APPH 4600/6600 Exam 3 2014 Name:_____

Email exam and final score to GT address (yes/no): ____

Section 1: 10 pt each

1. Sketch a force-length curve and use the sliding filament theory to explain the different regions.

2. Sketch a force-velocity curve and use the crossbridge theory to explain the decline in force.

3. Describe the Hill model of force production and sketch the response of each component to a step change in length.

4. Describe the antagonistic actions of growth factor signaling and nutrient depletion on mTOR. Include the names of any important molecular effectors.

5. Explain how calcium signaling helps to differentiate between "endurance" and "hypertrophy" adaptation in muscle. Again, be sure to mention important molecular effectors by name.

6. Name the three major pathways for protein degradation. Pick one of them and describe its process and regulation.

Section 2: 5 pt each

7. True or false: Satellite cells are required for muscle hypertrophy (1 pt). Describe experimental evidence in support (4 pt).

8. True or false: IGF-1 released during overload causes muscle hypertrophy (1 pt). Describe experimental evidence in support (4 pt).

9. True or false: Rapid strength gains early in a new exercise program reflect neural plasticity with little muscle contribution (1). Describe experimental evidence in support (4 pt).

10. What is "sarcopenia?" Explain one theory for its cause and provide supporting observations.

11. What is the role of inflammatory cells following traumatic injury? Following contractile injury?

12. What does a "centrally located nucleus" mean, and how does it get there?

13. .What are AMPK and PGC-1α, and what do they have to do with muscle plasticity?

14. Propose a treatment or therapy regimen for someone who has suffered traumatic injury of the radial nerve, innervating the wrist extensors, if re-innervation is expected to take six months.