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Professor Dr. Mark Mattson's special contributions to ageing research and neuroscience

We would like to take the opportunity to recognize and honor Dr. Mark Mattson for his accomplishments in ageing research and dedication to the field of gerontology in multiple areas and dimensions. As Dr. Mattson prepares for his retirement from his post as Senior Investigator and Chief of the Laboratory of Neurosciences at the National Institute on Aging, National Institutes of Health, we feel that it is the perfect season to expound upon his accolades and seminal contributions in the field of ageing and neuroscience that has touched many different areas of specialization. We are of course indebted to Dr. Mattson for his tireless efforts and dedication to *Ageing Research Reviews* since the beginning (2002) and in which he served as Editor-in-Chief until 2017, bringing the journal to the forefront to communicate knowledge pertaining to mechanisms of ageing and age-related diseases, and the applications of ageing research to longevity, health-span, and disease prevention.

As a backdrop for our tribute, we will share some insights to Mark Mattson's passion as a scientist in his professional life through his upbringing and life experience. For this, we are indebted to Mark's wife Joanne Mattson, who very recently shared with us some of her perspectives. Mark grew up in the rugged and beautiful Midwest State of Minnesota, being the middle child with older sister Polly and younger brother Eric and his parents Martha and DeWayne Mattson. On their Olmstead County 72-acre farm with a busy horse track, Mark and his siblings learned the value of work before play, and when you work, do it well. Doing chores and taking care of the farm animals required self-discipline and frankly, hard work. Even on Christmas Day, the animals got taken care of first, opening Christmas presents came second. Taught by his Dad DeWayne, Mark quickly mastered how to train and drive standardbred race horses (trotters and pacers), care for the animals to keep veterinarian bills down, and be responsible for himself and his world. Perhaps Mark's experiences with animal husbandry as well as his close-up encounters with the beauty of horse racing planted a seed in him to become dedicated to biological processes/mechanisms and achievement of optimal performance, key themes in ageing research. His no-nonsense Midwestern upbringing resurfaces time and time again in his thorough investigations of difficult and challenging neuroscience topics and concepts, evidenced by his prolific publication record in outstanding high-impact journals and as significantly, the highest esteem from his peers. (Fig. 1)

Aside from his upbringing, Mark Mattson has long been captivated by the benefits of diet and endurance exercise, particularly running, for healthy lifespan and more specifically, brain well-being (Fig. 2). While both food consumption and physical activity have been considered by many ageing researchers as lifestyle choices that can reap tremendous paybacks, the Mattson lab has invested significant effort to characterize the very basis for improvement to cellular stress and the molecular mechanisms underlying enhanced performance and improved health. Taking genetics into account, research from Mark and his colleagues has begun to elucidate the signaling pathways at the very heart of leading long and productive lives, enhanced by our own choices and behaviors.

Fig. 1. Professor Mark Mattson in the library of his home in Bel Air, Maryland. Photo courtesy of his wife, Joanne Mattson.

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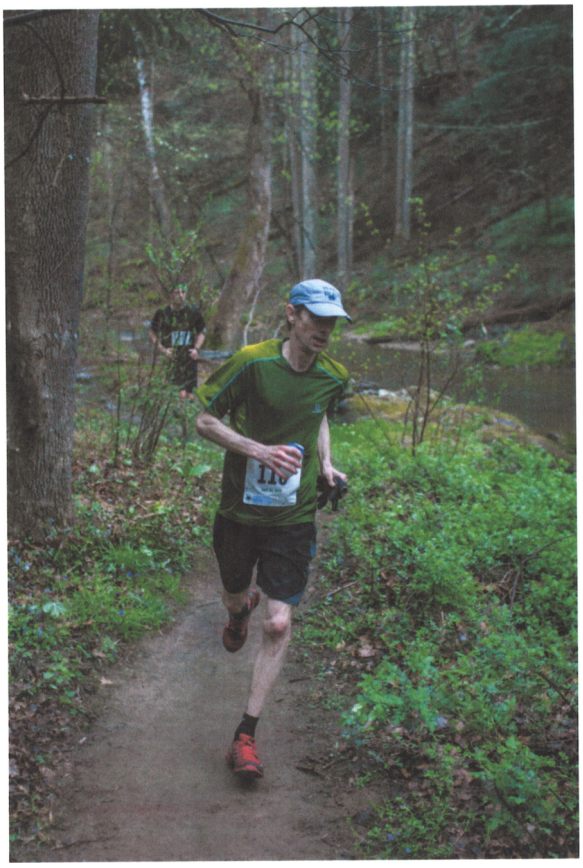

Fig. 2. Runner Mark Mattson competing in the Schaeffer Farms 10 km Trail Race in Germantown, Maryland where he placed first in his age group. Photo courtesy of his wife, Joanne Mattson.

Dr. Mattson's primary interests have focused on alterations in the nervous system as we age, not only to document these at the molecular, cellular, tissue/organ, and organismal levels, but extending his investigations to characterize how lifestyle choices, modalities, and emerging therapies ameliorate functional decline in healthy brain activity. Using a smorgasbord of strategic approaches and experimental models over the past 30 years, Dr. Mattson has led teams of scientists at the University of Kentucky, the National Institute on Aging, and Johns Hopkins University with collaborators throughout the world in basic research efforts and preclinical and clinical paradigms that represent state-of-the-art and cutting-edge research in neuroscience. His important contributions to understanding the pathogenesis of Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis, and stroke, all characterized by abnormal neuronal plasticity and neurodegeneration, are at the forefront of biomedical research moving into the 21st Century, creating new insights for diagnosis, treatments, and cures.

Dr. Mattson has led efforts to characterize at the molecular level the signaling mechanisms underlying proper neuronal functional and brain health. His research of neuronal synapses using in vitro models as well as experimental animal models of neurodegenerative disease have inspired new ideas of how to enhance cognitive function and treat aberrant physiology of the brain. Importantly, Dr. Mattson's research has provided valuable inroads to non-pharmaceutical measures including dietary restriction and physical exercise to prevent or ameliorate cognitive deficiencies. Thus, research from the Mattson lab has brought new insight to therapeutic interventions benefitting diseased individuals as well as the normal aging population.

A complete documentation of Dr. Mattson's enormous contributions to research are beyond the scope of this editorial and are encompassed in other sources and will continue to be recognized in the scientific community. Beyond the discoveries made in the Mattson laboratory, his life's work and passion for research will continue to inspire a new cadre of budding scientists who find inspiration from Mark's charge to face one of the greatest health problems of the current time: the basis for neurodegenerative diseases/malfunctions and development of effective treatment strategies and cures. While we work toward and anxiously await those "*Eureka*!" moments of insight in ageing research, we all look toward the Pioneers of the field for guidance and encouragement. Professor Mark Mattson clearly stands out as a Leader in this regard, and his work will no doubt continue to challenge us with innovative ideas bearing profound implications for gerontology research and practice.

Robert M. Brosh Jr.*
National Institute on Aging, NIH, United States
E-mail address: broshr@grc.nia.nih.gov (R.M. Brosh)

Claudio Franceschi**
University of Bologna, Italy
E-mail address: claudio.franceschi@unibo.it (C. Franceschi)

* Corresponding author.
** Corresponding author.