertical plane that divides the body into front and back halves
- Best seen: standing in front of or behind a person's body

www.tech.nite.go.jp/.../ referencedbintro.html

Planes of the Body: Transverse Plane

- horizontal plane
- Divides body into upper and lower halves



www.tech.nite.go.jp/.../ referencedbintro.html

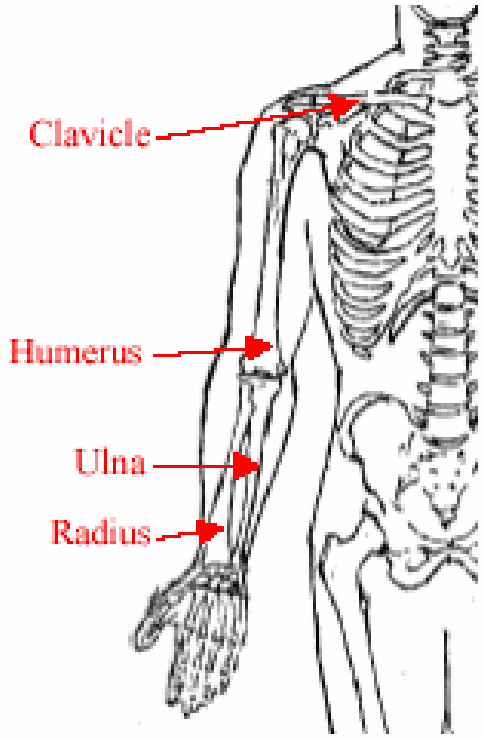
Generate Ideas

Refer to your sketch of the components of the arm (from shoulder to wrist).

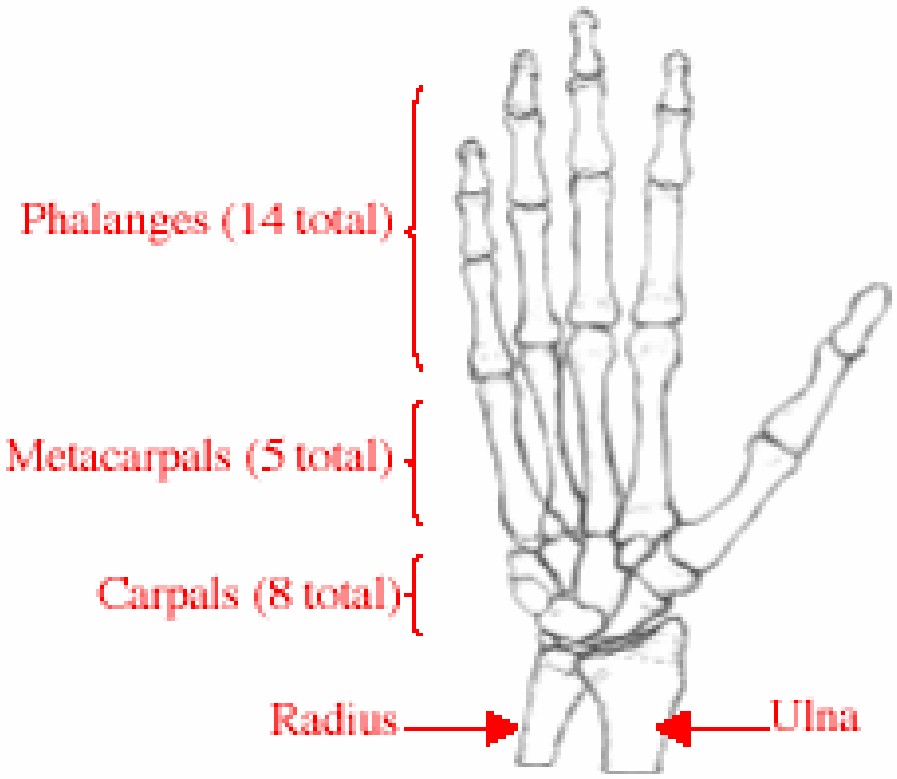
Recall what you included in the sketches.

Bones of the Arm

- There are four major bones in your arm
  - Radius
  - Ulna
  - Humerus
  - Clavicle

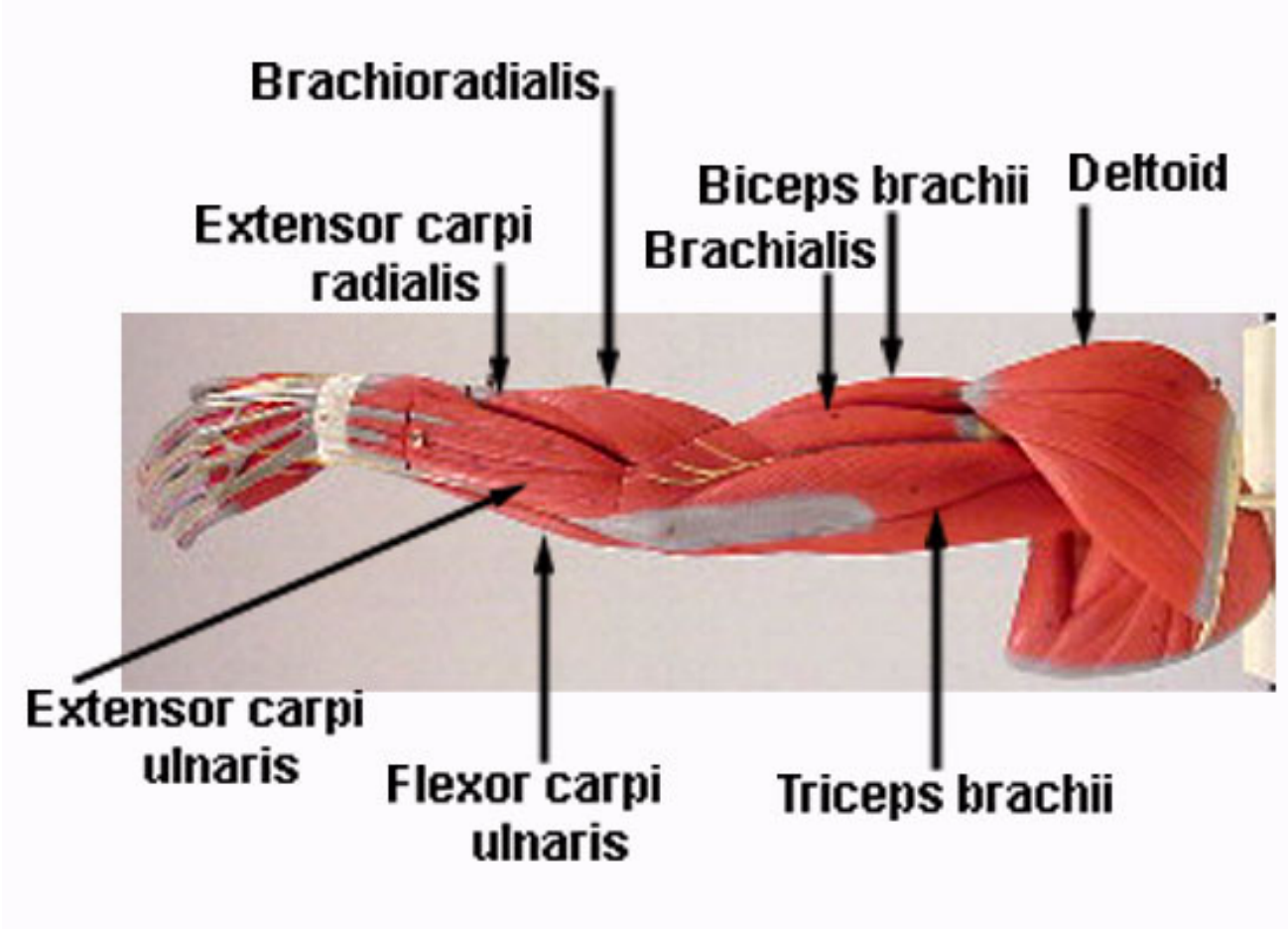


Bones of the Hand and Fingers



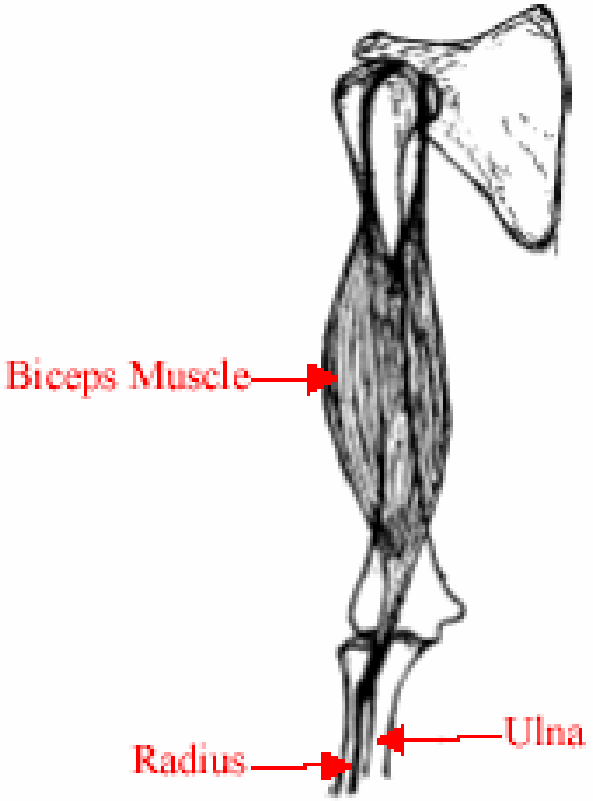
Left Hand, Anterior View

Arm Muscles


Brachioradialis
Extensor carpi radialis
Biceps brachii
Brachialis
Deltoid
Extensor carpi ulnaris
Flexor carpi ulnaris
Triceps brachii

Arm Muscles: Biceps

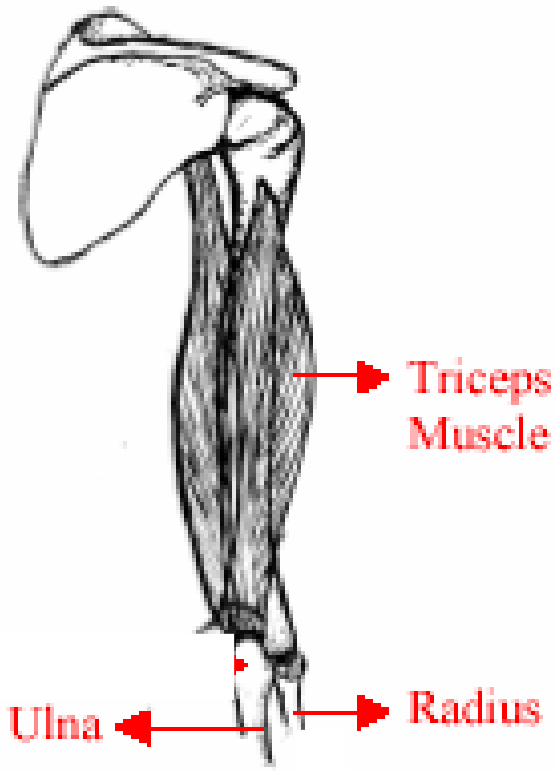
- Located on the anterior (front) side of your arm
- One of the major muscles in your arm
- When you contract your bicep, your triceps relax and your arm bends at the elbow
- This picture shows the bicep of the right arm of a person facing toward us



Biceps Muscle

Arm Muscles: Triceps

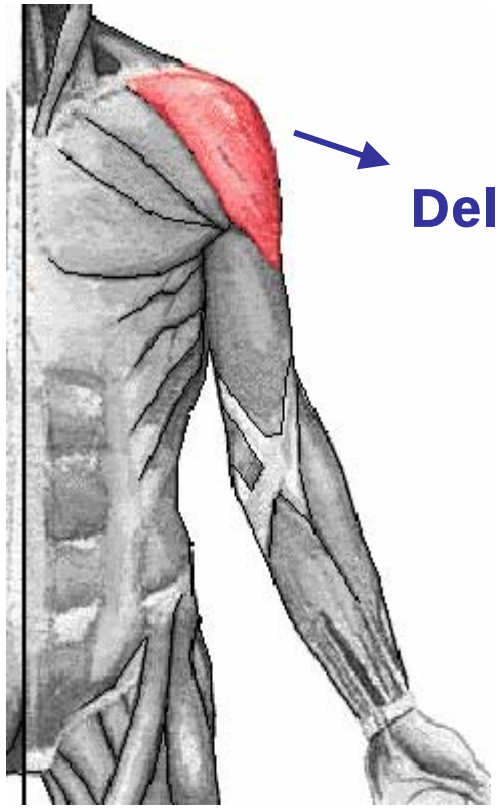
- Located on the posterior (back) and outside of the upper arm (humerus).
- When you contract your triceps, your biceps relax and your arm straightens

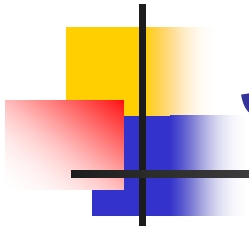


Triceps Muscle

Arm Muscles: Deltoid

- Located on the shoulder (anterior side on the clavicle and posterior side on the scapula or the shoulder blade).



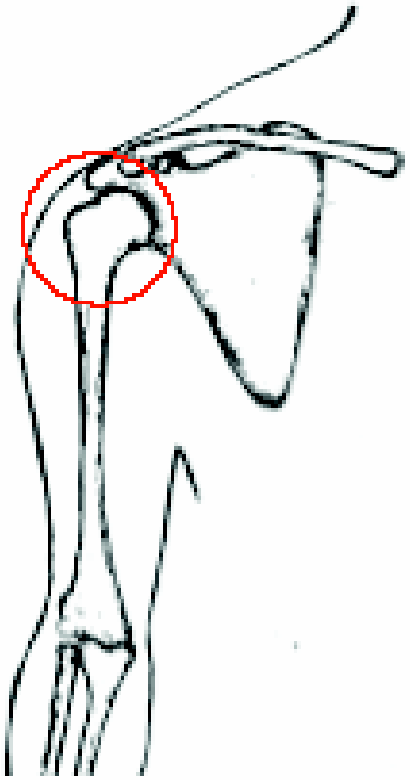


Joints

- A joint is where two bones come together
- The human skeleton has four basic types of joints
  - Hinge joint
  - Ball and socket joint
  - Pivot joint
  - Gliding joints
- Different types of joints allow the human body to move in many different ways

Joint: Shoulder

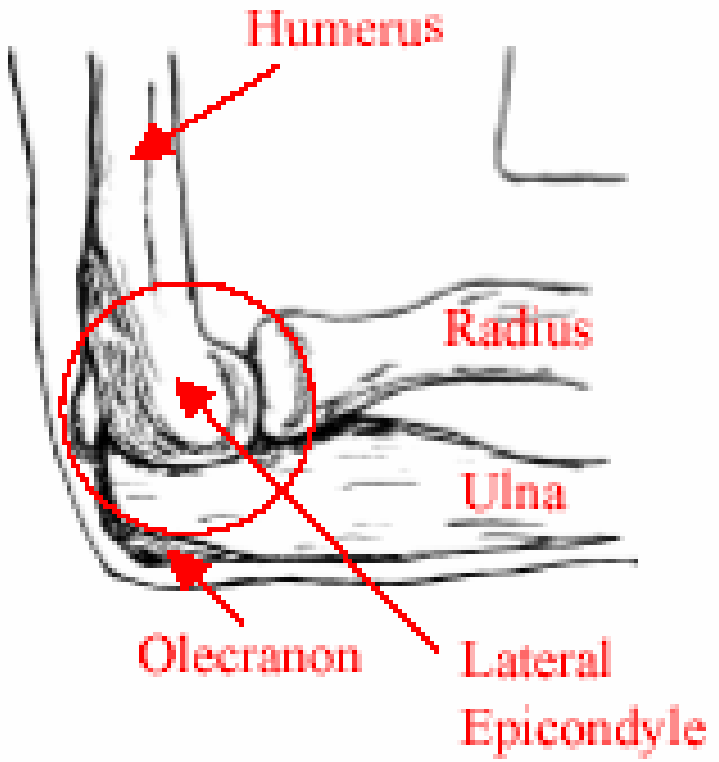
- Where the humerus meet the scapula or shoulder blade
- The shoulder joint is a **ball and socket joint**: the most versatile joint in the body
- Allows three different motions
  - Up and down
  - Front to back
  - Rotational
- Notice the ball-like end of the humerus inserted into the shoulder socket



Shoulder Joint

Joints: Elbow

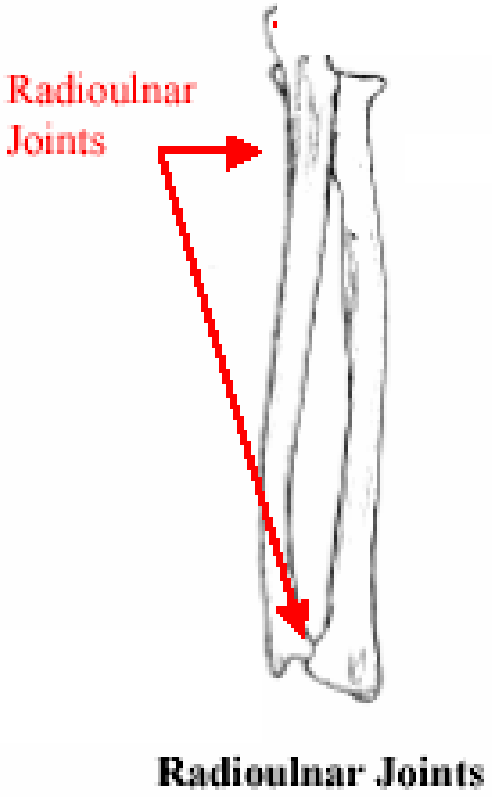
- Where the humerus connects with the radius and ulna
- The elbow is a **hinge joint**: opens and closes like a door
- The hinge joint is the simplest kind of joint



Elbow Joint

Joints: Radioulnar

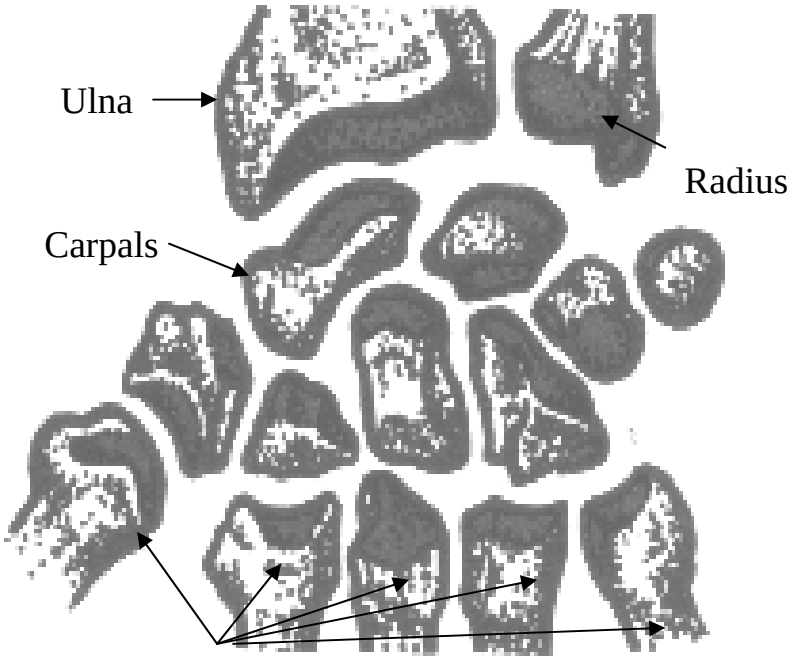
- Where the radius connects to with the ulna
- The radioulnar is a **pivot joint**: allows the radius to rotate around the ulna



Radioulnar Joints

Joints: The Hand

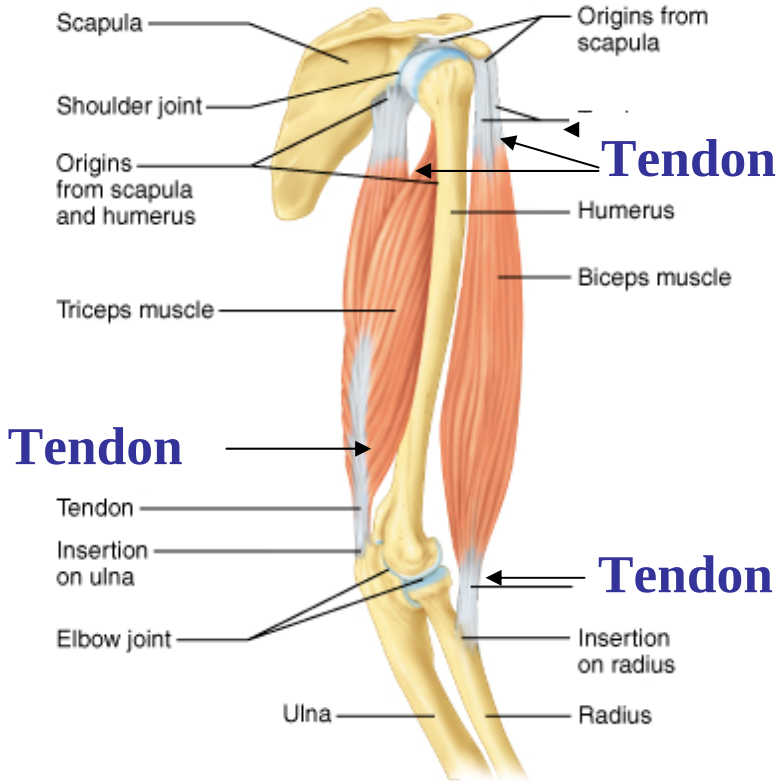
- The joints in your hand are called **gliding joints**
- Allow the bones in your wrist to slide over one another when you move your wrist



Picture courtesy of http://www.botany.uwc.ac.za/sci_ed/grade10/manphys/joints.htm

Tendons in the Arm

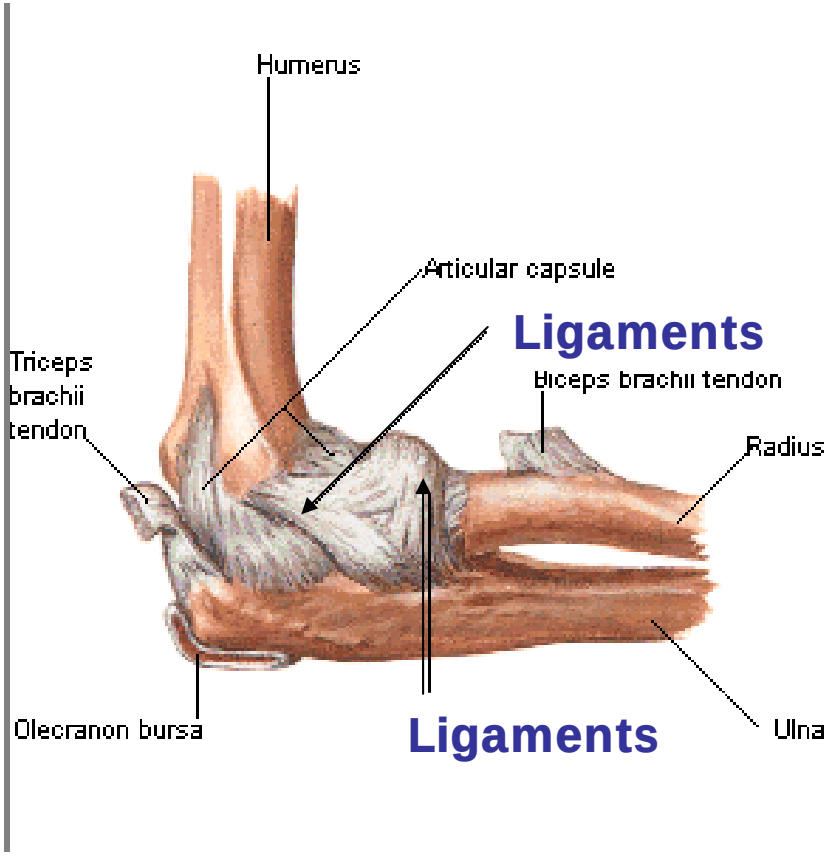
- Tendons are cord-like extensions of muscle
- Tendons attach muscles to bones
- The grey colors in the picture show the tendons of the upper arm



(a) Origin and insertion of skeletal muscle

Ligaments in the Arm

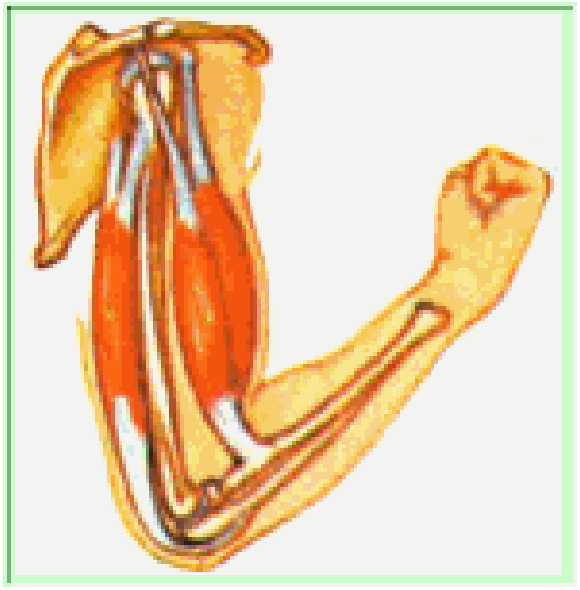
- Ligaments are strong bands of tissue that attach between bones to form a joint
- Ligaments also help prevent the dislocation of joints



http://www.ma.psu.edu/~pt/384elb5.gif

Review: Arm Anatomy

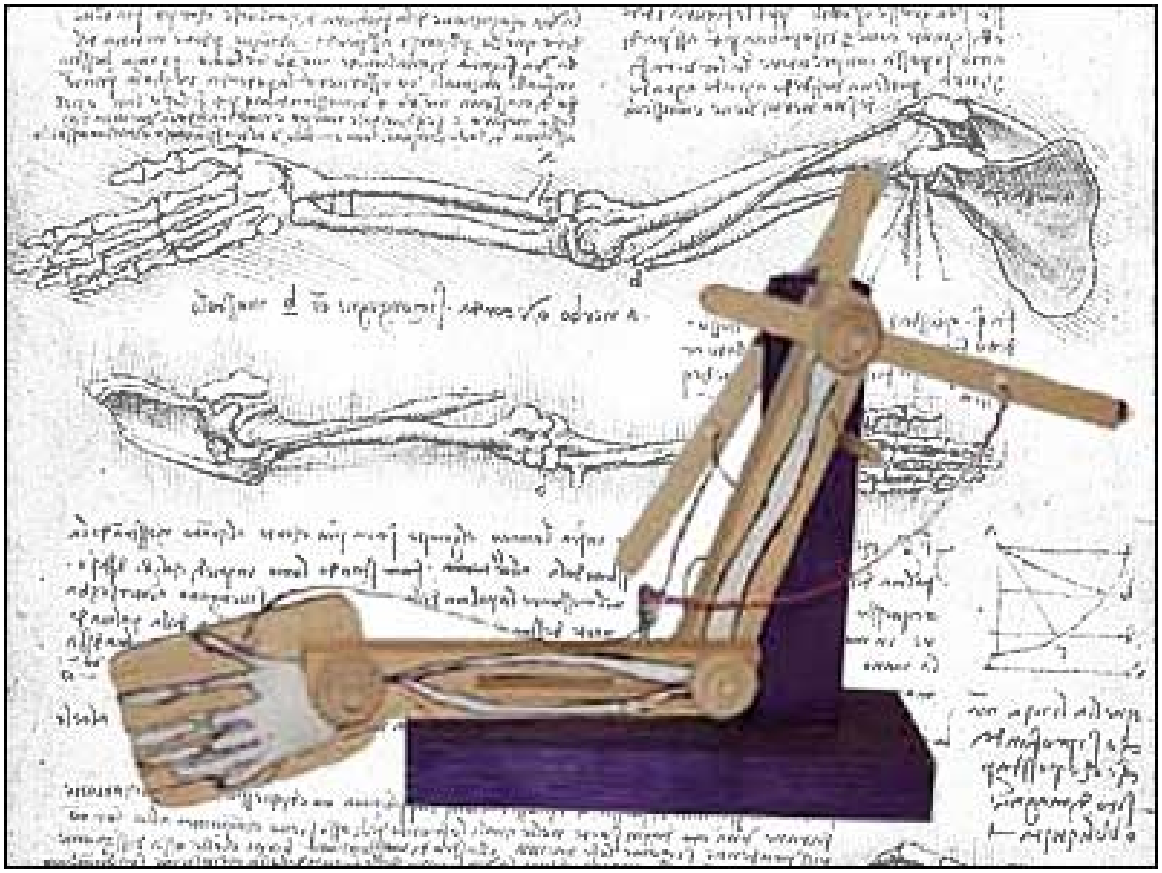
What makes your arm come up and bend into a 90° angle?



osms.otago.ac.nz/ biol115/Paper-outline.html

www.anatomy-resources.com/ human-anatomy/sh241.htm

Leonardo Da Vinci's Mechanical Model



(http://www.eliwhitney.org/schl2003/l4.htm#)