The Human Muscular System

Homeschool Science Infographic #18

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GREETINGS HOMESCHOOLING PARENTS,

Students in my homeschool science classes love human anatomy. I've created this infographic to help students understand the human muscular system anatomy (structure) and physiology (function). I hope it's helpful to your family and please feel free to share it with others.

–Greg Landry
Homeschool Dad
Former College Professor
www.HomeschoolLabs.com

An audio recording will walk you through this graphic

CLICK TO LISTEN

nm = nanometers
= one billionth of a meter
= 0.000000001 meters
= 25,400,000 nm in 1 inch

Virus size (average): **100 nm**

Bacteria size (average): **950 nm**

Human cell (average): **50,000 nm**

Human muscle cell (average): **60,000 nm**

Human hair width (average): **100,000 nm**

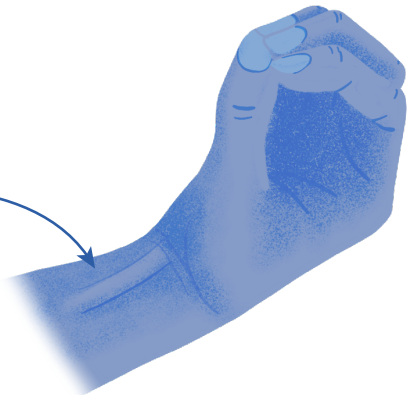
COOL MUSCLE FACTS!

- Humans have over 600 muscles.
- 3 types of muscles:
  - skeletal (most of the muscles in the body)
  - cardiac (heart)
  - smooth (intestines, walls of arteries, etc.).
- "Muscle" come from the Latin "musculus," which means "little mouse"
- Muscles are attached (called origins & insertions) to bones with very strong tendons that mesh into the bone.
- They move the body with incredible coordination and precision.
- They contract (shorten) via a sliding filament mechanism.
- They produce heat that helps maintain normal body temperature (homeostasis).
- They love high energy ATP for energy.
- Glycogen (stored glucose) is stored in the muscle and liver and broken down to glucose when needed
- Glucose, along with oxygen, goes through cellular respiration to produce the high energy molecule that muscles love: ATP!
- Proprioception (muscle sense) allows our brain to know where our muscles are and what they're doing.
- Regular activity (manual work or exercise) increases the muscle's tone (state of slight contraction) and ability to use oxygen to create ATP (improves fitness level and your 5K time). :-)
- Muscle hypertrophy (increase in size) occurs when it has to do "harder" work than it normally does (weight training or manual work that requires heavy lifting).
- The longest muscle cell is about 32 cm (sartorius muscle in the leg) and the shortest is about 0.1 cm (stapedius muscle in the ear).

DO YOU HAVE A PALMARIS LONGUS?

Do you have a palmaris longus? 23% of the population does not.

Here's how to determine if you do: squeeze your fingertips together like this while bending your wrist and look for the palmaris longus tendon.



Does not having a palmaris longus affect you negatively? Your grip strength might be slightly decreased, but it's not noticeable.

Anterior Muscles

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TERMINOLOGY

Anterior = front

Posterior = back

Lateral = away from the midline of the body

Medial = toward the midline of the body

Adduction = moving the arm or leg toward the body

Abduction = moving the arm or leg away from the body

Anatomical position = standing, arms by the side, palms forward

Frontalis

Deltoid

Covers all of the shoulder: anterior, middle and posterior. Enables you to move your arms away from your body (abduction).

Pectoralis Major

Biceps Brachii

Triceps Brachii

Brachioradialis

Quadriceps

or "quads" are a group of these four muscles:

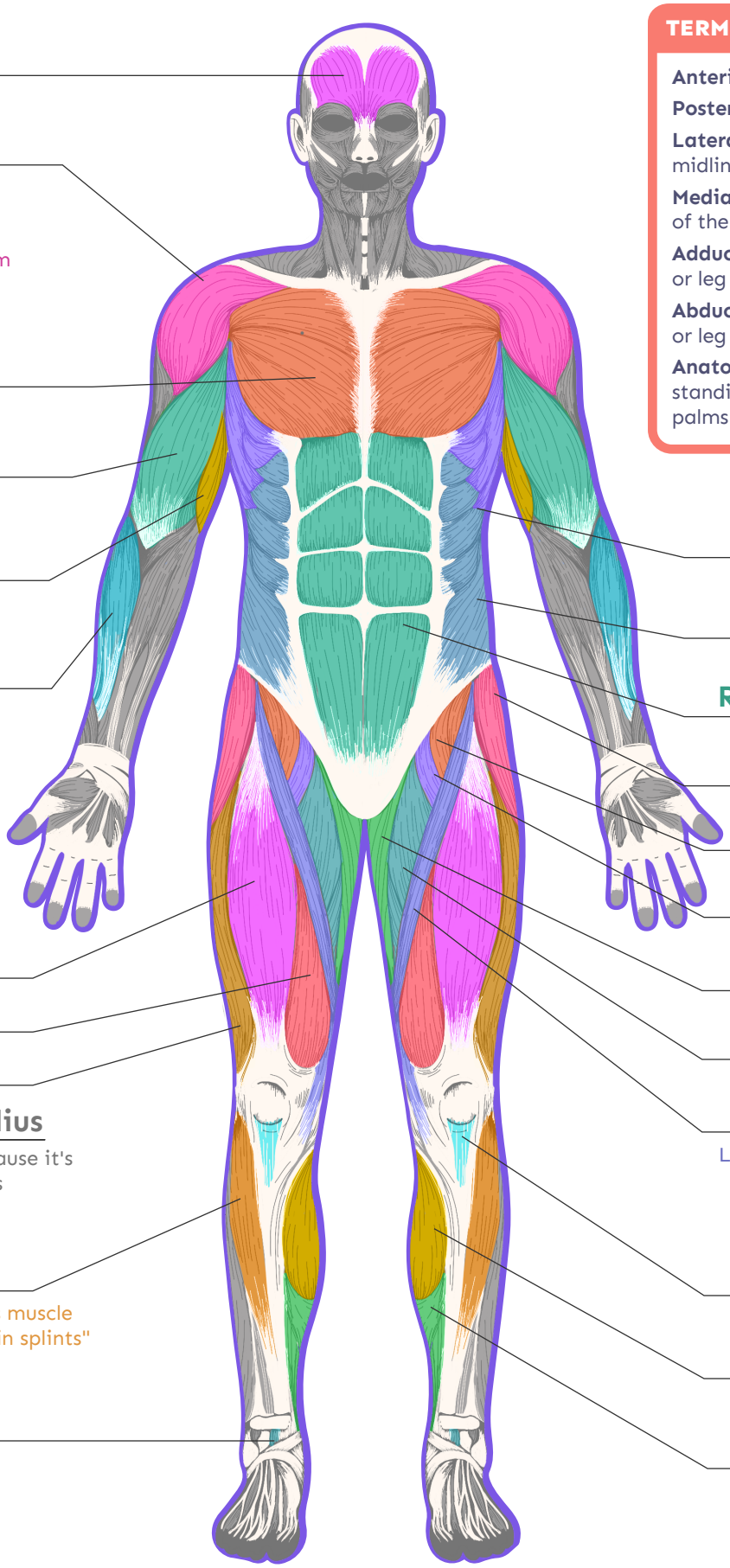
- Rectus Femoris
- Vastus Medialis
- Vastus Lateralis
- Vastus Intermedius

  which can't be seen because it's below the rectus femoris

Tibialis Anterior

The pain we feel when this muscle becomes sore is called "shin splints"

Extensor Hallicus



Serratus Anterior

External Oblique

Rectus Abdominis

Gluteus Medius

Iliopsoas

Pectineus

Gracilis

Adductor Longus

Sartorius

Longest muscle in the body and it's rare in that it crosses other muscles

Patellar Tendon

Gastrocnemius

Soleus

Posterior Muscles

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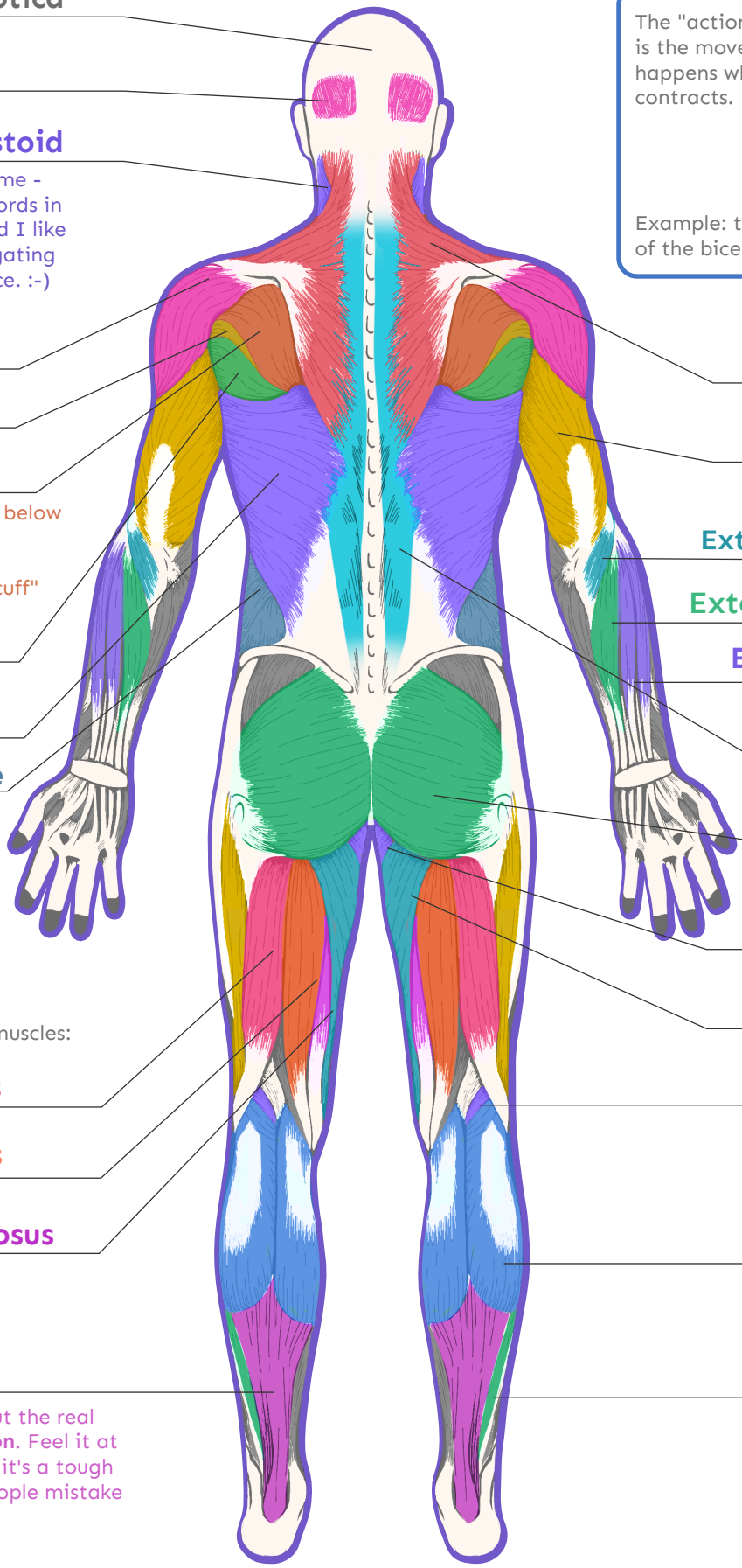
The "action" of a muscle is the movement that happens when it contracts.

Example: the action of the bicep is flexing of the arm.



Galeus Aponeurotica

Occipitalis

Sternocleidomastoid

i love the this muscle name - it's one of the longest words in the English language and I like to pronounce it by elongating "mastoid" in a deep voice. :-)

Deltoid

Teres Minor

Infraspinatus

Name indicates that it's below the spine (ridge) of the scapula. One of the four muscles of the "rotator cuff"

Teres Major

Latissimus Dorsi

External Oblique

Hamstrings

A group of these three muscles:

- **Biceps Femoris**
- **Semitendinosis**
- **Semimembranosus**

Achilles Tendon

is the common name, but the real name is **calcaneal tendon**. Feel it at the back of your ankle - it's a tough round tendon - some people mistake it for a bone.

Trapezius

Triceps Brachii

Action is to extend the arm

Extensor Carpi Radialis

Extensor Carpi Ulnaris

Extensor Digitorum

Sacrospinalis

Gluteus Maximus

Largest muscle in the body

Adductor Magnus

Gracilis

Plantaris

Gastrocnemius

Soleus

Student Worksheet Anterior Muscles

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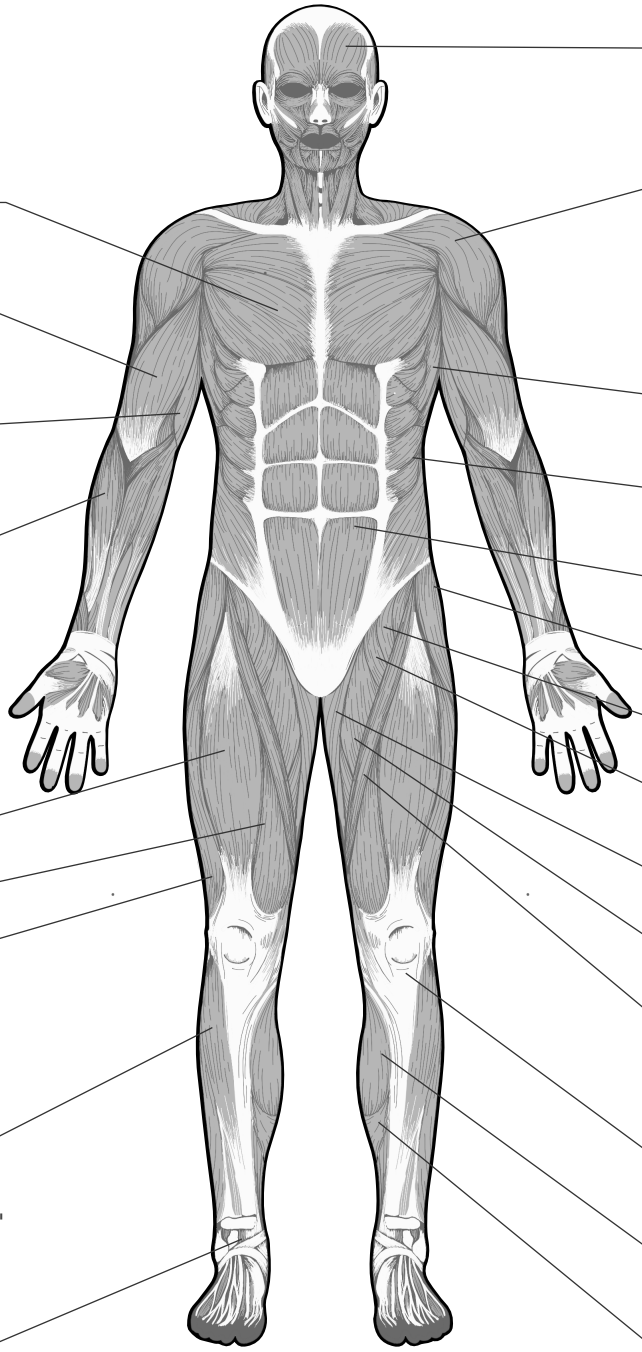

Covers all of the shoulder: anterior, middle and posterior. Enables you to move your arms away from your body (abduction).

_____ or "quads" are a group of these four muscles:

- _____
- _____
- _____
- _____

_____ which can't be seen because it's below the rectus femoris

Longest muscle in the body and it's rare in that it crosses other muscles

The pain we feel when this muscle becomes sore is called "shin splints"

True or False

1. **T** **F** The average muscle cell width is 5 nanometers.
2. **T** **F** In anatomical position, the biceps brachii muscle is on the anterior of the body.
3. **T** **F** The "quadriceps" are a group of four muscles on the anterior of the leg.
4. **T** **F** Ligaments attach muscles to bones.
5. **T** **F** Some people do not have a palmaris longus muscle.

Student Worksheet Posterior Muscles

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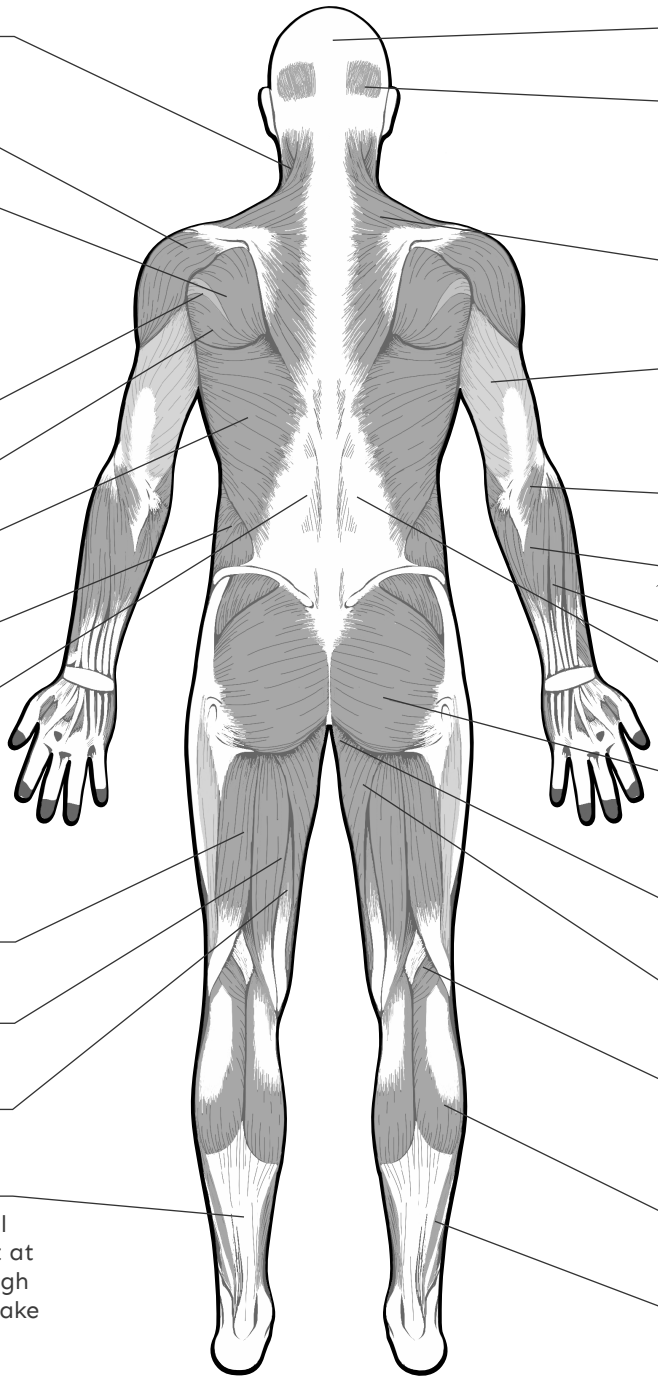

Name indicates that it's below the spine (ridge) of the scapula. One of the four muscles of the "rotator cuff"

Action is to extend the arm

Largest muscle in the body

A group of these three muscles:

- _____
- _____
- _____

_____ is the common name, but the real name is **calcaneal tendon**. Feel it at the back of your ankle - it's a tough round tendon - some people mistake it for a bone.

True or False

6. **T** **F** Humans have over 900 muscles.
7. **T** **F** Muscles produce heat to help maintain temperature homeostasis.
8. **T** **F** The trapezius muscle is posterior leg muscle.
9. **T** **F** The tendon of the gastrocnemius is the calcaneal tendon.
10. **T** **F** Adducting the leg is moving it toward the midline of the body.