Ensuring Good Health and Well-Being of the Aging Equine Population

K. Malinowski and K.H. McKeever

Rutgers Equine Science Center, Rutgers – The State University of New Jersey

One of the largest industries in the United States involves horses, a $39.2 billion business associated with 9.2 million animals. The horse industry’s contribution to the U.S. gross domestic product is $102 billion, generating over 1.4 million full-time equivalent jobs across the country (AHC, 2005). More than 11.4% of the equine population is over the age of 20 years and many of these animals continue to participate in athletic activities (NAHMS, 2015). Partly responsible for the increased life-span of horses is the fact that equine nutritionists have advanced the development of “senior feeds”, and that the animal pharmaceutical industry has developed effective anthelmentics for parasite control. However, advancing age in horses often is associated with declining body condition, muscle tone, aerobic capacity, thermoregulatory ability in response to acute exercise, and general well-being. While aging and obesity-related loss of function and diseases have many factors, understanding the underlying imbalance of molecular signaling mediators in metabolically important tissues, such as muscle, to preserve functionality of physiological systems needs to be addressed. Advanced age in horses is associated with a decline in immune response and is characterized by increased production of pro-inflammatory cytokines, termed inflammageing, which has been linked to obesity. Horses over 20 years can improve aerobic performance, reduce body fat, and partially restore changes that occur in the hypothalamic-pituitary-adrenal axis, in response to acute exercise, and insulin sensitivity with regular exercise training. Physiological similarities between humans and horses allow for broad implications of equine exercise physiology research in relation to aging and performance. Understanding the molecular mechanisms behind the adaptive response to exercise will aid in the development of exercise conditioning and nutritional strategies meant to preserve the health and well-being of this socio-economically important species.