

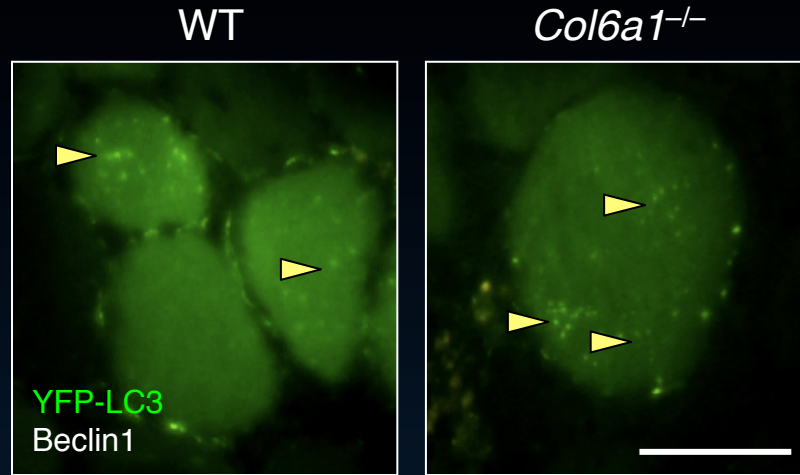
Can autophagy be reactivated?

We can reactivate autophagy

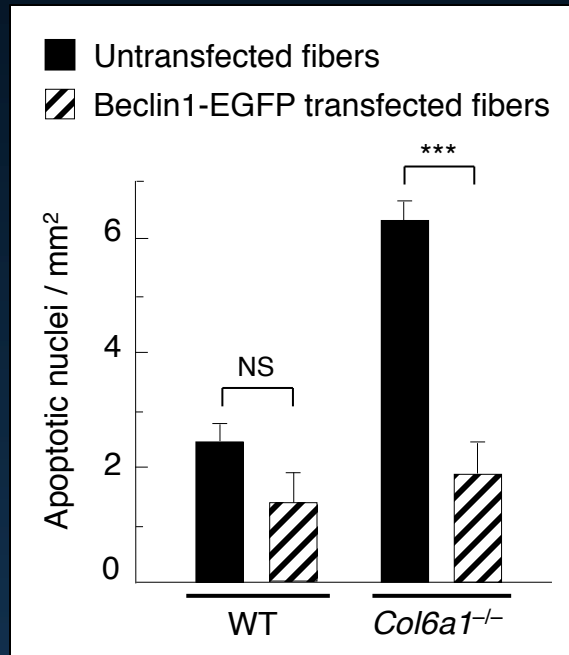
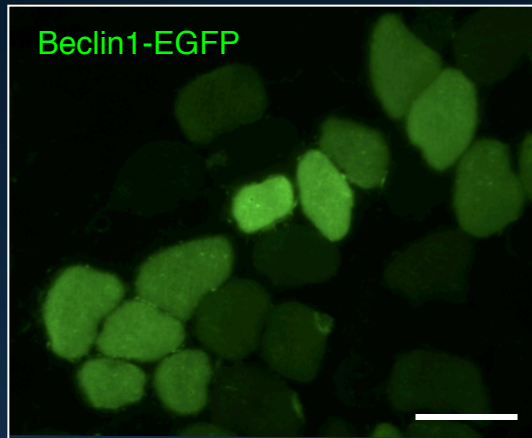
Grumati P, et al., Nat Med. 2010, 16, 1313-20.

- Genetic approaches (Beclin1 over-expression)
- Prolonged starvation
- Low Protein Diet
- Pharmacological tools (Rapamycin, Cyclosporin A)

Over-expression of Beclin1 in *Col6a1*^{-/-} TA muscle

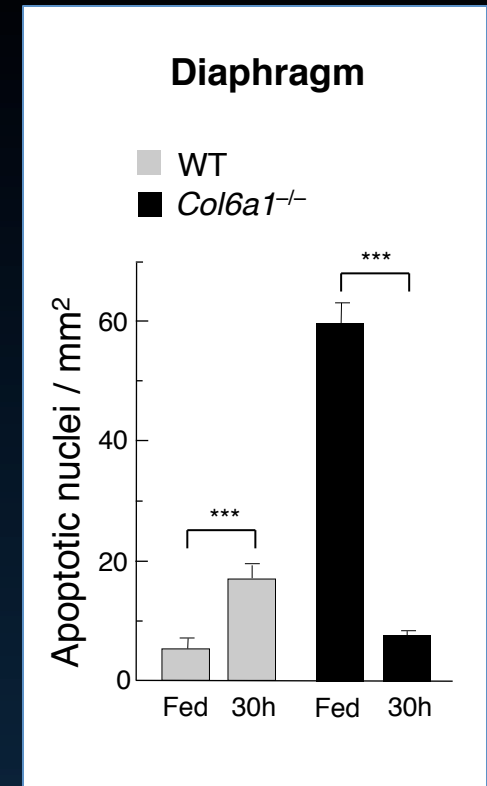
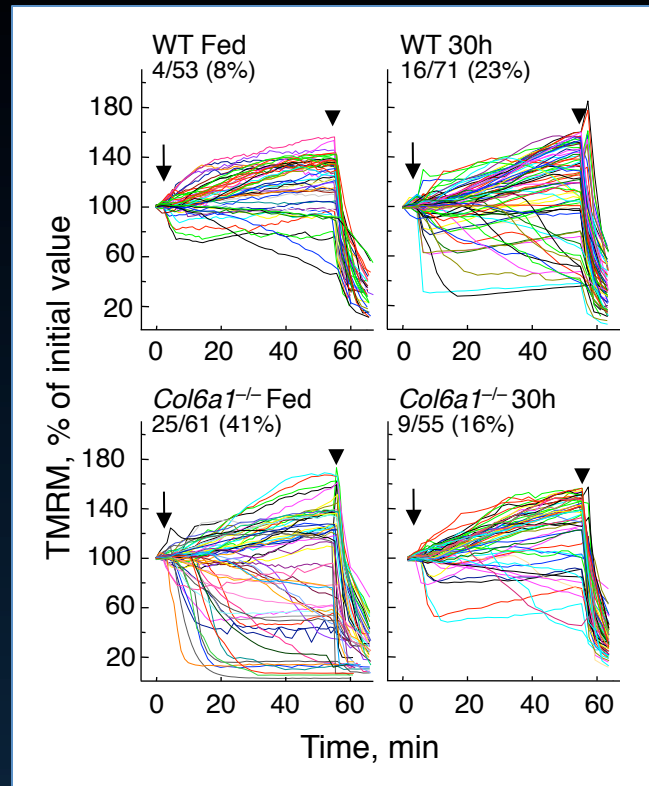
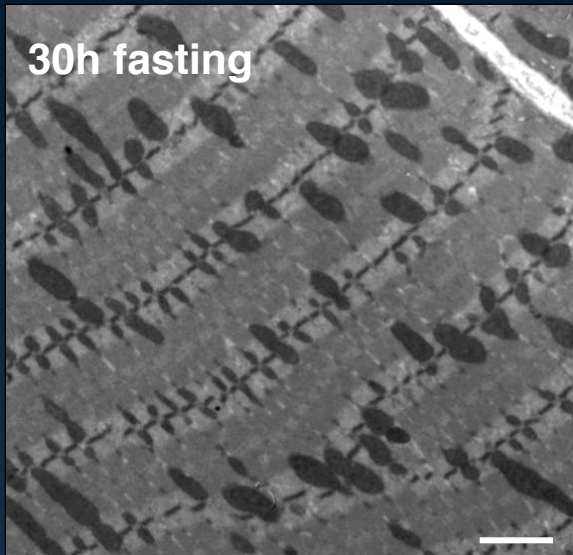
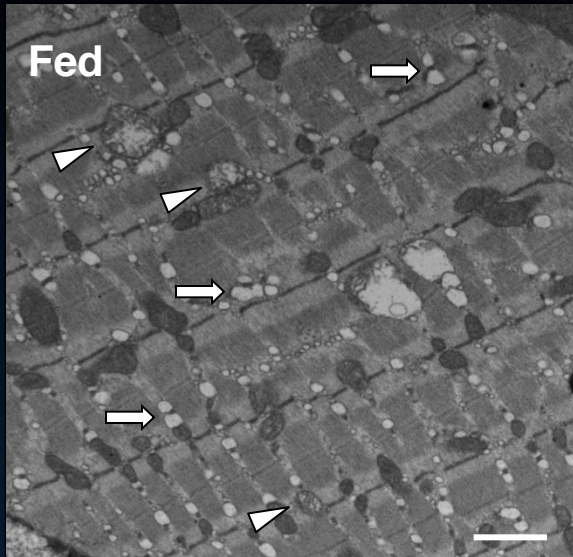


activates
autophagy



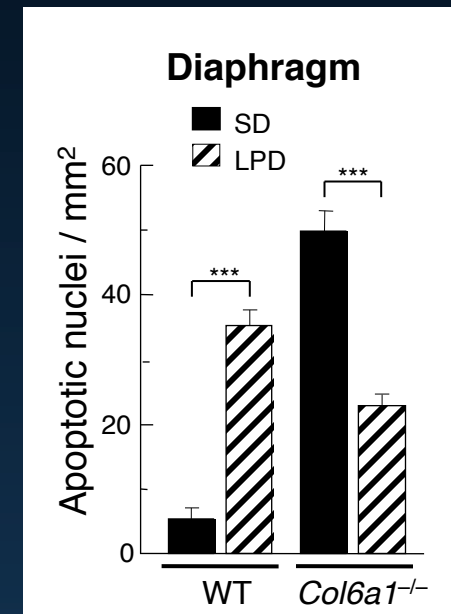
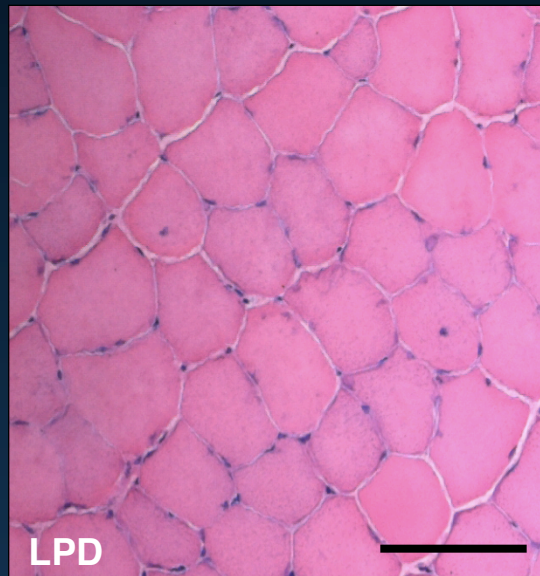
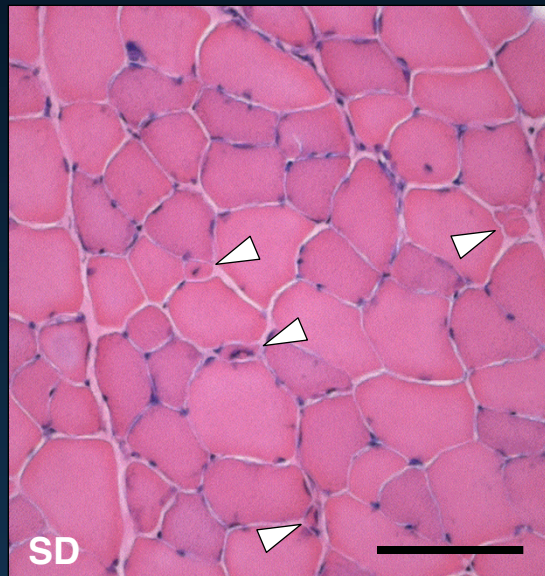
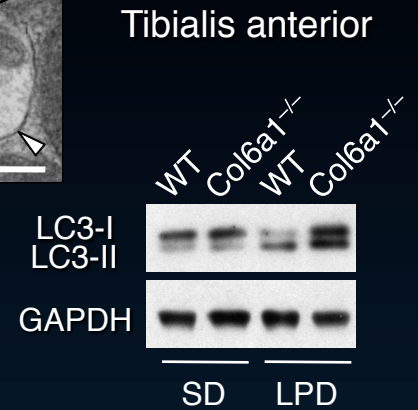
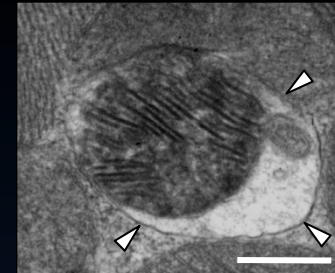
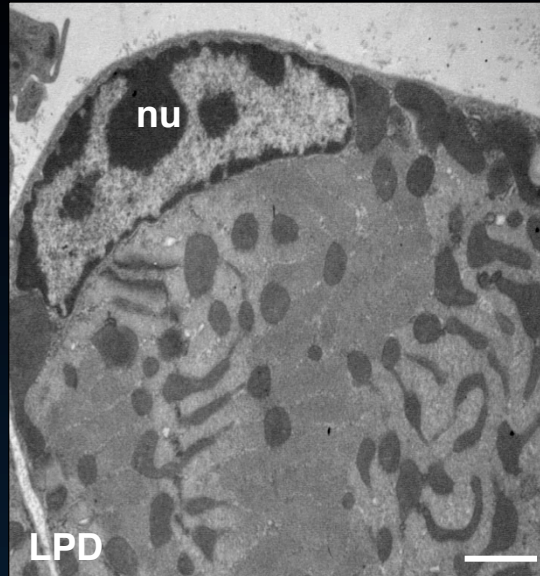
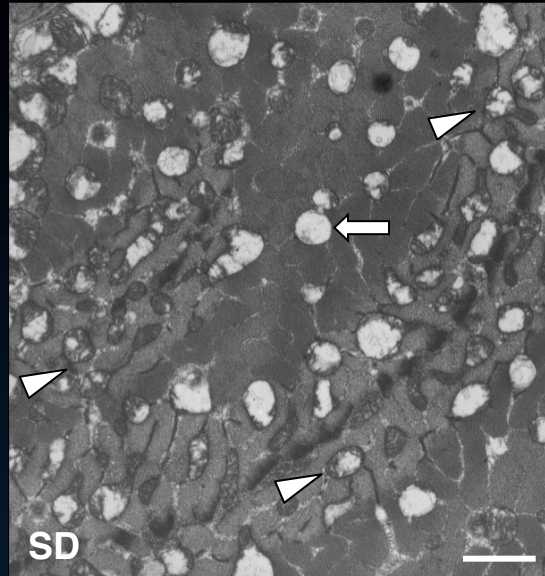
recovers
apoptosis

Effects of the prolonged starvation on phenotype

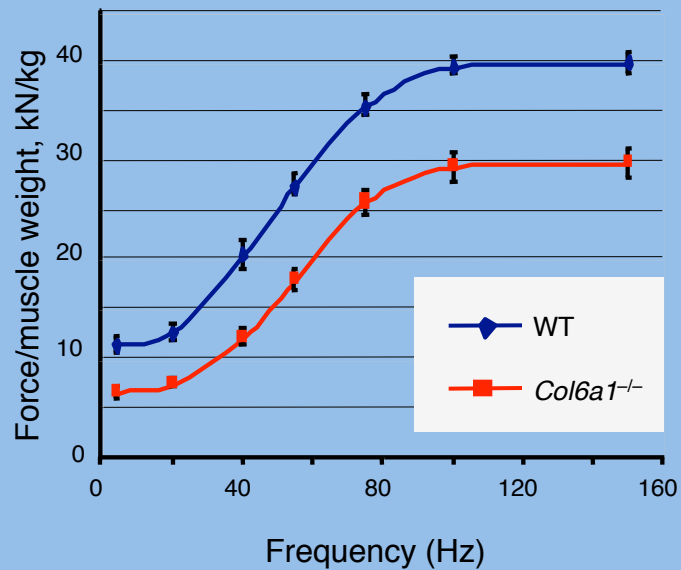


Rescue of dystrophic phenotype in *Col6a1*^{-/-} mice

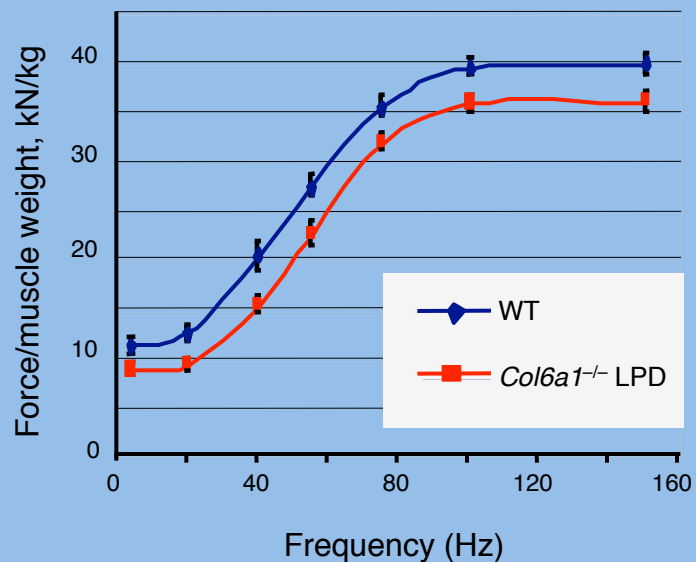
Effects of the "low protein diet" on phenotype



Effects of the prolonged starvation on muscle strength

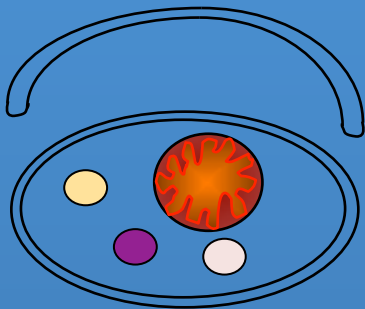


Recover of skeletal muscle force



Wild-type

Basal autophagy



Clearance of
damaged organelles

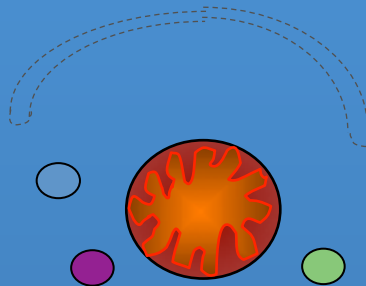


Myofiber
survival

Normal
muscle

Col6a1^{-/-}

Impaired autophagy



Accumulation of
altered organelles



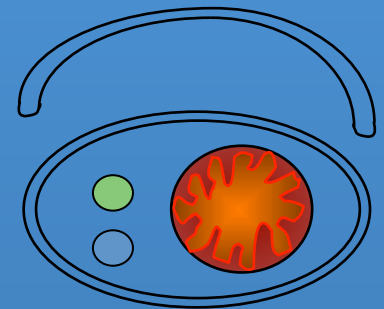
Excessive
apoptosis

Dystrophic
muscle

Col6a1^{-/-}



Reactivation of autophagy



Removal of
altered organelles



Myofiber
survival

Rescue of
dystrophic
phenotype