

## muscle physiology lecture 34

anabolic cellular signaling: hypertrophic signaling

APS: caffeine and other methylxanthines - PDE inhibitor allows more PKA activation - mobilizing fats, more lipolysis. it does not seem to impair muscle responses / anabolic

signaling. leucine supplements: trained males ingested an amino acid beverage during cycling in one of two compositions: 3.50g of leucine or 1.87g of leucine.

after exercise, during a three hour assessment, muscle protein synthesis was 33% greater in the higher leucine group. effective amino acid. HMB supplement:

stimulates protein synthesis (not as much as leucine), exhibits an anti-catabolic effect (decreased protein breakdown by inhibiting the ubiquitin-proteasome

pathway) HMB does anti-catabolic very well. helps bed ridden people to conserve their lean body mass (preserves muscle mass / tissue) HMB will

likely elicit greater improvements in strength and lean body mass (compared to a placebo) for at least a month if you are previously untrained and

you are just beginning a resistance training program. if you are already well-trained, the ergogenic effect is not quite as good. it probably will not

help if you are already well adapted to your routine so if you change up your routine (novel stimuli, including more protein breakdown), it should

work a little bit better. betaine / trimethylglycine supplement: glycine with three methyl groups on it, from the natural breakdown of choline.

taking mTOR to the weight room: all of these enzymes are trainable.

specificity of stresses, specificity of adaptation. you need to put your body in a condition where the chemical, mechanical, and endocrine responses

are maximized, such as heavy lifting and using multiple or large muscle groups. conditions that maximize activation: chemical - getting a large

chemical response through tissue damage, mechanical loading - mechano-transducers, extracellular matrix, cell needs to be activated in order to

adapt, must withstand the load, hormonal - hypothalamus, pituitary gland,

nutritional - insulin response from carbohydrates