Mimics Human IgG Protease to Treat Canines and Enables Further Therapeutics Research Using Animal Models

This IgG protease is canine-specific and mimics a Streptococcal cysteine endoprotease used to treat human immune-mediated inflammatory diseases such as arthritis, glomerulonephritis and thrombocytopenia. Infusion of IdeS, an IgG-specific cysteine endoprotease produced by the exclusively human pathogen, Streptococcus pyogenes, is a new alternative approach to treating these and other immune-mediated illness in humans. However, due to the exquisite species specificity of this enzyme it only degrades IgG in humans and rabbits. Animal models will be important to study IgG protease therapy across that broad spectrum of clinical applications, but rabbits are not natural models of human immune-mediated diseases. Available therapies to suppress the malfunctioning immune response of these disorders have traditionally included steroids, nonsteroidal anti-inflammatory drugs, or other immune suppressants, but with continual use these therapies can produce side effects more severe than the underlying condition and may put subjects at risk for other medical conditions.

Researchers at the University of Florida have discovered a homolog of this enzyme produced by the canine commensal bacterium Mycoplasma canis. It is anticipated that this canine-specific protease (IdeMC) will be used to further the study of protease therapy for human immune-mediated diseases, using dog models, and may also lead to a new treatment for canine equivalent diseases.

Application

Canine IgG protease (IdeMC) could be developed as a therapeutic to treat canine immune-mediated diseases as well as facilitate the study of human IgG proteases to treat human immune-mediated diseases

Advantages

• Reduces immune responses initiated by the specific protease, IgG, potentially offering a significant advantage over current treatments that use steroid and anti-inflammatory drugs
• Provides a pathway to further the study of protease therapy for human immune-mediated diseases using dog models

Technology

The canine commensal bacteria Mycoplasma canis produces IdeMC, a very specific IgG protease that is homologous to the IgG-specific cysteine endoprotease, IdeS, which is produced by Streptococcus pyogenes and used as a therapeutic to treat various autoimmune disorders. Researchers at the University of Florida have shown that IdeMC is capable of efficient species-specific degradation of canine Ig and
can cleave IgG in a subject or in the bodily fluid of a subject. IdeMC has therapeutic potential for treating common canine equivalents of human immune-mediated diseases and would enable using animal models suitable for developing therapy for various canine immune-mediated diseases.

### Inventors

**Daniel Brown, Ph.D,** is an associate professor and interim chair for the Department of Infectious Diseases & Immunology at the University of Florida. He received his Ph.D. in genetics from the University of Arizona and his master’s degree in quantitative genetics, from Louisiana State University. Dr. Brown received the International Organization for Mycoplasmology Derrick Edward Award for Outstanding Research in Mycoplasmology as well as the University of Florida College of Veterinary Medicine C.E. Cornelius Young Investigator Award and is member of the Phi Zeta National Honor Society of Veterinary Medicine. His research interests include the culture- and non-culture-based discovery of new bacterial pathogens and commensals from clinical specimens.