

mTOR Part 3 of 7

What are the things that turn on mTOR (and induce hypertrophy)?

>Immune/chemicals

arachidonic acid is released during exercise, which is a substrate of COX.

Prostaglandins are synthesized and single MEK-ERK (ie; MAPK) pathway. MEK-ERK and mTOR cross-talk at TSC1/2 and Raptor; hypertrophy

Interleukin-15; released during tissue damage that promotes protein synthesis and inhibit protein degradation. (Pathway: PI3K-mTOR)

Myostatin; inhibition of PKB

Wnt signaling increase mTORC1 by inactivating TSC1/2. Wnt pathway inhibits GSK3, a kinase that promotes TSC1/2

>Mechanical tension

Relay messages based off mechanical loads

>Titin and integrins/cadherins

>Titin stabilizes myosin, provides elasticity of sarcomere,

mechanotransduction

>Integrins and cadherins (cell to cell) are transmembrane proteins

>Inter, intra cell

Eccentric loading increases mTOR

>PI3K, MAPK, DGK pathway

>Endocrine

>Nutrition,

What happens if you load your muscle in the presence of rapamycin?

You abolish the hypertrophic response.

>Wortmannin (PI3K inhibitor)

Use wortmannin to inhibit PI3K and you do not see inhibition of mTOR- induced hypertrophy from mechanical stimuli

Some of the signal transduction pathways may be mediated by the chemicals released during metabolic stress and tissue damage.

ie; ROS