

# SnapShot: Exercise Metabolism

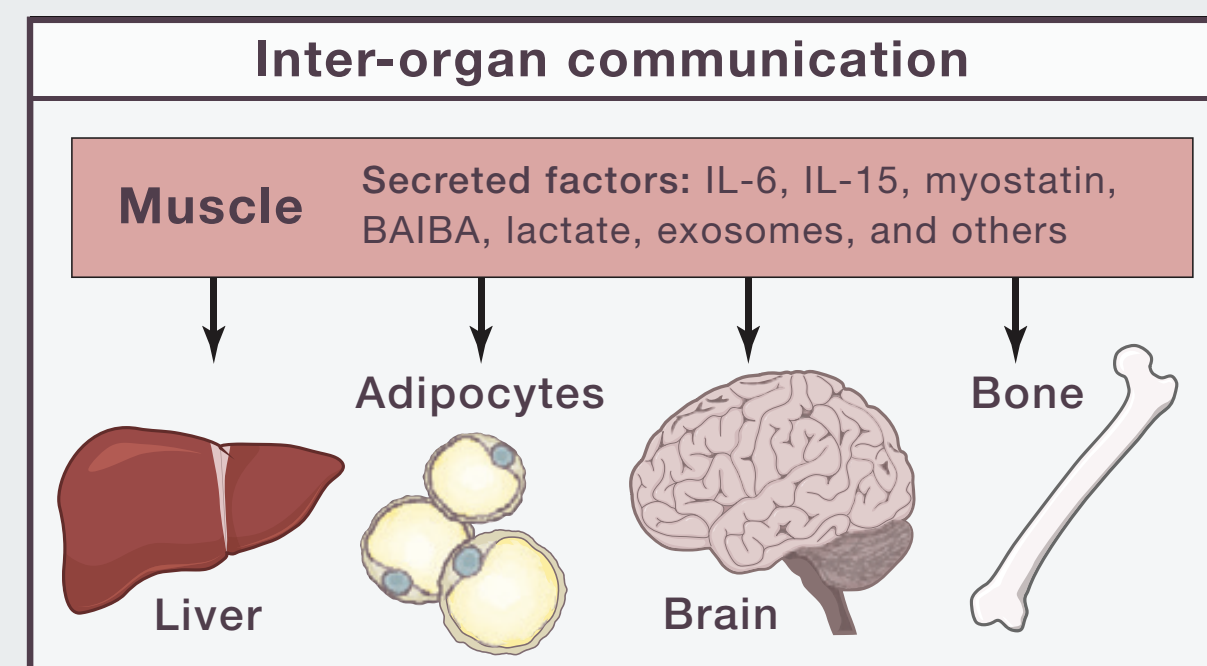
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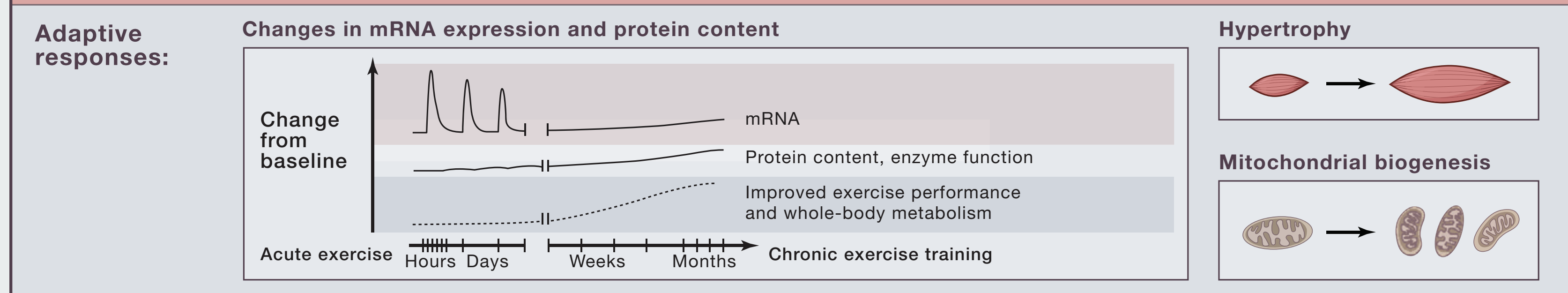
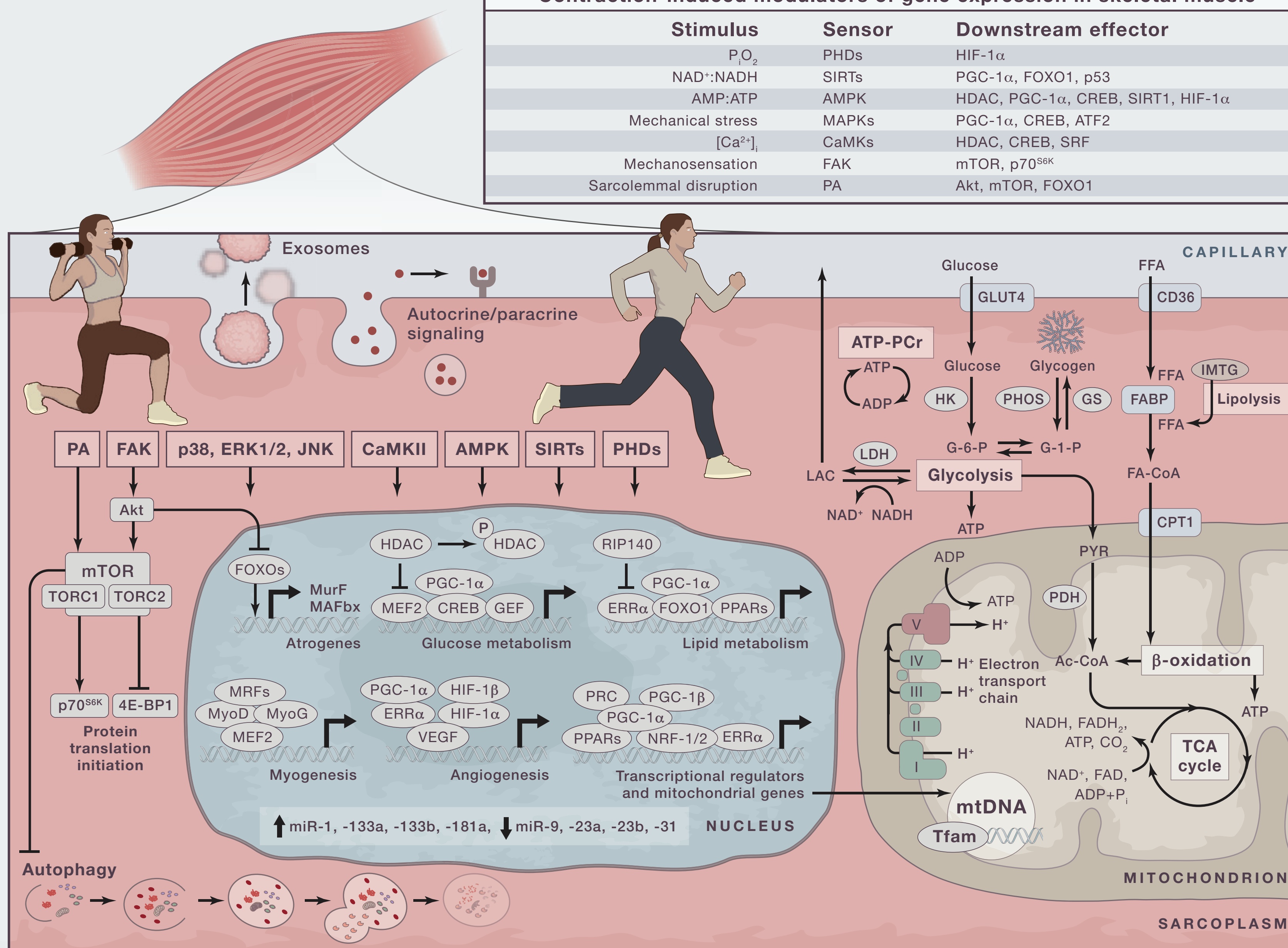
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Sources of energy provision in skeletal muscle	
<b>ATP hydrolysis</b>	$ATP + H_2O \rightarrow ADP + P_i + H^+ + \text{energy}$
<b>ATP resynthesis</b>	
<b>Anaerobic pathways:</b>	
Phosphocreatine degradation	$ADP + PCr + H^+ \rightarrow ATP + Cr$
Adenylate kinase reaction	$2ADP \rightarrow ATP + AMP$
Anaerobic glycolysis	$Glycogen + 3 ADP \rightarrow 2 \text{ lactate} + 2 H^+ + 3 ATP$
<b>Aerobic pathways:</b>	
Carbohydrate oxidation	$Glucose + 6 O_2 + 38 ADP + 38 P_i \rightarrow 6CO_2 + 6H_2O + 38 ATP$
Lipid oxidation	$Palmitate + 23 O_2 + 130 ADP + 130 P_i \rightarrow 16 CO_2 + 146 H_2O + 130 ATP$



**Contraction-induced modulators of gene expression in skeletal muscle**

Stimulus	Sensor	Downstream effector
$P_i$ , $O_2$	PHDs	HIF-1 $\alpha$
NAD <sup>+</sup> :NADH	SIRT6	PGC-1 $\alpha$ , FOXO1, p53
AMP:ATP	AMPK	HDAC, PGC-1 $\alpha$ , CREB, SIRT1, HIF-1 $\alpha$
Mechanical stress	MAPKs	PGC-1 $\alpha$ , CREB, ATF2
$[Ca^{2+}]_i$	CaMKs	HDAC, CREB, SRF
Mechanosensation	FAK	mTOR, p70 <sup>S6K</sup>
Sarcolemmal disruption	PA	Akt, mTOR, FOXO1



Expanding and differentiating skeletal muscle progenitor cells (myoblasts) are common practices during the study of myogenesis, disease modeling, and co-culture systems. MyoCult™ media are specifically formulated to expand, maintain, and differentiate primary human myoblasts. These specialized media are designed to provide researchers with standardized workflows and culture systems to minimize cell culture variability and increase experimental reproducibility.

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The MyoCult™ Expansion Kit (Catalog #05960) is formulated for the expansion and maintenance of human myoblasts. The MyoCult™ expansion medium provided in this kit suppresses the expression of key myogenic differentiation genes while maintaining the expression of myogenic progenitor markers. Myoblasts expanded in MyoCult™ expansion medium are fully compatible with the MyoCult™ Differentiation Kit (Catalog #05965).

**DIFFERENTIATE**  
The MyoCult™ Differentiation Kit (Catalog #05965) is formulated to differentiate human myoblasts into myotubes. This kit also includes a cell attachment substrate to support optimal adherence to culture vessels and maintain myotube morphology for downstream assays. Myotubes generated from the MyoCult™ Differentiation Kit can serve as a robust two-dimensional in vitro myofiber model for myogenic studies.

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