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BluePort tissue platform: A tool to induce and study pan-arthropod immunity

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Statement of the Problem: Development of vaccines to prevent diseases caused by arthropod-borne pathogens remains, with few exceptions, an elusive goal. This is in part due to the complexity of the immune evasion mechanisms they deploy to thrive in vertebrate and invertebrate hosts. A promising alternative is to target antigens present in the saliva that hematophagous arthropods deliver, along with pathogens, at the bite site. One major advantage of this approach is that molecular structures preserved during the evolution of arthropods can be incorporated in the development of pan-arthropod vaccines. One additional advantage is that natural exposure to saliva from both infected and non-infected arthropods can boost transmission-blocking immunity.

Methodology & Theoretical Orientation: We used the BluePort tissue platform, a well-vascularized and macrophage-rich compartment, as tool to induce and evaluate anti-salivary immunity. Saliva from three species of hematophagous arthropods, *Lutzomyia longipalpis, Ochlerotatus triseriatus* and *Ixodes scapularis,* was used to study the cross-reactive immunity generated, and lectins and enzymes used to study N-linked glycans as potential inductors of this immunity.

Findings: The BluePort tissue platform is a lymph-node type structure that can be used to accelerate the acquisition of cross-reactive anti-salivary immunity. Drastic differences in the cell inflammatory profile detected in naïve and immune animals strongly suggest that the BluePort vaccination portal facilitates the induction of strong TH-2 type responses, and that allergenic structure, such as arthropod N-linked glycans, might be involved in the inducting of cross-reactive immunity.

Conclusion & Significance: It is possible to induce cross-reactive immunity towards salivary glycoproteins using the BluePort as vaccination portal, it remains to be determined whether the immunity induced block pathogen transmission.

Biography

J Santiago Mejia is a Research Scientist interested in the development of solutions to medical problems, in particular those caused by arthropod-borne pathogens. He is passionate about scientific discovery and new perspectives into complex problems. His work characterizing the immune and inflammatory response after the bite of hematophagous arthropods lead him realize that while exposure to the bite of infected arthropods represent a health risk, exposure to the bite of healthy arthropods might be essential to human health. The complete removal from human dwellings of hematophagous arthropods might represent an eco-pathological process associated with an increased risk of chronic non-communicable diseases. Under this perspective it will be necessary to explore strategies to ensure that residents of intervened areas get access to saliva from laboratory-reared pathogen-free arthropods.

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