Lecture 35: Movement and Its Control 1066...1105-1119

Knee-Jerk Reflex

- 1- the reflex is initiated artificially by tapping the tendon connected to the quad
- 2- sensors detect a sudden stretch in the quad-
- 3- sensory neurons convey the info to the spinal cord
- 4- in response to signals from the sensory neurons, motor neurons convey signals to the quad, causing it to contract and jerking the lower leg forward
- 5- sensory neurons also communicate with interneurons in the spinal cord
- 6- the interneurons inhibit motor neurons that lead to the hamstring muscle. This inhibition prevents contraction of the hamstring which would resist the action of the quad

## 50.5 The Physical Interaction of Protein Filaments is Required for Muscle Function

### Vertebrate Skeletal Muscle

- skeletal muscle: attached to the bones and is responsible for their movement
- -skeletal muscles consist of a bundle of long fibers running parallel to the length of the muscle and each fiber is a single cell with many nuclei, reflecting its formation by the fusion of many embryonic cells.
- a muscle fiber contains a bundle of smaller myofibrils arranged longitudinally.
  - -myofibrils composed of thin filaments and thick filaments
  - -thin filaments: 2 strands of actin & 2 strands of a regulatory protein coiled around one another
  - -thick filaments: staggered arrays of myosin molecules
- -skeletal muscle is also striated muscle because of the regular arrangement of the filaments creates a
  pattern of light and dark bands
- each repeating unit is a sarcomere, the basic contractile unit of the muscle
- -in a muscle fiber at rest, thick and thin filaments only partially overalp

#### The Sliding-Filament Model of Muscle Contraction

- -neither the thin filaments nor the thick filaments change in length when the sarcomere shortens; rather, the filaments slide past each other longitudinally, increasing the overlap of the thin and thick filaments
- -sliding of filaments based on the interaction between the myosin and actin molecules that make up the thick and thin filaments
- -each myosin molecule consists of a long tail region and a globular head region extending of the side
- -the tail adheres to the tials of other myosin molecules that from the thick filament
- -head center that powers muscle contractions
- -it can bind ATP and hydrolize it into ADP and phosphate
- -bydrolysis of ATP converts myosin to a high-energy form that can bind to actin, form a cross-bridge, and pull the thin filament toward the center of the sarcomere
- -cross bridge is broken when a new molecule of ATP binds to the myosin head
- -in a prepeating cycle, the free head cleaves the new ATP and attaches to a new binding site on another actin molecule farther along the thin filament
- -a typical muscle fiber at rest contains only enough ATP for a few contractions...energy needed for repetitive contractions is stored in creatine phosphate and glycogen
  - -creatine phosphate can transfer a phosphate group to ADP → ATP
- -the resting supply of creatine phosphate is sufficient to sustain contractions for about 15
- seconds....glycogen → glucose and energy used to generate ATP
- -Myosin-actin interactions underlying muscle fiber contraction
  - 1- the myosin head is bond to ATP and is in its low energy configuration
  - 2- the myosin head hydrolyzes ATP to ADP and Pi and is in its high energy configuration
  - 3- the myosin head binds to actin, forming a cross bridge
  - 4- releasing ADP and Pi myosin returns to its low energy configuration, sliding the thin filament
  - 5- Binding of a new molecule of ATP releases the myosin head from actin, and a new cycle begins

# **Iba Final Exam Study Guide Answers**

Annelies Vredeveldt, Timothy John Hollins

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Agricultural Research Results ,1978 WASTES: Solutions, Treatments and Opportunities IV Candida Vilarinho, Fernando Castro, Margarida I Ouina, 2023-09-06 WASTES Solutions Treatments and Opportunities IV contains selected papers presented at the 6th edition of the International Conference Wastes Solutions Treatments and Opportunities that took place on 6 8 September 2023 in Coimbra Portugal The Wastes conference which takes place biennially is a prime forum for sharing innovations technological developments and sustainable solutions for waste management and recycling sectors worldwide with the participation of experts from academia and industry The papers included in this book cover a wide range of topics including Management of waste streams Environmental economic and social aspects in waste management Logistics policies regulatory constraints and markets in waste management Waste to energy technologies Life cycle assessment and carbon footprint Biological treatment techniques Waste treatment and valorization technologies Circular economy and industrial symbioses Smart technologies and digital tools in waste management Recycling of wastes and resources recovery Wastes refineries Food waste management and bioeconomy Plastic waste impacts management strategies and solutions Wastes as critical raw materials resources WASTES Solutions Treatments and Opportunities IV is aimed at academics and professionals involved in waste management and recycling sectors globally Environmental Distraction to Facilitate Cognitive Performance Annelies Vredeveldt, Timothy John Hollins, 2015-03-26 When faced with a difficult task people often look at the sky or close their eyes This behavior is functional the reduction of distractions in the environment can improve performance on cognitive tasks including memory retrieval Reduction of visual distractions can be operationalized through eye closure gaze aversion or by comparing exposure to simple and complex visual displays respectively Reduction of auditory distractions is typically examined by comparing performance under quiet and noisy conditions Theoretical reasoning regarding this phenomenon draws on various psychological principles including embodied cognition cognitive load and modality specific interference Practical applications of the research topic are diverse For example the findings could be used to improve performance in forensic settings e g eyewitness testimony educational settings e g exam performance occupational settings e g employee productivity or medical settings e g medical history reporting This Research Topic welcomes articles from all areas of psychology relating to the reduction of distractions to improve task performance Articles can address but are not limited to new empirical findings comprehensive reviews theoretical frameworks opinion pieces or discussions of practical applications Second Decennial Edition of the American Revisiting the Assessment of Second Language Abilities: From Theory to Practice Sahbi Hidri, 2018-01-12 Digest ,1917 This book presents an overview of revisiting the assessment of language abilities It also showcases how the measurement of such constructs can result in negative or positive washback and how outcomes might be conducive to repercussions that decide on the future of many stakeholders. The 23 chapters were selected among tens of chapters received from different

contexts that addressed the issue of revisiting the assessment of language abilities such as Tunisia Ukraine Algeria Russia KSA Sudan Egypt Canada Kurdistan UK USA Iran Turkey etc These contexts have highlighted the necessity to revisit the different constructs which should be assessed with a clear and straightforward foundation on students learning objectives and their actual language ability To do so most of the chapters present hands on use of relevant statistical tests that might serve in revisiting the construct definition both theoretically and operationally Perhaps the sole and intricate question that the authors of these contributions ask is what it means to revisit the assessment of the construct of individualized language ability and how In addition the book accentuates the momentousness and significance of reflecting on test fairness and validation as the mainspring and backbone for democratization of assessment This book appeals to a broad readership such as English Language Teaching ELT practitioners language teachers students testing organizations policy makers test designers writers of test specifications testing experts researchers program evaluators especially in the Middle East and North Africa MENA as well as other international contexts **CUET (UG)-Common Universities Entrance Test for** Under Graduate Programmes: Agriculture Subject Ebook-PDF Chandresh Agrawal, nandini books, 2024-07-16 SGN The Ebook CUET UG Common Universities Entrance Test for Under Graduate Programmes Agriculture Subject Covers Objective Questions From Various Competitive Exams With Answers Annual Report Northern Nut Growers Association, CUET (PG) Agricultural Science PDF Common University Entrance Test (PG): Agricultural Science Subject Domain Specific Knowledge Only eBook Chandresh Agrawal, nandini books, 2025-06-12 SGN The CUET PG Agricultural Science PDF Common University Entrance Test PG Agricultural Science Subject Domain Specific Knowledge Only eBook Covers Objective Questions Asked In Various Competitive Exams With Answers Tree Planters' Notes ,1979 Some no include reports compiled from information furnished by State Foresters and others Planters' Notes ,1978 Some no include reports compiled from information furnished by State Foresters and others

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