



Primal picture

Anatomy and Physiology Online(APO)



FlySheet
Med-Informatics

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飛資得醫學資訊

APO簡介

- 為Primal Pictures所發展的產品，內容涵蓋解剖學及生理學的範疇
- 透過3D模型，剝除圖層、旋轉模型、將圖層重建成具有結構方式與解剖教材互動
- 根據人體解剖與生理學學會(HAPS)制定學習目標

APO簡介

- 引導式學習資源，學生可與線上資源互動，提供學生課外學習素材。
- 提供**19**個身體系統模組，各類模組內容包含
 - 學習目標
 - 清晰的3D影像
 - 綜合文字說明
 - 臨床與案例研究
 - 練習題
- **250**多個涵蓋病理生理學的臨床主題及案例研究

APO簡介

19個身體系統模組包含

- 血液
- 身體構造與組織
- 心血管系統
- 細胞生物學
- 化學
- 消化系統
- 內分泌系統
- 體液電解質與酸鹼平衡
- 組織學
- 皮膚系統
- 淋巴系統與免疫性
- 代謝
- 肌肉系統
- 神經系統
- 生殖系統
(男性與女性)
- 呼吸系統
- 骨骼系統
- 特殊感覺
- 泌尿系統

APO使用者介面

說明單元
學習目標

綜合文字說明

INTRODUCTION

What you need to know

On completing this module, you should be able to describe the following:

- Microanatomy of skeletal muscle fibers.
- Action potentials crossing a neuromuscular junction.
- Excitation-contraction coupling.
- The muscle contraction cycle.
- Contraction of a skeletal muscle fiber.
- Skeletal muscle classification and nomenclature.



3D互動學習

Muscular system overview



Frame 3 of 36

Layer 13 of 13

Anatomy and Physiology

MUSCULAR SYSTEM



INTRODUCTION

Muscular tissue is specialized in that cells have both contractile and conducting properties. It provides us with our ability to move, regulate organ volumes, maintain posture, communicate, and, through the consumption of energy in the form of ATP, perform work.

Common properties that muscles share enable our muscular system to adapt to the changing needs of the body. These include: **electrical excitability**, **contractility**, **elasticity**, and **extensibility**.

PROPERTIES OF MUSCULAR TISSUE

Electrical excitability	Electrical excitability refers to the ability of a muscle to respond to stimuli, such as neurotransmitters, by eliciting an electrical signal called an action potential.
Contractile	Contractility refers to the ability of a muscle to shorten in response to an action potential.
Extensible	Extensibility refers to the ability of a muscle to stretch (without injury).
Elastic	Elasticity refers to the ability of a muscle to recover its original shape after contraction or extension.

All muscles work through the conduction of action potentials and subsequent contraction and relaxation, but all have different purpose relative to their design and location. There are hundreds of muscles in the body, which work together in unison to perform work.

Aging

Clinical and Case Studies

Quiz

APO使用者介面

分成小單元供使用者做選擇

The screenshot displays the APO (Anatomy and Physiology Online) user interface. On the left is a vertical navigation menu with icons and labels for: Introduction, Micro-anatomy, Physiology, Contraction, Classification, Actions, and Head. The main content area is titled 'Anatomy and Physiology' and features a 'MUSCULAR SYSTEM' section. This section includes an 'INTRODUCTION' paragraph, a table of 'PROPERTIES OF MUSCULAR TISSUE', and a 'Clinical and Case Studies' link. A large 3D model of a human muscular system is visible in the center. A red box highlights the navigation menu, and a blue speech bubble points to the 'Clinical and Case Studies' link.

Micro-anatomy of skeletal muscle fibers:

- Action potentials crossing a neuromuscular junction.
- Excitation-contraction coupling.
- The muscle contraction cycle.
- Contraction of a skeletal muscle fiber.
- Skeletal muscle classification and nomenclature.

MUSCULAR SYSTEM

INTRODUCTION

Muscular tissue is specialized in that cells have both contractile and conducting properties. It provides us with our ability to move, regulate organ volumes, maintain posture, communicate, and, through the consumption of energy in the form of ATP, produce body heat.

The common properties that muscles share enable our muscular system to adapt to the changing needs of the body. These include: **electrical excitability**, **contractility**, **elasticity**, and **extensibility**.

PROPERTIES OF MUSCULAR TISSUE

Electrical excitability	Electrical excitability refers to the ability of a muscle to respond to stimuli, such as neurotransmitters, by eliciting an electrical signal called an action potential.
Contractile	Contractility refers to the ability of a muscle to respond to an action potential by contracting.
Extensible	Extensibility refers to the ability of a muscle to stretch (e.g., during injury).
Elastic	Elasticity refers to the ability of a muscle to return to its original shape after contraction.

All muscles work through the conduction of action potentials and subsequent contraction and relaxation, but all have different purposes relative to their design and location. There are hundreds of muscles in the body, which work together in unison to perform various functions.

Navigation Menu:

- Introduction
- Micro-anatomy
- Physiology
- Contraction
- Classification
- Actions
- Head

Bottom Bar:

- Aging
- Clinical and Case Studies
- Quiz

Frame 3 of 36

Layer 13 of 13

臨床案例
研究

練習題

APO 3D互動式教學

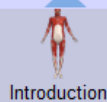
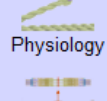
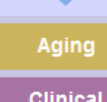


APO 綜合文字說明





INTRODUCTION

 Introduction
  Microanatomy
  Physiology
  Contraction
  Classification
  Actions
  Aging
  Clinical

What you need to know

On completing this module, you should be able to:

- Identify the properties of muscle tissue and the functions of the muscular system.
- Review the anatomy of skeletal muscle fibers.
- Explain the formation and transmission of action potentials across the neuromuscular synapse.
- Explain the events of the contraction cycle of skeletal muscle.
- Identify the different types of skeletal muscle fibers and muscle contractions.



Muscular system ~ overview



Maximize

Anatomy and Physiology

MUSCULAR SYSTEM



Muscular tissue provides us with the ability to move, communicate, and through the contraction of muscles, the body can adapt to the changing needs of the body. The common properties of muscle tissue are **contractility, elasticity, and extensibility**.

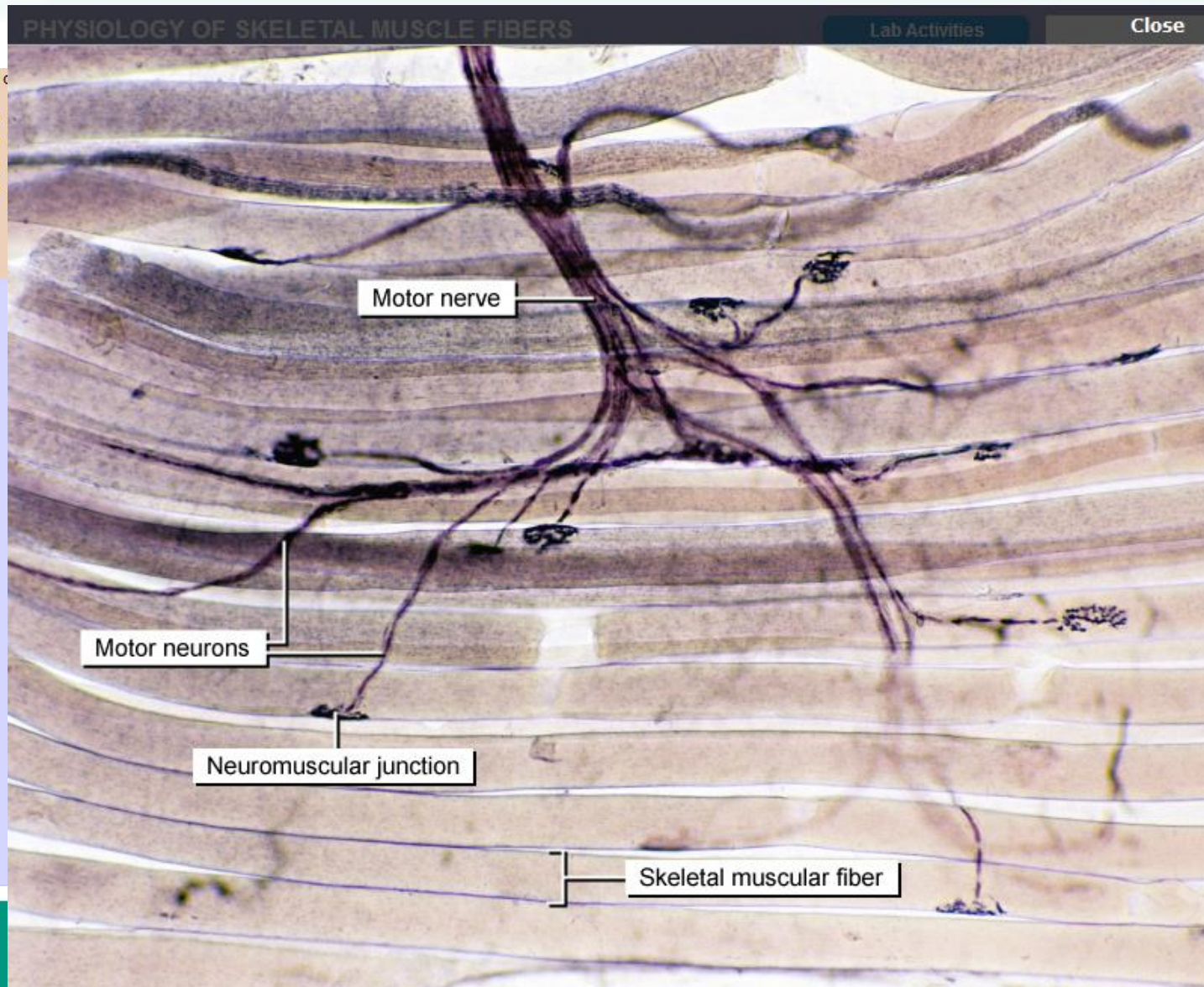
PROPERTIES OF MUSCULAR TISSUE	
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Extensible	Extensibility refers to the ability of a muscle to stretch (without injury).
Elastic	Elasticity refers to the ability of a muscle to recover its original shape after contraction or extension.

All muscles work through the conduction of action potentials and subsequent contraction and relaxation, but all have a different purpose relative to their design and location. There are hundreds of muscles in the body, which work together in unison to achieve the numerous functions of the muscular system.

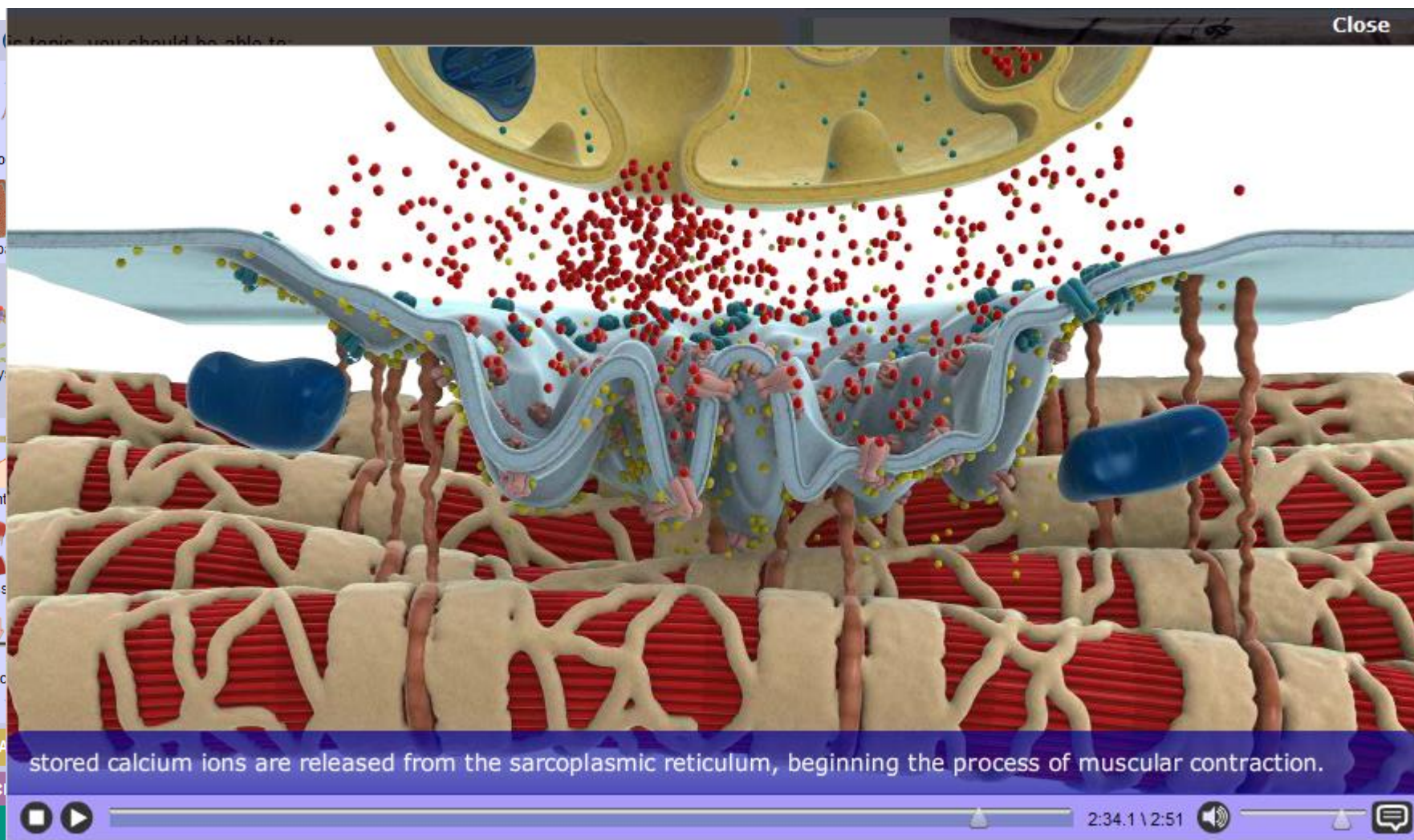
There are three different types of muscle found in the body: **skeletal, cardiac, and smooth**. Each type is specifically designed for its individual function.

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檔做使用

APO文字說明內容簡介-組織學



APO文字說明內容簡介-影片檔



APO 臨床相關症狀

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檔做使用

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Clinical



[COMPARTMENT SYNDROME](#) | [DUCHENNE MUSCULAR DYSTROPHY](#) | [MYASTHENIA GRAVIS](#) | [ROTATOR CUFF TEAR](#) | [TENDONITIS](#)

Disorders of the muscular system are commonly related to sporting or occupational activities that have led to overuse and traumatic injury. Rarer causes include autoimmune and inflammatory conditions. Many muscular conditions are treated by general practitioners or physiotherapists, with only the more uncommon diseases being treated by specialists known as rheumatologists.

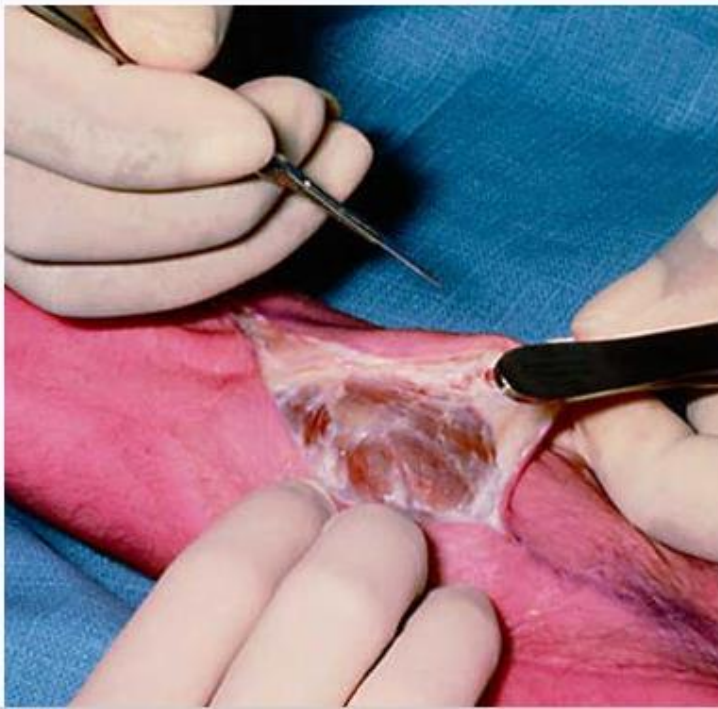
COMPARTMENT SYNDROME

Overview

Compartment syndrome is a condition whereby an abnormal increase in pressure within a closed body compartment compromises the blood supply to the tissues, which can subsequently lead to necrosis or dysfunction of the organs within that compartment. It is the muscle compartments of the limbs that are most commonly affected and the pressure rise is usually due to swelling within the compartment. The muscles of the body, particularly within the limbs, are grouped into these distinct functional units called compartments which are bound by tough fibrous tissue (fascia) and bones. It is the inflexible nature of these boundaries that causes pressure to rise if there is any swelling.

Causes

Compartment syndrome can be caused by anything that induces swelling within a compartment, such as soft tissue injuries, burns or fractures, all of which can lead to inflammation. Swelling may also be caused if the venous blood flow from a limb is impaired by a tight fitting plaster cast or bandage. The sites most frequently affected are the anterior compartment of the leg and the flexor compartment of the forearm.

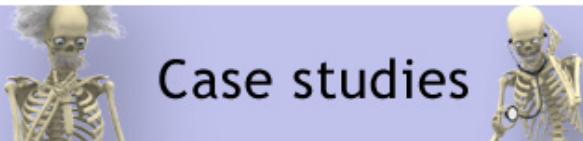


APO 案例研究

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檔做使用

Close

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Case studies

Abdominal wall surgery

Natalie, a 24-year-old actress, was undergoing an operation to remove her appendix. The surgeon cut through the muscle layers of the abdominal wall, 5 cm lateral to the rectus abdominis muscle. There were complications during the operation and the surgeon decided to make a larger incision via the linea alba, to provide a clear field of view.

1. Name, from superficial to deep, the three muscular layers of the abdominal wall that the surgeon would have cut through initially.	
Reveal answer: 	
2. What are the normal roles of the abdominal wall muscles named in answer to question 1?	
Reveal answer: 	
3. Where is the rectus abdominis muscle located?	
Reveal answer: 	
4. What are the attachments of rectus abdominis? What are the functions of the rectus abdominis?	
Reveal answer: 	
5. What is the rectus sheath? What forms the rectus sheath?	
Reveal answer: 	
6. What is the linea alba?	
Reveal answer: 	

Anesthesia

Reggie, a 48-year-old factory worker, was being anesthetized prior to an operation. During induction of the anesthesia, Reggie received a dose of rocuronium, a non-depolarizing neuromuscular junction blocking agent. Rocuronium competitively blocks the postsynaptic receptor at the neuromuscular junction and therefore prevents the activation of the receptors by the normal signaling molecule.

APO 練習題

Quiz

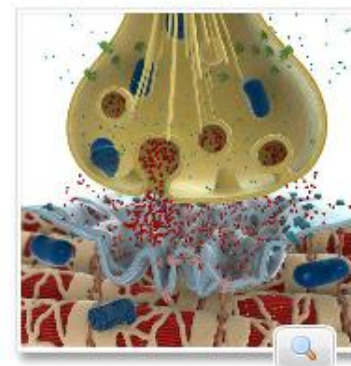
Close

Physiology of skeletal muscle fibers

Question 1 of 5

Point Value: 1

What is the term used to describe the **connection** between a muscle fiber and the neuron that innervates it?



做完習題後，會輸出考試成績，
做為學習成效參考依據

Score so far: 0 points out of 0

SUBMIT

謝謝您的支持
另有APO on iPad