

APPH 4600/6600 Skeletal muscle structure and function Spring 2013

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Text: Lieber, R.L., **Skeletal Muscle Structure and Function: Implications for rehabilitation and sports medicine, 3rd ed**, Lippincott Williams & Wilkins, 2010.

Web: <http://www.ap.gatech.edu/Burkholder/4600/>

Date	Topic	Reading
Jan 8	Embryonic myogenesis	Text 1-11
Jan 10	Molecular myogenesis	Bentzinger, <i>et al.</i> (2012). Building muscle: molecular regulation of myogenesis. Cold Spring Harb Perspect Biol 4.
Jan 15	Organelle structure	Text 11-14
Jan 17	Sarcomere structure	Text 15-21
Jan 22	Fiber architecture	Text 22-33
Jan 24	Structural specialization	Text 34-38; 62-63
Jan 29	Electrotonic structure	Text 18-19
Jan 31	Innervation; Sensory	Banks, <i>et al.</i> (2009). A comparative analysis of the encapsulated end-organs of mammalian skeletal muscles and of their sensory nerve endings. Journal of Anatomy 214, 859-87.
Feb 5	Moment arms	Alexander & Dimery. (1985). The significance of sesamoids and retro-articular processes for the mechanics of joints. Journal of Zoology 205, 357-371.
Feb 7	Structure Exam	
Feb 12	Excitation Contraction Coupling	Text 41-46
Feb 14	Length tension relationship	Text 46-52
Feb 19	Force velocity relationship	Text 53-57
Feb 21	Hill model	Siebert, <i>et al.</i> (2008). Nonlinearities make a difference: comparison of two common Hill-type models with real muscle. Biological Cybernetics 98, 133-143.
Feb 26	Crossbridge mechanics	Text 58-62
Feb 28	Fiber types	Text 64-76
Mar 5	Recruitment	Text 76-84
Mar 7	Metabolism	Text 65-69
Mar 12	Fatigue	Text 72-78
Mar 14	Function exam	
Mar 19	Spring break	
Mar 21		

Date	Topic	Reading
Mar 26	Calcium Signaling	Text 141-146
Mar 28	Metabolic signaling	Aschenbach, et al. (2004). 5' adenosine monophosphate-activated protein kinase, metabolism and exercise. Sports Medicine 34, 91-103.
Apr 2	Compensatory Hypertrophy	Text 147-164
Apr 4	mTOR signaling	Deldicque, et al. (2005). Regulation of mTOR by amino acids and resistance exercise in skeletal muscle. European Journal of Applied Physiology 94, 1-10.
Apr 9	Satellite Cells	Ten Broek, et al. (2010). Regulatory factors and cell populations involved in skeletal muscle regeneration. Journal of Cellular Physiology 224, 7-16.
Apr 11	Training	Text 165-179
Apr 16	Immobilization/Unloading	Text 183-191; 199-206
Apr 18	Denervation/SCI	Text 192-225
Apr 23	Muscle Injury	Text 229-242
Apr 25	Sarcopenia	Text 207-212

Evaluation

Exams: Feb 7; Mar 14; May 2, 2:50pm Undergrads: 100%; Grads, 70%
Modeling project Undergrads 0%; grads 30%

General policies

Closed-book exams
No make-up exams
Email communication is best
Office hours by appointment – near L1118 before after class