

# PENNSYLVANIA STATE UNIVERSITY

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IE 553

Engineering of Human Work

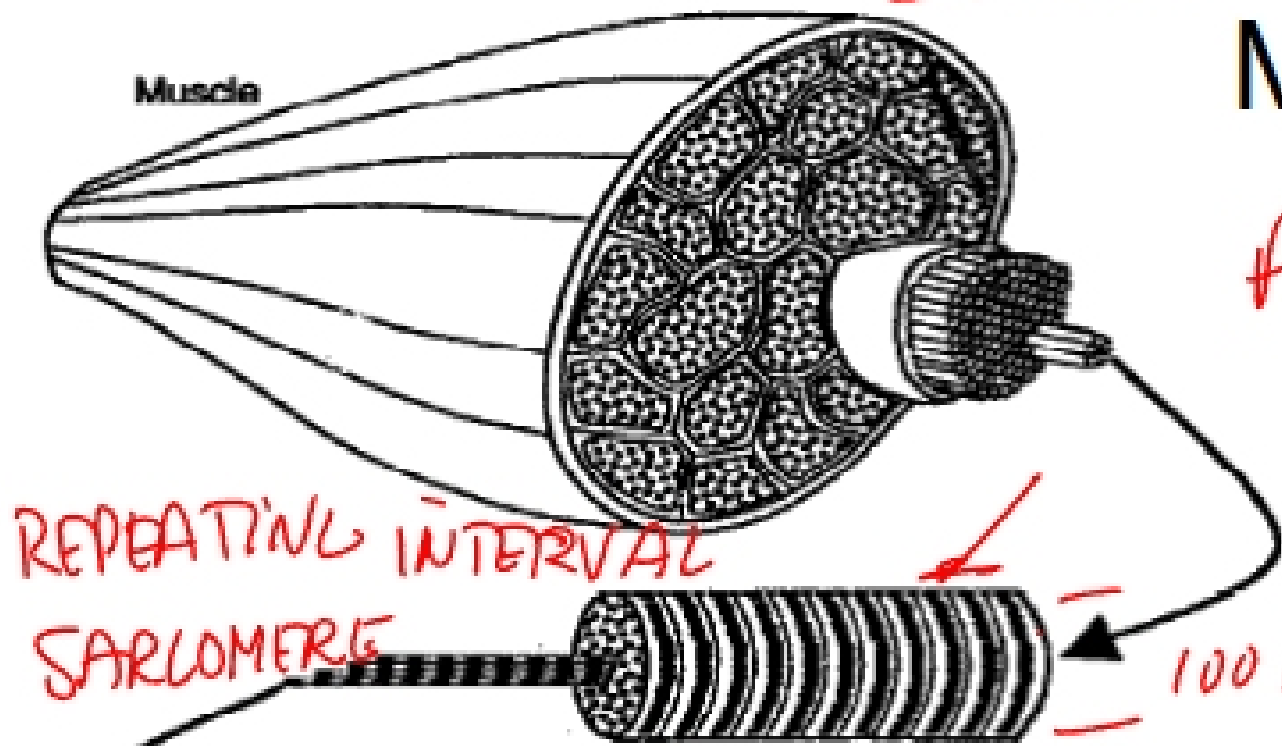
Dr. Andris Freivalds

Class #2

# Muscle Structure

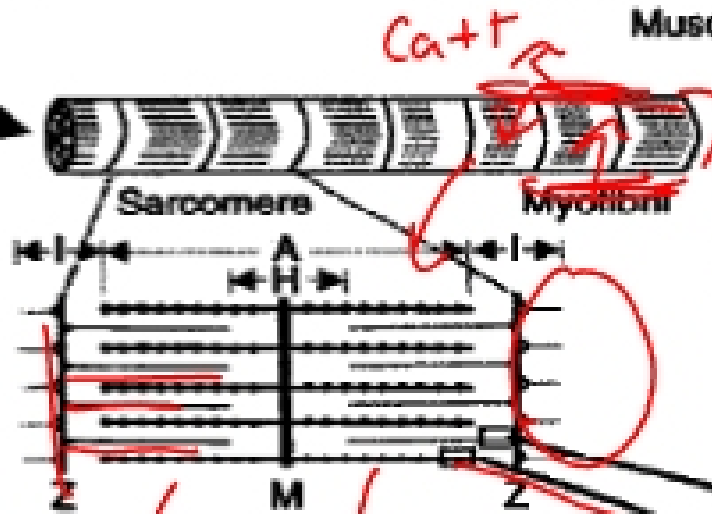
SKELETAL STRIATED

FASCICULI = BUNDLES OF FIBERS



REPEATING INTERVAL  
SARCOMERE

STRUCTURAL UNIT  
SARCOPLASMIC RETICULUM  
MICROSCOPE



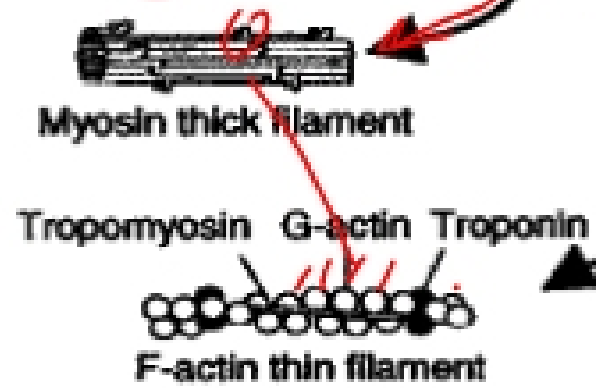
1000s  
MYOFIBRILS  
TUBULE SYSTEM Ca<sup>++</sup>

PROTEIN FILAMENTS

e-SCOPE

Z DISC  
THIN



THICK FILAMENT = MYOSIN MOLECULE  
TAIL HEAD = BOND BRIDGE



ACTIN 0 2-CHAINS

# Sliding Filament Theory

H.E. HUXLEY (1950's)

- Thick & thin filaments slide over one another
- Shortening distance between z-lines <sup>disc</sup> 
- Crossbridges - bonds between myosin head and globular actin 
- Requires energy in form of ATP molecule
- Initiated by Ca<sup>++</sup> ions releasing inhibition
- Produce several basic properties  
ADENOSINE TRI-PHOSPHATE 