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An assay to detect neutralizing antibodies against H5N1 influenza without the requisite for live virus using Surface Plasmon Resonance (SPR) technology

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Avian influenza continues to be a public health problem. Vaccination may prevent or ameliorate the disease; however, it may not always be feasible to match the timing of the vaccine administration to the time of exposure or additional therapeutics may be needed in the case of severe disease. Passive antibody therapy with polyclonal anti-influenza immune (hyperimmune) globulins may be an effective complementary therapy. Hyperimmune globulin therapy is already in place for several infectious agents and an anti-H5N1 Equine F(ab')₂ product has recently obtained EMA Orphan Drug status. In order to screen individual plasma donations for high neutralizing titers to pool into a hyperimmune product, a fast and reliable neutralizing antibody assay is needed. Currently, the hemagglutination inhibition (HAI) and microneutralization (MN) assays are used to detect neutralizing antibodies against influenza viruses; however, each assay requires the use of live virus. We developed a Surface Plasmon Resonance (SPR) assay to measure anti-H5 HA antibodies for neutralizing activity which has no requirement for live virus. Briefly, biotinylated multimeric glycans containing sialic acid moieties were captured on a streptavidin-coated surface, acting as a model for influenza cell-surface receptors. Multimeric H5 HA recombinant protein micelles pre-incubated with a dilution sequence of antibodies or serum were then injected over the glycans. The results of the antibody dilutions pre-incubated with H5 HA were compared to H5 HA only and an IC₅₀ was calculated. Using the IC₅₀ measurement we could rank the mAb and polyclonal sera in order of neutralizing activity. The SPR assay may also be adapted to measure the neutralizing antibody against other infectious agents where the host receptor is known.

Biography

Malgorzata G Norton has received her MS degree in Veterinary Medical Sciences/Immunology from Louisiana State University, School of Veterinary Medicine studying Cat Scratch Disease. She is currently a Biologist at the U.S. Food and Drug Administration in the Laboratory of Plasma Derivatives, a position she has held for over 10 years. She is involved in both regulatory review and research involving plasma-derived polyclonal immune globulin. Her current research involves protein-protein and protein-carbohydrate interactions using Surface Plasmon Resonance (SPR). Her collaborations span the fields of virology, bacteriology, immunology and hematology.

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