COMPANION ANIMALS SYMPOSIUM: Living beyond 20: Discoveries in geriatric companion animal biology

C. L. Morris
Department of Comparative Nutrition, Omaha’s Henry Doorly Zoo, Omaha, NE 68107

INTRODUCTION

The Companion Animal Symposium titled “Living Beyond 20: Discoveries in Geriatric Companion Animal Biology” was held at the Joint Annual Meeting of the American Society of Animal Science and the American Dairy Science Association on July 10 to 14, 2011, in New Orleans, Louisiana. The objectives of this symposium were 1) to explore the scientific discoveries specific to the quality of life, nutrition, and well-being of geriatric companion and exotic animals and 2) to promote future research related to these growing animal populations. Both companion and exotic animals are managed for longevity and conservation, as opposed to production purposes; therefore, both animal populations were included in the symposium.

The landscape of the animal science community has evolved over the past several decades to include not only those animals managed for end product value but also those animals with value unrelated to production. Companion animals have become increasingly valued in homes for companionship and service, whereas exotic animals in zoological institutions are managed for species conservation, education, and research programs. It is estimated that more than 25% of the dog and cat population in the United States is over the age of 7 yr, and many exotic species live longer in zoological institutions compared with their wild counterparts as a result of improved disease management, nutrition, genetics, and husbandry practices that have largely been developed from traditional animal science inquiry. As these populations continue to grow, so does the need for advancements in all areas of animal science research and education.

The first presentation by George Fahey Jr. (Faber and Fahey, 2011) established the historical landscape and shift that departments of animal sciences have observed regarding companion animals and their inclusion in departmental research and teaching programs. He discussed further how feeding strategies and diet formulation for companion animals were not focused on production and end product value but rather on supplying appropriate nutrients throughout the entire life cycle of the animal. The importance of proper nutrition begins for animals in utero and is affected by the nutritional status of the dam. Supplying breeding animals with optimal nutrition during breeding and gestation is paramount to building strong nutritional foundations in offspring that support longevity and health throughout life. Traditional animal sciences have provided an array of comparative research demonstrating the necessity of proper nutrition to lactating females for optimal growth and development. Current companion animal research is focused heavily on understanding the link with nutrition of growing animals, brain development, learning, and cognition. This focus is just one highlighting the shift away from feed efficiency to the improvement of lifelong health and well-being of the animal both physically and mentally. Although Fahey discussed the relevance of nutrition throughout the life cycle, the importance of nutrition throughout adult and senior years was the main focus of the presentation, specifically in relation to changes in metabolism, such as reduced energy requirements and enzymatic activities, along with increased physiological demands for essential nutrients such as antioxidants, fatty acids, and protein. These particular physiological changes make it necessary to provide geriatric animals with highly digestible diets formulated with high-quality ingredients. The research efforts in this field are providing a solid base for pet food companies to develop special-

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2Corresponding author: cherylm@omahazoo.com
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ized foods that meet physiological needs throughout the life cycle of the individual.

Although research has demonstrated the need to develop reduced calorie diets with bioavailable nutrients for older animals, highly digestible pet foods tend to contain excessive amounts of calories, leading to epidemic numbers of obese pets. Due to lack of exercise and nutrient availability, many exotic animals in zoological institutions also suffer from obesity. The second presentation by Dorothy Laflamme (Laflamme, 2012) focused specifically on obesity as it relates to domestic dogs and cats. Recent estimations indicate that 50% of pet dogs and cats between the ages of 5 and 10 yr of age are obese. Obesity results in impairments of health and physiological function, and increases morbidity rates. After discussing the definition and prevalence of obesity, she discussed the role of the endocrine system and how advances in research related to hormones and proteins, such as leptin and adipokines, were aiding in the understanding of the pathophysiology of obesity as a disease and pro-inflammatory state. She concluded her presentation with management strategies for obesity. The major strategy discussed included appropriate diet formulation, particularly regarding macronutrients and the importance of caloric restriction with appropriate essential nutrient density. The importance of consistent exercise programs, nutraceuticals, and owner education were also highlighted.

The third speaker, Karen Overall (Overall, 2011) presented data regarding age-related cognitive changes in animals. Research in animals is demonstrating that the decline in mental and cognitive function in older animals may be associated with reduced use of neurological systems and brain stimulation. Declines in mental function for animals may be improved by incorporating cognitive stimulation exercises and continuing training programs. In addition, sensory organ systems such as smell may be highly correlated with maintenance of cognitive function as animals age, implicating the necessity to provide appropriate stimulation to animal environments that target multiple sensory systems. Problem solving activities and environmental enrichment activities should provide multiple sense (i.e., tactile, visual, olfactory, social, auditory, and spatial) stimulation. Evidence is strong that these environmental interventions may reduce loss of cognition and improve overall mental well-being in aging animals.

The fourth presentation was given by Cheryl Morris and Jill Cline (Morris and Cline, 2011). Cline discussed sensory changes and their effect on palatability and diet acceptance for domestic dogs and cats. She discussed the notion that diet preference and intake are affected by several factors and physical changes that coincide with aging, including nasal epithelium changes, hyposmia, hypoguesia, food aversion, or some combination of these. Some of these factors, along with metabolic changes, lead to losses in body condition. As dogs age, lean body mass is reduced, whereas fat mass is increased, resulting in substantial losses in total lean tissue body composition. Regarding cats over the age of 11 yr, reductions are observed in both lean and fat tissue, with substantial losses in fat tissue preceding death by approximately 3.5 yr. Morris then transitioned into her portion of the presentation by initially addressing exotic carnivore body condition. Body condition changes in exotic animals appear more associated with clinical condition, as opposed to strictly age. For example, renal disease results in loss of fat and lean tissue, whereas diabetes is often associated with obesity in many different species including primates and carnivores. As with domestic animals, dietary preference and intake in exotic animals seem to be associated with sensory changes. Moisture content was discussed as a possible factor in maintaining food preference and intake for multiple species. Whole-prey food items including rodents (70% moisture) are preferred over kibble foods (10% moisture) for carnivores, whereas fresh browse, leaves, and grasses (85% moisture) are preferred over hay and pellets (10% moisture) by most herbivores. These ingredients, used in addition to standard ingredients such as kibble or pellets and hay, are not only useful for maintaining feed intake, but also provide additional sensory stimulation that may be beneficial in managing geriatric exotic animals in zoological institutions.

Finally, Bertrand Lussier discussed physiology of bone health and improving mobility in senior animals (Lussier, 2011). The incidence of osteoarthritis in the US population of pet dogs is estimated to be at least 20%. Typically osteoarthritis is a secondary condition associated with genetics, physical structure or conformation, or other degenerative diseases and pro-inflammatory conditions, and its primary causes are typically dysplasia of hips or elbows and ruptures of cruciate ligaments. Prevention of osteoarthritis begins early in life with appropriate nutrition, exercise, and body condition. Being overweight and having poor physical condition are likely to be strong factors in the development of osteoarthritis in older animals. The treatment of osteoarthritis begins with an accurate diagnosis of the actual cause, including possible surgical repair. Supplemental treatment should include appropriate rehabilitation therapy and physical conditioning, proper body condition and BW management, and nutritional support. Nutritionally, there is strong evidence supporting the supplementation with antioxidants (e.g., vitamins E and C), anti-inflammatory agents (e.g., omega-3 fatty acids), and joint-supportive nutraceuticals (e.g., green-lipped mussels, chondroitin sulfate, and glucosamine). Although the evidence supporting these supplements is strong, combinations and interactions are poorly researched. Anecdotally, it ap-
pears that these nutraceuticals have synergistic effects and may provide optimal benefit when used in combinations; however, that body of research is currently lacking. Additional research is needed to determine optimal doses and combination regimens for treating and managing osteoarthritis in aging pets.

The presentations in the symposium were effective at highlighting both the current knowledge base and the need for further research regarding geriatric nutrition for companion and exotic animals. Discoveries in animal science research have provided a sound base for establishing optimal nutrition in utero and during growth and development. As geriatric animal populations increase, so does the need for understanding how to optimally care for and manage them. Additional research should not focus only on domestic dogs and cats. Zoological institutions house numbers of species with relatively unknown nutrient requirement data. Exotic herbivore species including zebra, giraffe, rhinoceros, antelope, and okapi would all benefit from comparative geriatric research in traditional livestock species such as domestic cattle, sheep, and horses. Additionally, geriatric animal research provides an excellent model for understanding human geriatric care.

LITERATURE CITED


