

Ankyrin-B interacts with fission machinery in skeletal muscle to modulate mitochondrial dynamics

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Ankyrin-B (AnkB) is a cytoskeleton-associated protein which helps facilitate microtubule-based organelle transport globally¹ and has a role in insulin secretion, specifically in pancreatic β cells¹. Mutations in AnkB have been linked to cell-autonomous adiposity², hereditary cardiac arrhythmia¹, and type 2 diabetes¹. Mutations in AnkB have implicated metabolic syndrome in nearly one million North Americans¹. Unpublished studies in the Lorenzo Lab have shown that mice lacking AnkB only in skeletal muscle (SKM) exhibit decreased exercise capacity, glucose mishandling, and elongated mitochondria (Fig 1A). Previous proteomic data showed that Mitochondrial Fission Factor (MFF) interacts with AnkB (Fig 1B). This project investigates the interaction of AnkB with mitochondrial fission protein MFF, Dynamin-related protein 1 (DRP1), and Mitochondrial Fission 1 protein (FIS1) endogenously in mitochondria-rich (soleus, SOL) and mitochondria-poor (gastrocnemius, GC) SKM. MFF was shown to interact with AnkB endogenously, while FIS1 and DRP1 do not appear to have a prolonged interaction with AnkB. Overexpression of fluorescently tagged AnkB with fluorescently tagged MFF and DRP1 in HEK293 cells confirms interaction between AnkB and MFF, but does not suggest sustained interaction between AnkB and DRP1; further experiments are needed to confirm transient interactions between AnkB and DRP1.