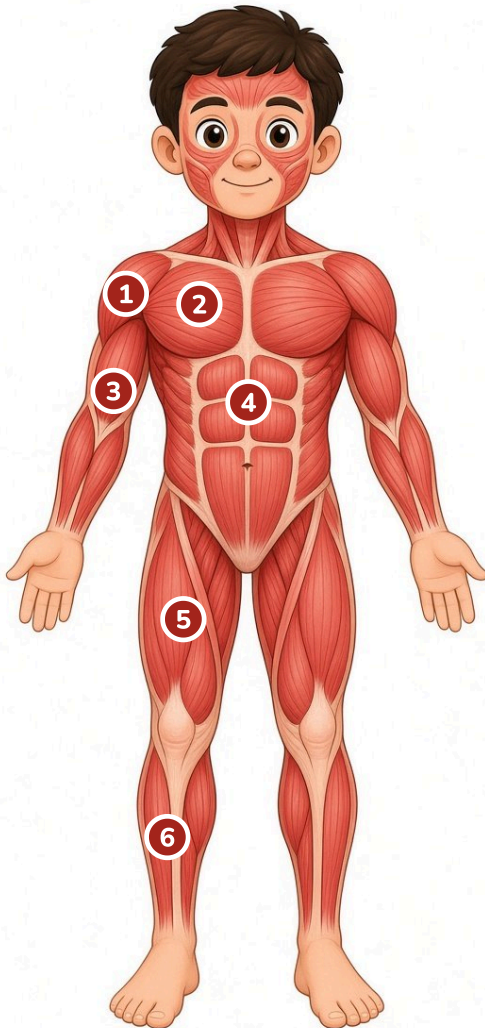




Instructions: No word bank: name the numbered parts from memory or from the module. Number the discoveries in order and write each date. Analyse the source, explain significance, then write full-sentence answers and plan the essay.

1. Name the parts (no word bank)



1 _____ 2 _____ 3 _____ 4 _____
5 _____ 6 _____

Did you know?

- It takes more than a dozen muscles to smile.
- The tiny stapedius muscle in the ear is the smallest skeletal muscle.
- Muscle fibres contract because protein threads slide over each other.
- Galvani's experiments inspired ideas about electricity in the body.

Background

You have more than 600 muscles. Muscles are made of long cells called muscle fibres that can contract (get shorter). When a muscle contracts it pulls. Muscles can only pull, never push. Muscles make up around a third to two-fifths of your body weight.

2. Timeline: order and date

Number the events 1 to 7 (1 = earliest) and write the date of each.

#	Event	Date
1	Vesalius draws the muscles in detail	
2	Helmholtz measures the speed of nerve signals	
3	Swammerdam studies how muscles change when they contract	
4	Hill wins a Nobel Prize for muscle research	
5	Galen shows nerves control muscles	
6	Galvani: electricity makes muscles twitch	
7	Sliding filament theory explains contraction	

4. Significance

Scientist or term	Who or what? Why does it matter?
Luigi Galvani	
Andrew Huxley and Hugh Huxley	
Galen	
Archibald Hill	
Contract	

6. Longer answers (full sentences)

1. Explain what an antagonistic pair is, using the quadriceps and hamstrings.

2. Why do we get hot during exercise and shiver when cold?

3. Compare skeletal and cardiac muscle in two ways.

4. How did Galvani's experiment change ideas about the body?

5. Explain in your own words: Explain two ways you can keep your muscles healthy.

3. Source analysis

When the nerve was touched with a metal tool while a machine made sparks nearby, the frog's leg muscles contracted strongly, as if seized by a spasm.

Luigi Galvani, report on animal electricity (1791), (paraphrased)

1. What made the frog's muscles contract?

2. What did this suggest about how muscles are controlled?

3. Why should we check other scientists' experiments, like Volta did with Galvani's?

5. Cause and consequence

1. Explain why muscles need to work in antagonistic pairs.

2. Explain one consequence of not exercising for a long time.

7. Essay question

Essay: 'Cardiac muscle is the most important muscle in the body.' How far do you agree? Plan an essay.

Plan: introduction · point for (evidence) · point against (evidence) · conclusion with your judgement.