aging, the functionality of stem cells declines, contributing to tissue decline. This symposium will focus on the mechanisms underlying stem cell aging in various compartments, including muscle, brain and the hematopoietic system.

GENETIC, EPIGENETIC, AND METABOLIC MAINTENANCE OF NEURAL STEM CELLS DURING AGING

Ashley Webb, *Brown University, Providence, Rhode Island, United States*

Tight metabolic regulation is essential to maintain stem cell homeostasis and support healthy aging. With age, metabolic alterations cause neural stem cell (NSC) dysfunction and are associated with a decline in neurogenesis, but the underlying mechanisms are not known. Aged stem cells display defects in the autophagy-lysosomal pathway that may disrupt mitochondrial dynamics, resulting in metabolic disruptions that alter self-renewal and differentiation potential. We have used genomic and functional approaches to investigate the metabolic mechanisms that support NSCs throughout aging. We found that mitochondrial and mitophagy gene networks as well as mitophagy dynamics are differentially regulated between the quiescent and activated states and become dysregulated with age. This work provides new insight into the metabolic regulation of NSCs and may lead to strategies to enhance neurogenesis in the context of aging and neurodegenerative disease.

INTERVENTIONS TO DRIVE IMPROVED FUNCTIONAL POTENTIAL OF AGED OR DYSFUNCTIONAL HEMATOPOIETIC STEM CELLS

Isabel Beerman,[1] Le Zong,[2] Mayuri Tanaka-Yano,[3] Hagai Yanai,[2] and Ferda Tekan-Turhan,[2], *1. NIA, Baltimore, Maryland, United States, 2. NIA / NIH, Baltimore, Maryland, United States, 3. NIA/ NIH, Baltimore, Maryland, United States*

Stem cell dysfunction is a hallmark of aging, associated with the decline of physical and cognitive abilities of humans and other mammals. Therefore, it has become an active area of research within the aging and stem cell fields, and various techniques have been employed to mitigate the decline of stem cell function both in vitro and in vivo. We have examined changes in the hematopoietic system after interventions and show modest, but positive effects on the aged system as well as the aged stem cells

STEM CELLS IN TISSUE MAINTENANCE AND REPAIR

Amy Wagers, *Harvard University, Cambridge, Massachusetts, United States*

SESSION 6555 (SYMPOSIUM)

MODEL ORGANISMS: GRANDEUR IN THE DIVERSITY OF AGING ORGANISMS

Chair: Anne Brunet

Aging is a complex process that converts vigorous and healthy individuals into frail and decrepit ones, with increased susceptibility to a constellation of diseases. Human aging is influenced by many factors, including genetics, environment, lifestyle, sex, and socio-economic status. While aspects of aging can be studied directly in humans, discovering the causative factors that modulate this process often requires interventions and modeling. Traditional models will likely continue to provide a wealth of translatable information. Studying 'extremophiles' has exciting potential for providing new concepts that could be implemented for lifespan regulation. The development of new experimental models uniquely tailored to aging studies is also an essential step. This symposium will discuss African killifish, planarian, naked mole rats, and domestic dogs as new models for aging and exceptional longevity and rejuvenation. The iteration between new models and humans could be particularly helpful in delineating strategies to promote healthy aging and extend the disease-free portion of life.

DEVELOPMENT OF THE AFRICAN KILLIFISH AS A NEW MODEL TO STUDY AGING AND SUSPENDED ANIMATION

Anne Brunet, *Stanford School of Medicine, Stanford, California, United States*

We have pioneered a new model organism for aging research, the naturally short-lived African killifish Nothobranchius furzeri. The African killifish lives in ephemeral pools of water in Africa, and has evolved a short life cycle adapted to this habitat. Its embryos can also resist drought until the next wet season in a state of 'suspended life'. In laboratory conditions, the African killifish has a maximal lifespan of about 4-6 months, and is, so far, the shortest-lived vertebrate that can be bred in captivity. We have successfully transformed this natural short-lived vertebrate into a usable model organism for aging research, including de novo assembly of the genome and CRISPR-Cas9 mediated genome-editing. Our goal is to use this model to discover new principles underlying aging, longevity, and 'suspended animation' in vertebrates.

EXTREME LONGEVITY MECHANISMS IN THE NAKED MOLE RAT

Shelley Buffenstein

COMPANION DOGS TO TEST LONGEVITY INTERVENTIONS

Matt Kaeberlein, *University of Washington, Seattle, Washington, United States*

PLANARIA: A MODEL FOR IMMORTALITY

Alejandro Sanchez Alvarado

SESSION 6560 (SYMPOSIUM)

REGULATION OF AUTOPHAGY IN AGING AND DISEASE

Chair: Malene Hansen

The cytosolic recycling process of autophagy plays an important role in many age-related diseases and has been directly linked to aging, including in the nematode C. elegans