

muscle physiology lecture 9

what is adaptation?

biological things responds to their environments stimuli & stressors

cells spend their lives constantly adjusting themselves to tolerate their environments

tardigrades / water bears can withstand outrageous conditions. some can survive space.

they do not follow "stress-begets-adaptation" physiology like we do. "what doesn't kill

you makes you stronger." some changes are permanent, others are temporary.

toleration - you make do "pain tolerance" coping until it passes.

↓ habituation - repeatedly exposed so your response is diminished by familiarity

↑ sensitization - becoming more sensitive due to exposure, a refined palate, skill

accommodation - gradual tolerance, not adaptation bc it goes away.

adaptation - more permanent than accommodation. ex. muscle mass, skin tanning, chronic

habituation → sensitization → accommodation → adaptation → genetic adaptation.

adaptation generally follows accommodation. (slight oversimplification)

wolff's law - architecture of bones can be altered with mechanical loading & the

nature of the load matters (julius wolff: the law of bone remodeling)

davis's law: ligament / soft tissue adapt to the forces of stretching with a lengthening

response. corollary to wolff's

exercise trains your whole body, body is not compartmentalized by geography.

change in energy pathways leads to changes in enzyme concentrations which changes

mitochondria, transporter molecules, gene expression, receptor cells, immune system also

benefits from being exposed to different stresses.

why do these systems adapt? self-preservation.

body is in a constant state of change → constant state of adaptation → specific adaptation

based on the type of stress it is exposed to.

selye = gas: general adaptation syndrome - body adapts to every stressor the same way.

"fight or flight" "a typical syndrome"

general alarm reaction - first stage of alarm.

physical / emotional stress → alarm