

From seals to cells: A comparative approach to understanding skeletal muscle physiology

Comparative physiology celebrates extreme and unique physiologic adaptations that have evolved across the animal kingdom. This seminar will highlight cellular and molecular approaches used to characterize adaptations to diving, a form of breath-hold exercise, in Phocid seals. These animals are capable of diving upwards of two hours on a single breath; such physiologic feats are possible, in part, due to an increased capacity for internal oxygen storage, as demonstrated by abundant myoglobin expression in seal muscle. Through primary cell culture, development of this hallmark adaptation was found to have a direct connection to dietary lipid. Further exploration into this novel relationship between myoglobin oxygen stores and fat in seals revealed a similar connection in model organisms, ultimately challenging physiologists to rethink the functional paradigm of a widely studied protein.