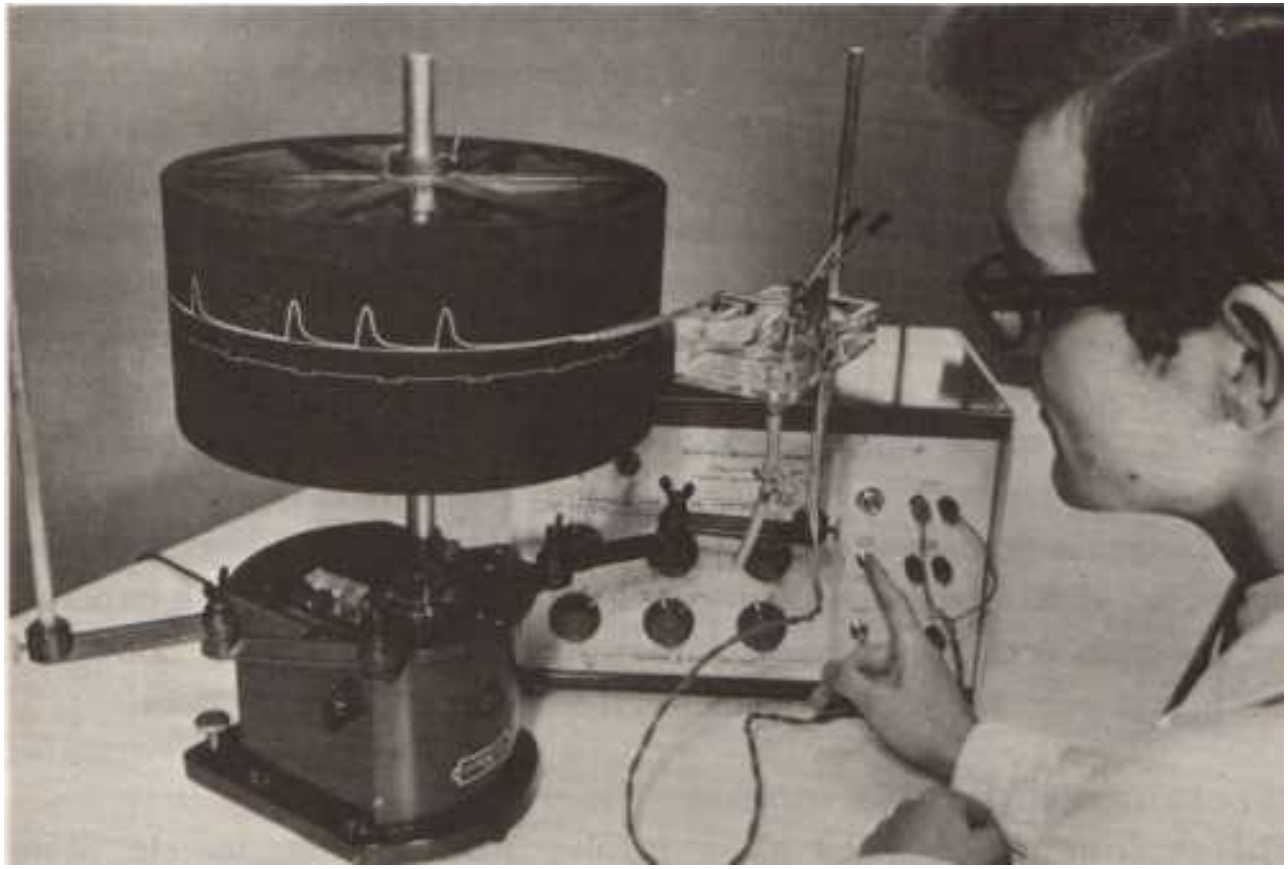
Dissection of Frog

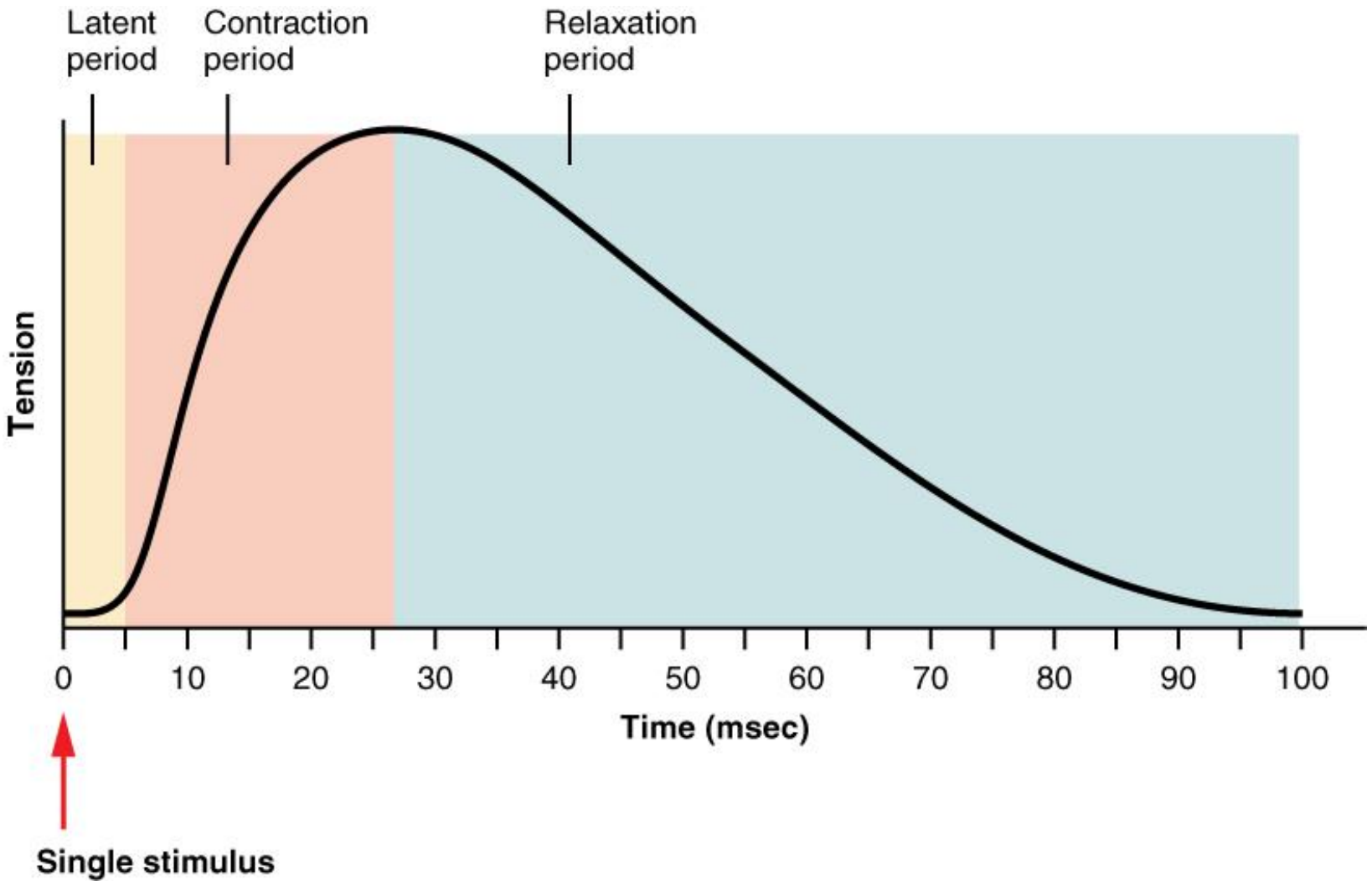
Kymograph

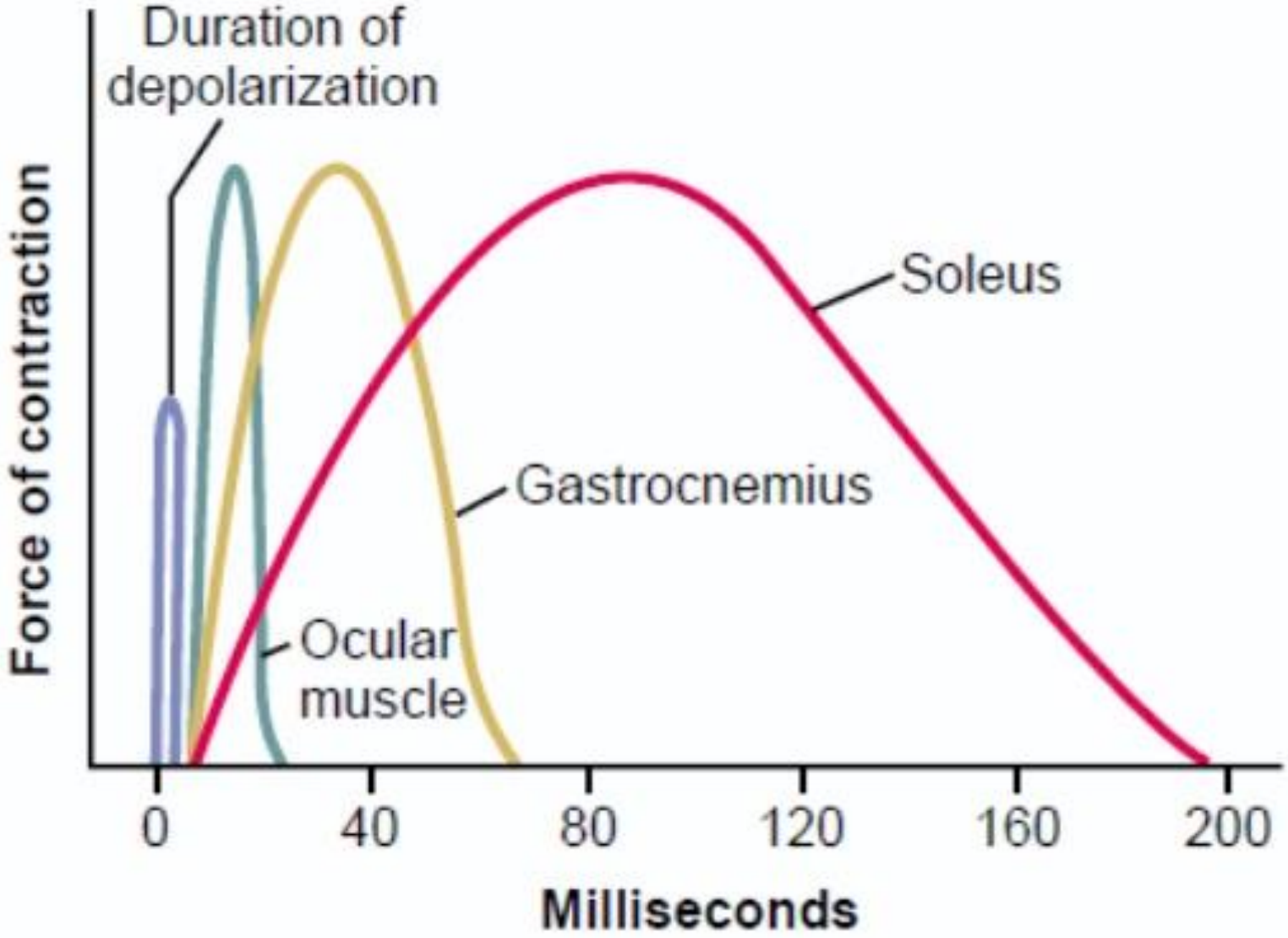
Stimulator

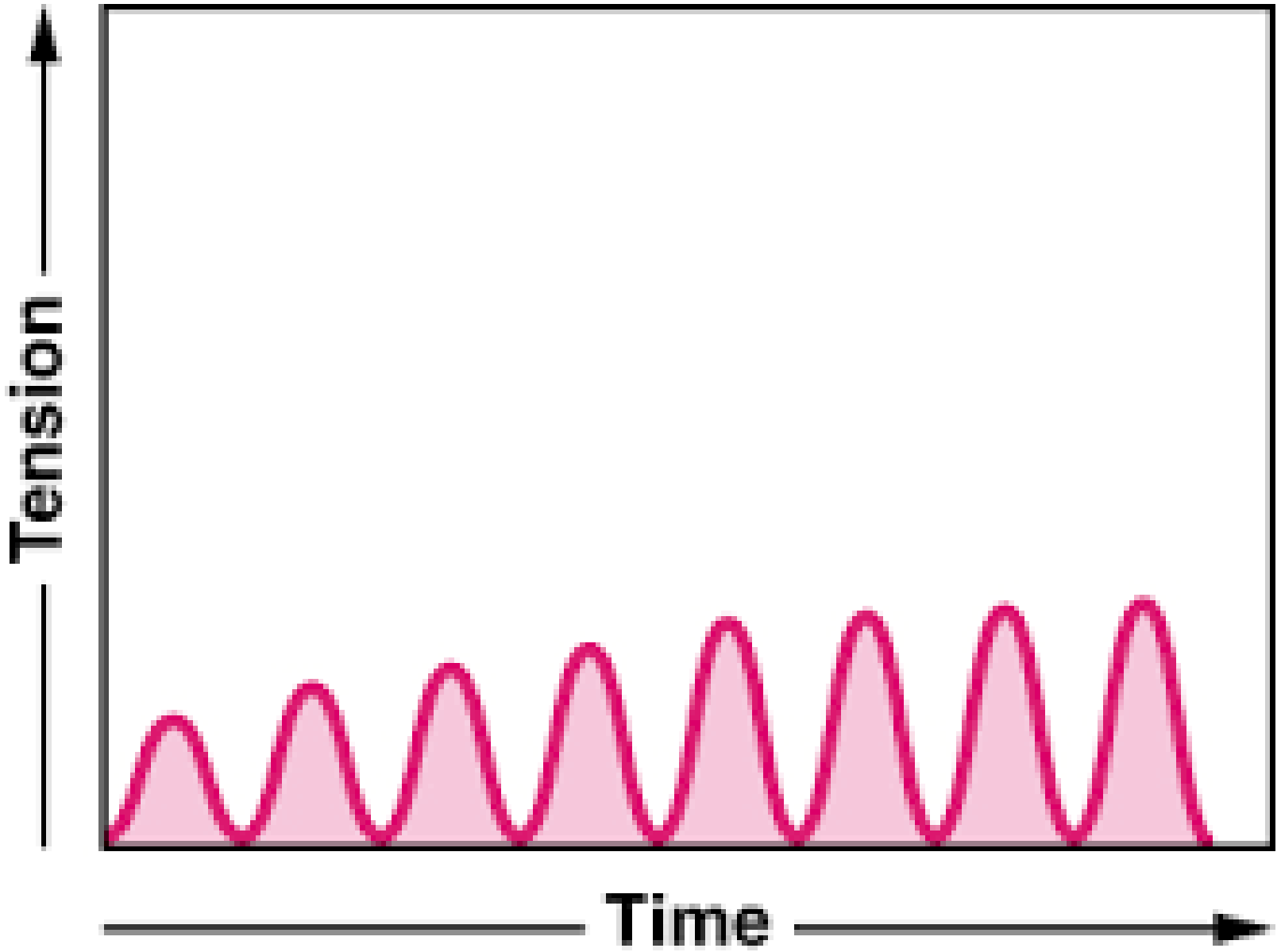
Experimental Setting



Recording of Simple Muscle twitch

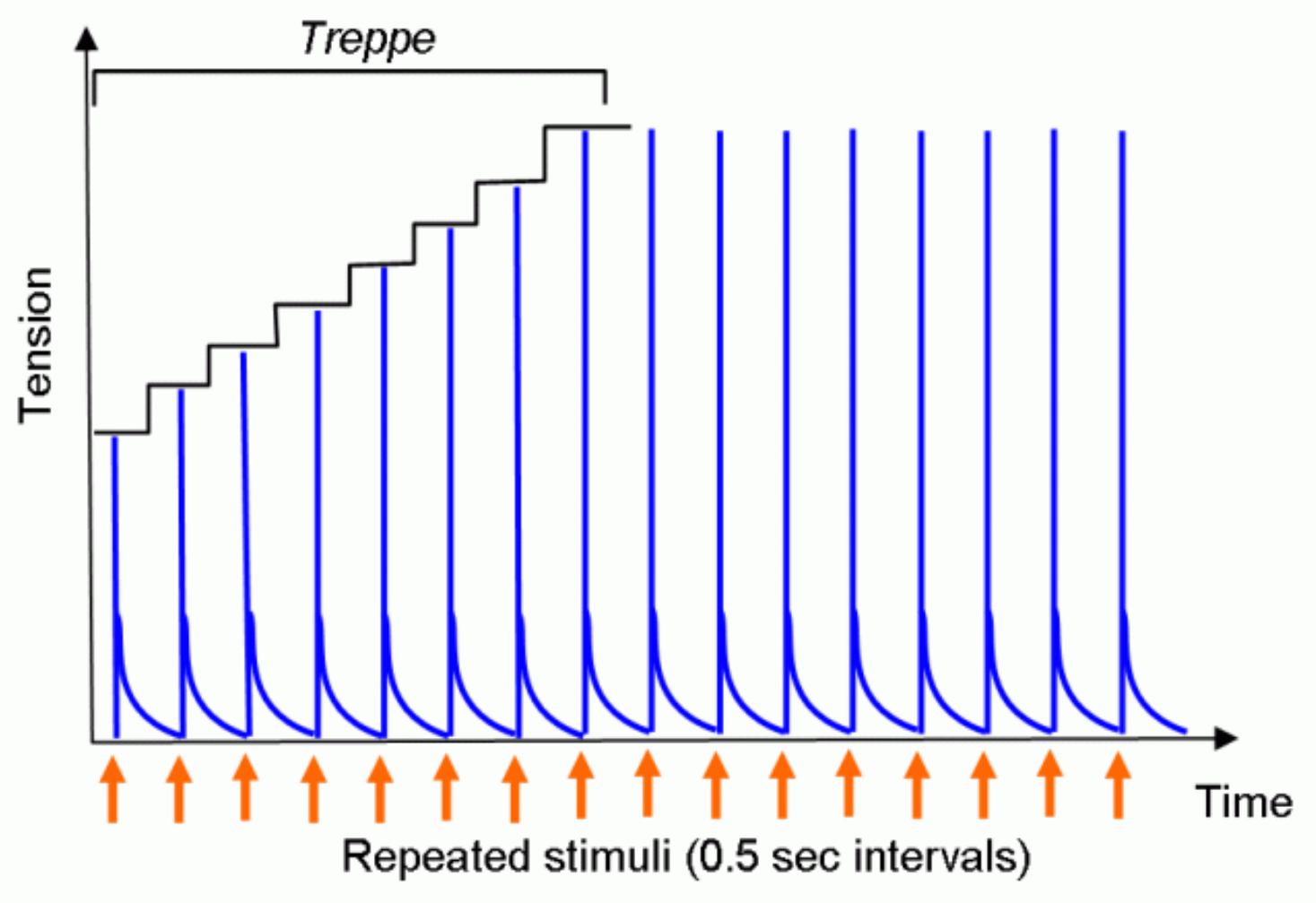



Duration of depolarization
Force of contraction
Soleus
Gastrocnemius
Ocular muscle
0
40
80
120
160
200
Milliseconds

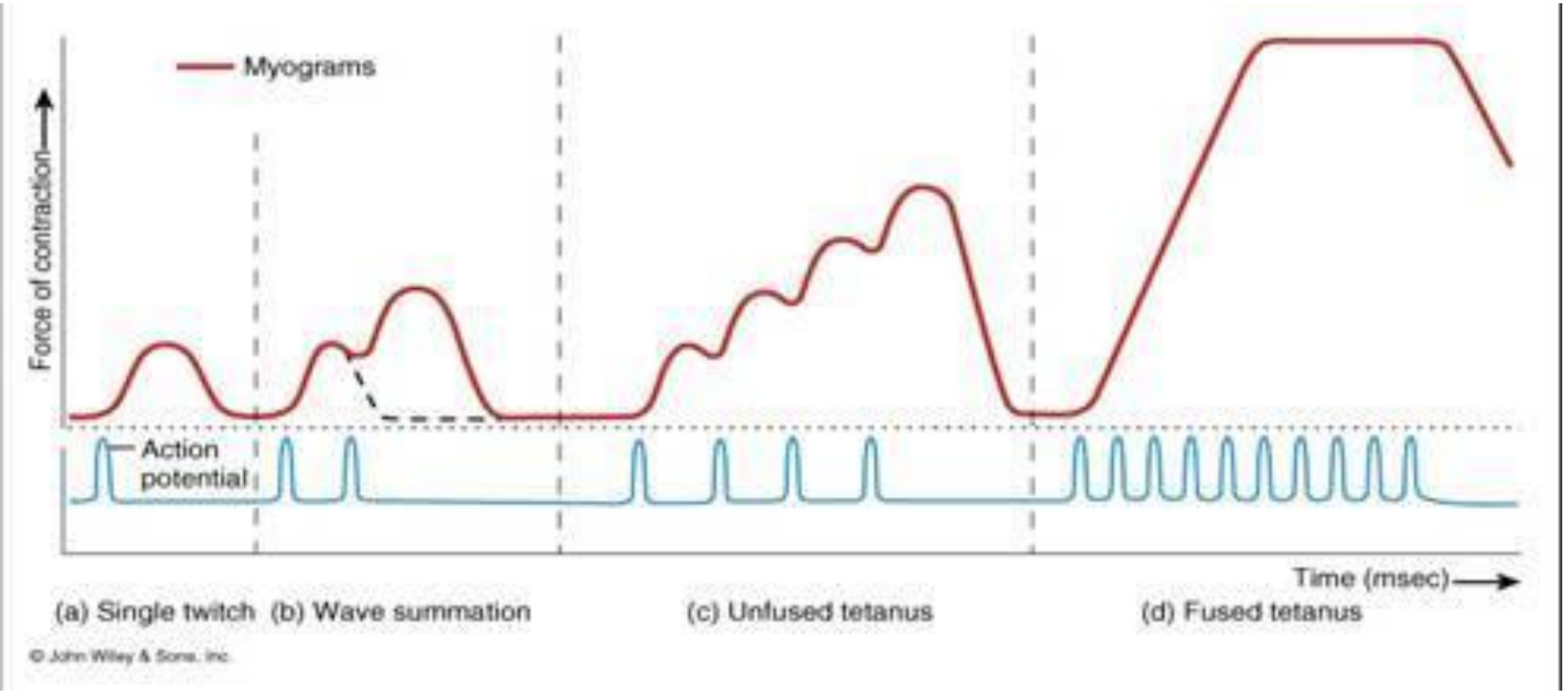


Treppe

Treppe



Summation



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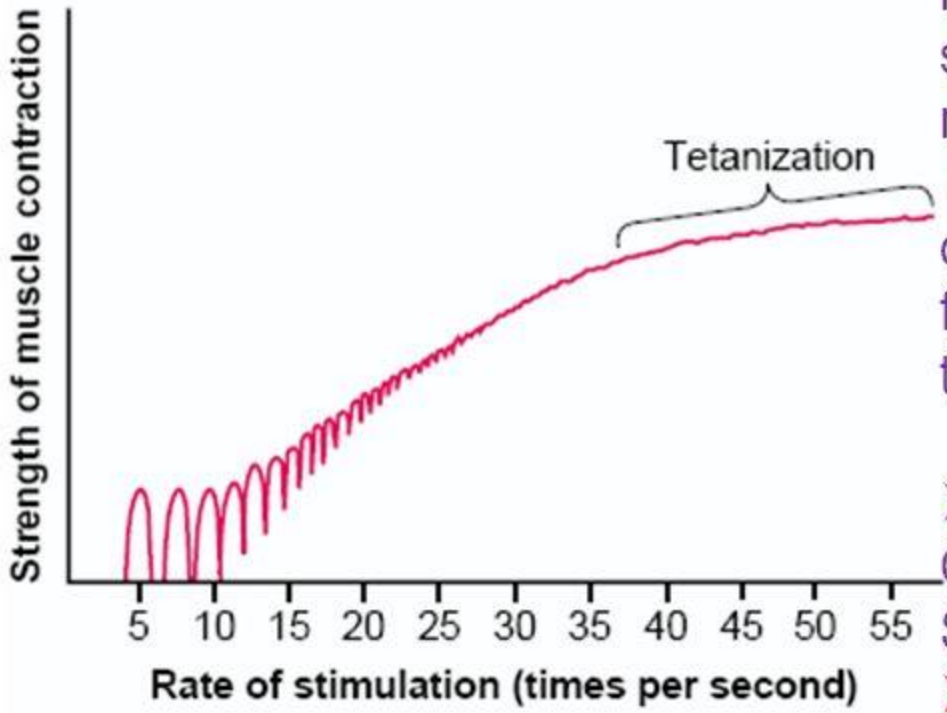
Summation of contractions

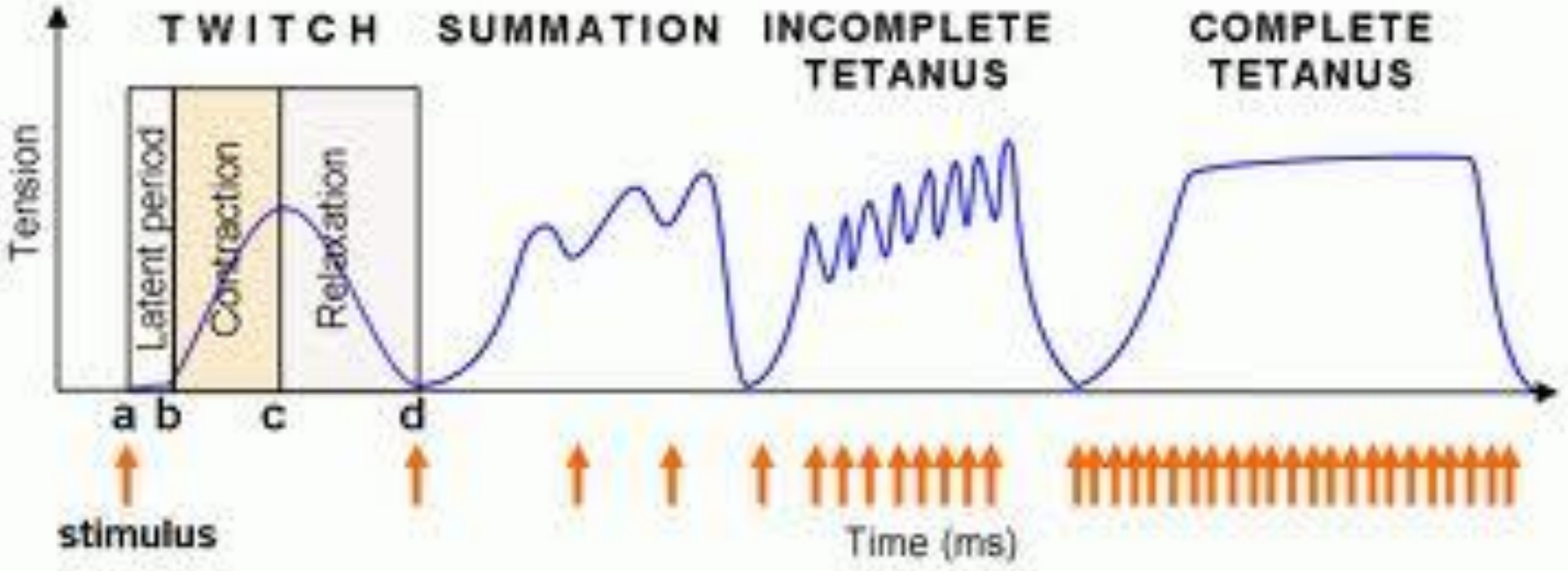


(1) by increasing the number of motor units contracting simultaneously, which is called multiple fiber summation,

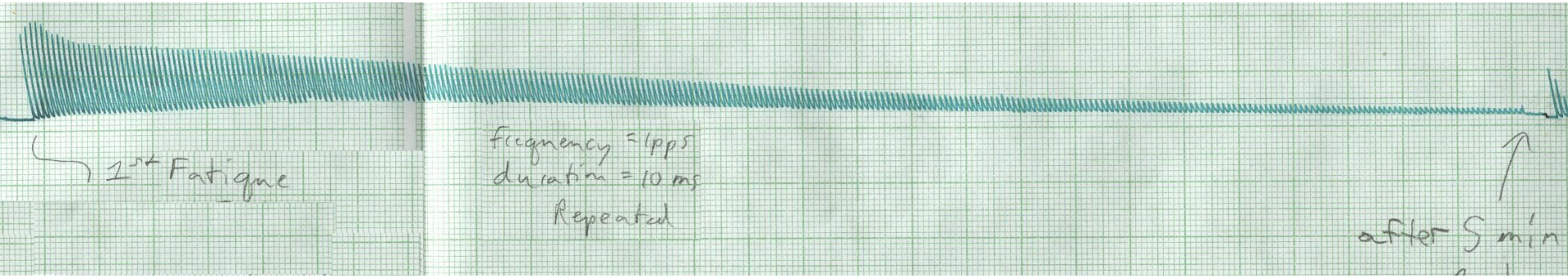
(2) by increasing the frequency of contraction, which is called frequency summation and can lead to tetanization.

- Changes in Muscle Strength at the Onset of Contraction—The Staircase Effect (**Treppe**).
- **Skeletal Muscle Tone**: muscle spindles role

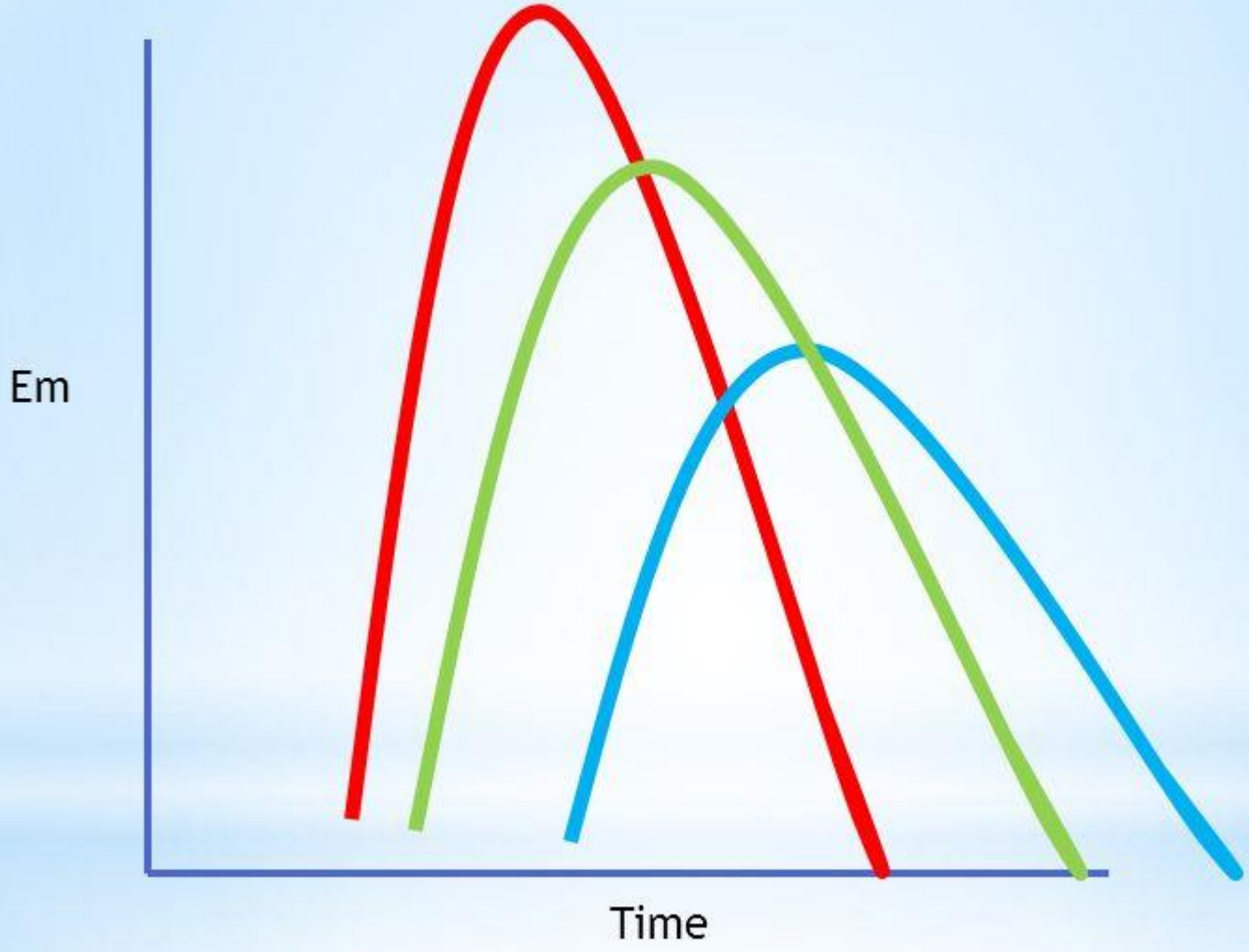
Muscle Fatigue: depletion of muscle glycogen, diminish of transmission of the nerve signal through the neuromuscular junction


TWITCH
SUMMATION
INCOMPLETE TETANUS
COMPLETE TETANUS
Tension
Latent period
Contraction
Relaxation
a
b
c
d
stimulus
Time (ms)

Muscle Fatigue



Effect of Temperature on Simple Muscle Twitch



Links to Labs

- **Practical Nerve and Muscle Physiology:**
- **Learning objectives:**
- Recording of muscle mechanics in Physiology labs:
- Simple muscle twitch (SMT)
- Effect of Temperature on SMT
- Treppe phenomenon
- Summation:
- Tetanization
- Fatigue

- **Recording of Simple Muscle twitch**
- https://www.youtube.com/watch?v=E7KBg1QPErE
- https://slideplayer.com/slide/10791693/
- https://www.youtube.com/watch?v=JJw9_2bDeGs
- **Recording of Summation and Tetanization:**
- https://www.youtube.com/watch?v=foDY-sseRH8
- https://www.youtube.com/watch?v=Qe95zVG1jn0
- https://www.youtube.com/watch?v=obim7tKV_5E
- **Recording of the effect of load on muscle contraction:**
- https://www.youtube.com/watch?v=sgcdxdfWY_s
- **Fatigue:**
- https://www.youtube.com/watch?v=Oui0Mni7Oi8

Do the experiment by yourself ???

- Go to the link below and change the number of stimuli and see recordings of twitches.
- Try to get Summation, Tetanization and Fatigue **if the link is opening**.
- http://www2.scsc.k12.in.us/physioEX/bc_physioex_8/media/objects/612/627400/experiments/index.htm?contentsvar=02_MusclePhysio/02_MusclePhysio.swf&experiment=MS