The role of oxidative stress in aging was first proposed in 1956 by Denham Harman and along with other similar hypotheses, focused on the direct damaging effect of oxidative stress on macromolecules and tissues. Recently an alternative hypothesis has been proposed, termed the “redox stress hypothesis”. This hypothesis centers on disruption of the redox-regulated signaling mechanisms due to a progressive pro-oxidizing shift in the redox state of cells causing age-associated loss of function. The question is how to maintain the optimal redox balance. We know that this becomes more difficult with aging, primarily because of the effect of aging on cell signal transduction whereby a stimulus that leads to beneficial effect in young is somehow lost in translation in the old. The work in my laboratory focuses on determining the effects of aging on redox signaling and resistance to oxidative stress and testing the effects of interventions such as exercise and phytonutrients to restore the redox balance toward a more optimal state. In my talk I will present data from several studies where we use a laboratory challenge to assess the capacity to resist to oxidative stress and acute exercise to stimulate cell signaling (Nrf2). The relevance of this work to clinicians is to be able to give evidence-based recommendations to patients to prevent or attenuate chronic diseases associated with oxidative stress.
About the speaker...

Dr. Tinna Traustadóttir is an Associate Professor in the Department of Biological Sciences at Northern Arizona University. Her research focuses on aging, redox balance, and exercise. She received her PhD from Arizona State University where her doctoral work investigated the role of exercise in attenuating age-related impairments in neuroendocrine stress resilience. During her post-doctoral work at the Kronos Longevity Research Institute, her research focus shifted to oxidative stress but still asking the same questions of whether exercise (and/or phytonutrient interventions) can restore age-related deficits in redox balance. Oxidative stress is believed to be a key mechanism in the aging process and it is also implicated in the etiology of many chronic diseases including cardiovascular disease, type 2 diabetes, cancer, and Alzheimer’s disease. Therefore, maintaining or increasing the capacity to resist oxidative stress is important for the promotion of successful aging and may have far-reaching effect in terms of prevention of age-related disease. The current goals in her laboratory at NAU are to determine the mechanisms of diminished resistance to oxidative stress with aging and the plasticity of the redox signaling pathways. Her own “antioxidant regimen” consists of road cycling, running, resistance training, and walking her rambunctious dogs on the trails in Flagstaff.