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My lab is performing research studies to determine how nutrition affects immunity. We are interested in nutrigenomic technology, or the study of how nutraceuticals affect the expression of genes involved in the immune response. We have several dog studies in progress to determine whether dietary changes can alter innate immune responses via changes in gene expression. We have shown that phagocytosis by peripheral blood neutrophils and transcript levels of genes involved in neutrophil-mediated functions are decreased in older dogs compared with dogs less than 1 year of age, which may contribute to increased morbidity and mortality with aging. Currently we are trying to determine if dietary modifications can enhance neutrophil functions, and thus innate immunity, particularly in older dogs.

My other research projects involve sheep and cows supplemented with selenium and its effects on the immune response. Selenium has been known to function as a nutrient for over 50 years. However, the dietary requirements of selenium for optimal immune function remain to be determined. In addition, the efficacy of organic versus inorganic sources of selenium has not been thoroughly investigated. Our goals are to determine if supplementing selenium at levels above those currently recommended can improve innate and adaptive immune responses, and whether organic selenium has increased bioavailability compared to inorganic selenium. Agronomic biofortification is defined as increasing the bioavailable concentration of an essential element in edible portions of crop plants through the use of fertilizers. We are also investigating the potential for using Se-containing fertilizers to increase crop Se concentrations.