Galectin-4 and the Functions of N- and C- Terminal Domains in Innate Immunity

McDonald, Marissa

The purpose of this project was to characterize human galectin-4 and its anti-microbial properties against self-like antigen bearing gram-positive and gram-negative bacteria while identifying the specific functions of individual domains. Killing assays were made by combining either E. coli O86, K. pneumoniae O1, P. alcalifaciens O5, WT or Delta S. agalactiae A9O9 with either whole Gal-4, 4C or 4N domains. Negative and positive controls included a mixture of PBS solution with bacteria and all assays involving O86 respectively. Assays were done with high or low Gal-4 concentrations, and inhibition of killing was observed through the addition of either lactose, TDG, or sucrose to the assays. Assays were plated and incubated overnight. Colony forming units were counted and standardized against the PBS control group to achieve a percentage of CFUs remaining after incubation with the protein. As a whole, Gal-4 bound to and killed all five strains of bacteria. Domain 4N killed all strains except O86 and Delta A9O9, which are now thought to be killed by 4C. Killing was most effective at a protein concentration of 0.4 optical density. Statistical calculations were done via chi-squared tests and support the results of this experiment. This research provides the first information on Gal-4 killing of gram-positive A9O9 bacteria and the specific functions of each domain, supporting the development of glycan-specific antibiotics to limit the killing of helpful microflora.

Awards Won:

Fourth Award of $500