US VETERINARY IMMUNE REAGENT NETWORK: PRIORITIZATION & PROGRESS.


1USDA, ARS, BARC, Beltsville, MD USA, 2University of Massachusetts, Amherst, MA USA, 3Kinghorn Biotech, Minneapolis, MN USA, 4University of Kentucky, Lexington, KY USA, 5Western Fisheries Res Ctr (USGS), Seattle, WA USA, 6University of Mississippi Medical Center, Jackson, MS USA, 7Cornell University, Ithaca, NY USA

Abstract

The US Veterinary Immune Reagent Network (VRN) (http://www.usamr.mil/vetimm) represents a broad community plan to begin to systematically address the immunological reagent gap for the US veterinary immunology research community including for the following groups: ruminants (concentrating on cattle), swine, poultry (primarily chickens), horses and aquatic species (concentrating on channel catfish and trout) with a goal of developing 20 reagents per species group. Advances in genomics, including full genome sequences for cattle, chicken, and horses, have provided improved data for gene and protein expression. The genome and EST data provides an excellent basis on which to accurately predict protein sequences for expression work that is the basis for production of needed immunological reagents including recombinant cytokines and chemokines and immune cell surface markers. Monoclonal antibodies (mAbs) will be generated to identify the major leukocyte subsets (T and B lymphocytes, NK cells, monocytes/macrophages, dendritic cells, neutrophils), react with cytokine/chemokine receptors, and their receptors, and target other important molecules that modulate immune function such as toll-like receptors and regulatory signals. These reagents will be used to evaluate changes during vaccine and disease responses, including identifying the causes of immune-pathology. Finally, these reagents will be used to generate or isolate immune responses either to enhance protective immune responses to vaccines or to reduce immune-system-mediated pathology.

Overall Background:

A broad community effort began in the US 24 months ago with the target species ruminants including cattle and sheep, swine, poultry including chickens and turkeys, horses, catfish, and trout. The project directors are coordinating their efforts with other international groups and are continually revising the prioritization list and seeking input from scientists working with these species.

US Veterinary Immune Reagent Network Purpose:

Monoclonal reagents will be produced including cytokines and chemokines. Monoclonal antibodies (mAbs) will be developed and targeted at identifying the major leukocyte subsets (T and B lymphocytes, NK cells, monocytes/macrophages, dendritic cells, neutrophils), reacting with cytokine/chemokine receptors, and modulating immune function, such as toll-like receptors and regulatory signals. They will be used to evaluate changes during vaccine and disease responses, including identifying the causes of immune-pathology. Finally, these reagents will be used to generate or isolate immune responses either to enhance protective immune responses to vaccines or to reduce immune-system-mediated pathology.

Overview of VRN:

The US Veterinary Immunological Reagent Network (VRN) will support and develop a national effort to produce monoclonal antibodies and recombinant cytokine fusion proteins for the following target species: ruminants (cattle and sheep), swine, poultry (chicken and turkeys), horses, channel catfish, and trout.

Monoclonal antibody production will be supported through the VRN with a goal of producing a standard number of mAbs per species group. Advances in genomics, including full genome sequences, and improved cell culture protocols will enable the generation of reagents per species group. Advances in genomics, including full genome sequences for cattle, chicken, and horses, have provided improved data for gene and protein expression. The genome and EST data provides an excellent basis on which to accurately predict protein sequences for expression work that is the basis for production of needed immunological reagents including recombinant cytokines and chemokines and immune cell surface markers. Monoclonal antibodies (mAbs) will be generated to identify the major leukocyte subsets (T and B lymphocytes, NK cells, monocytes/macrophages, dendritic cells, neutrophils), react with cytokine/chemokine receptors, and their receptors, and target other important molecules that modulate immune function such as toll-like receptors and regulatory signals. These reagents will be used to evaluate changes during vaccine and disease responses, including identifying the causes of immune-pathology. Finally, these reagents will be used to generate or isolate immune responses either to enhance protective immune responses to vaccines or to reduce immune-system-mediated pathology.

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Protein Expression:

Kingfisher Biotech, Joanna LaBresh, (soluble proteins)

Chemokines and cytokines will be expressed in yeast as Kingfisher, tested for bioactivity at species labs, and used for mAb production.

Monoclonal Antibody Production:

Cornell University, Bettina Wagner, (cell surface molecules)

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