Exploring the impact of alcohol and SIV on skeletal muscle mitochondria in western diet-fed Rhesus Macaques

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Background

- Skeletal muscle (SKM) is responsible for all movements performed by the body.
- Along with structural support, the skeletal muscle also acts as storage for glucose, in the form of glycogen.
- Human immunodeficiency virus (HIV/SIV) weakens the skeletal muscle.
- Alcohol has also been linked to dysfunctions found in SKM mitochondria.
- When combined, HIV and chronic binge alcohol (CBA) can prevent the mitochondria found in SKM from meeting the bioenergetic demand of the cell.
- Without functioning mitochondria, SKM does not receive the energy needed to perform everyday function.
- The lab studies the biogenic dysfunction associated with SKM using preclinical CBA models in SIV infected Rhesus Macaques.

Hypothesis: We hypothesize that alcohol and SIV, when combined with high fats and high sugars, will disrupt mitochondrial health.

Methods

**Experimental Design**

Model: Adult male Rhesus Macaques on a western high fat/high sugar diet (HFSD)

- ART (Biktarvy, i.g.)
- Ctrl/SIVmac251+17e (i.v.)
- VEH/CBA (2.5 g/kg/day)
- HFS-D (44% Carbs., 19% Fat, 17% Protein)

Timeline 15.5 mo.

**Groups**

- VEH/SIV: Isolumetric water vehicle (VEH) treatment + infected with SIV
- CBA/SIV: chronic binge alcohol treatment + infected with SIV

Relative mRNA Expression

Homogenization of SKM

cDNA Transformation

RNA Isolation

qPCR (with SYBR)

Mitochondrial Gene Functions

PCCs

TFAM

PPARs

NRFs

Detection of AMP-activated protein kinase

AMPK and P-AMPK

Protein Expression Analysis

1:10 Dilution

Western Blot

Antibody Detection

Detection of AMP-activated protein kinase

AMPK and P-AMPK

References