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Research Interest of Richard D. Cummings, Ph.D.

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The Cummings group explores the fundamental biological processes of cell adhesion and signaling through interactions of complex glycoconjugates and their receptors, e.g. glycan-binding proteins, on cell surfaces and in extracellular matrices. This research area also relates to processes by which animal pathogens, such as viruses, bacteria, and parasites stick to animal cells and initiate disease, as well as immune responses to pathogen invasion through innate and adaptive immune systems. Cummings' lab also studies alterations in glycoconjugate synthesis through either mutation or injuries that lead to many human diseases and disorders. These studies are fundamental to understanding animal development, differentiation, tumor metastasis, inflammation and pathogenesis by microbes and parasites. Finally, the Cummings laboratory is a leader in the field of glycomics and he and his colleagues in the Glycomics Center at Emory have developed glycan microarrays and "shotgun glycomics" to promote studies of glycan-binding proteins that recognize specific glycans and glycoconjugates. The lab also houses the Protein-Glycan Interaction Resource of the NIH/NIGMS, a funded resource derived from the Consortium for Functional Glycomics, which provides access to investigators world-wide to glycan microarray technology.