



**Anya Goropashnaya, PhD, Research Assistant Professor, IAB UAF.**

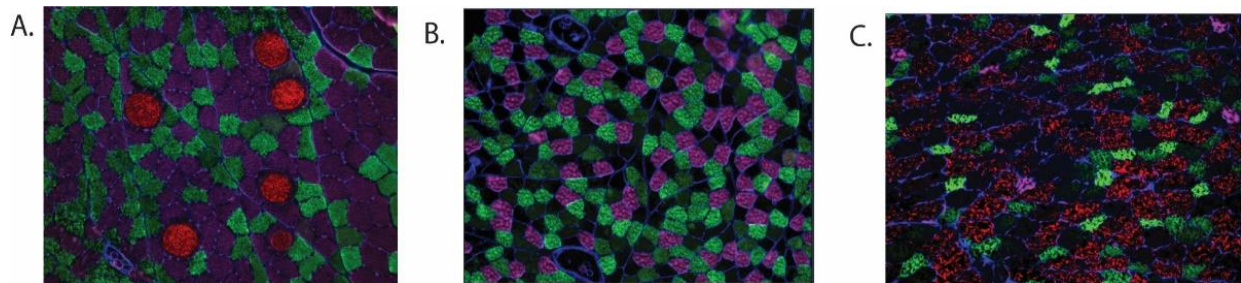
*Molecular changes in a hibernator's skeletal muscles during winter as a pathway to peripheral artery disease intervention.* [Published Works](#)



Photo credit, Øivind Tøien, PhD

Unlike humans and most mammals after being physically inactive for several months, the arctic ground squirrel (AGS) demonstrates limited loss of skeletal mass and strength by the end of winter following hibernation season. Muscles of hibernating AGS showed low blood flow in the hind limb, also known as ischemia, which reveals similarities to the human muscles experiencing low blood flow in patients with peripheral artery disease (PAD). This study's objective was to establish potential underlying processes for the lack of muscle loss during the hibernation season of AGS using immunohistochemistry to compare muscle fiber types of hibernating juvenile male AGS and pre-hibernating animals (control group). This research found the AGS preserves muscle fiber showing limited signs of muscle atrophy during the first weeks of hibernation, and yet-to-be-determined processes that suppress protein degradation in AGS muscles during hibernation. The brief upregulation of TRIM63 suggests that muscle shows initial signs of atrophy, but then adapts to disuse early in the season to prevent atrophy as the hibernation season progresses.

*Muscle Fiber Changes in Hibernating Arctic Ground Squirrels*



6-week hibernation

5-month hibernation

Summer active

Large muscle fibers, resembling the damaged fibers of PAD patients, have been observed in 6-week hibernating AGS (image A). These abnormalities were not found in the squirrels during late stages of hibernation (image B), or in summer active squirrels (image C).