

7th International Conference on

Proteomics & Bioinformatics

October 24-26, 2016 Rome, Italy



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Glycomics work-flows for the characterization of vaccine glycoprotein antigens

Currently the majority of seasonal influenza vaccine is produced in embryonated hen eggs. However, due to an inconsistent egg supply, many manufacturers are moving towards alternative cell substrates for vaccine antigen production such as MDCK (canine), VERO (primate), Sf9 (insect) and tobacco mosaic based (plant) systems. Because these cell systems derive, from different species, the proteins or viruses expressed in them, that will harbor species specific glycosylation characteristics. As glycosylation can have significant impact on antigenicity and processing by the innate and humoral immune systems, these cell specific differences in major influenza vaccine antigen glycosylation can impact vaccine efficacy and safety. To investigate the impact of glycosylation on influenza and other vaccines containing glycoprotein antigens, we have developed a glycomics workflow to investigate potential impact of these post translational modifications on antigen structure and function. This workflow includes: 1) Analysis of released and permethylated glycans; 2) glycopeptide analysis by nano-LC/MS^E; 3) Molecular modeling of antigenic sites with regard to glycosylation sites and their resident glycans. We have also developed in-house glycoinformatics tools to aid in our analyses.

Biography

John F Cipollo completed his PhD work at the State University of New York at Albany. He performed Post-doctoral studies at Boston University School of Medicine where he was the first to report the glycome of the model organism *Caenorhabditis elegans*, discovered phosphorylcholine oligosaccharides and demonstrated their synthesis in this organism. These compounds are host immune response modulators in parasitic nematodes. He was a Professor of Biochemistry at Boston University until recruited in 2007 to Center for Biologics Evaluation and Research at the US Food and Drug Administration where he has made meaningful contributions to the understanding of vaccine antigen glycosylation. He has published over 30 papers in reputed journals. He has also written guidance documents for the World Health Organization and United States Pharmacopeial Convention.

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