ORAL 1: Screening of tick-borne pathogens in Caribbean ticks using High-throughput qPCR (DOMOTICK Project)

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Among hematophagous arthropods, ticks transmit the greater variety of pathogens of public health and veterinary importance. Due to socio-economic and environmental factors, such as human practices, increased travel, global market, global warming, and environmental changes, the incidence of tick-borne diseases in both humans and animals is increasing worldwide, leading to a need for extended surveillance tools.

Recently, in Europe a large scale epidemiological study was conducted on 19,474 *Ixodes ricinus* nymphs collected from five European countries using a powerful new high-throughput approach to screen tick-borne pathogens (Michelet et al., 2014). The technology used in this study is a microfluidic high-throughput Taqman realtime PCR (BioMark™ dynamic arrays, Fluidigm Corporation), allowing the simultaneous detection of 25 bacterial, 12 parasitic and 22 viral species across 94 samples of ticks. They successfully determined the prevalence of expected tick-borne pathogens *(Borrelia burgdorferi sensu lato, Babesia divergens, Tick-Borne Encephalitis virus, etc.)*, unexpected *(Borrelia miyamotoi, Nairo-like virus)* or rare *(Bartonella henselae, Eyach virus)* tick-borne pathogens. This surveillance method represents a major improvement in epidemiological studies, able to facilitate comprehensive testing of tick-borne pathogens in various samples, and which can also be customized for the survey of emerging diseases in different areas of the world.

Caribbean, are a risk area for the (re)-emergence of vector-borne diseases. Population in Caribbean is in expansion, leading to a growing food demand. Maintaining a healthy livestock industry is crucial but often difficult to manage because of tick-borne diseases such as anaplasmosis, ehrlichiosis, or babesiosis. The Caribbean is also a world interface, with numerous air and maritime networks (tourism, and animals trade) leading to a serious risk of dispersion of tick and their tick-borne pathogens in this area. Moreover, few reports are available on tick-borne diseases in the Caribbean and are only focusing on livestock pathogens such as *Ehrlichia ruminantium, Babesia (bovis and bigemina)* and *Anaplasma marginale*.

In this context, the DOMOTICK project was designed to apply the high-throughput realtime-PCR technology for a large scale screening of tick-borne pathogens in the Caribbean. Methods included a comprehensive analysis of the literature on tick-borne pathogens, as well as pathogen detection by RNA-sequencing on nucleic acids extracted from ticks collected in Guadeloupe and Martinique to determine which pathogens need to be included in this new high-throughput technology. Preliminary results obtained from NGS analysis suggest that these ticks may harbor more pathogenic microorganisms than the currently known in the Caribbean, such as Rickettsia and Borrelia species of public health importance. Up to now, 40 bacterial species have been listed, including the genera *Anaplasma, Ehrlichia, Bartonella, Borrelia, Rickettsia, Mycoplasma, Francisella, Coxiella, Aegyptianella, Mycoplasma;* 14 parasites species, belonging to *the genera Babesia, Theleria, Hepatozoon, Leishmania, Rangelia vitalii, Cytauxzoon felis;* and 25 arboviruses belonging to viral families of *Orthobunyavirus, Phlebovirus, Nairovirus, Asfivivirus, Thogotovirus, Flavivirus, Coltivirus and Orbivirus.*

The detection tool will be validated with tick samples collected on various vertebrate hosts through the Caribbean islands thanks to the CaribVet network, and to local veterinarians. Results obtained will be used to do an exploratory epidemiological study on the tick-borne pathogens circulating in the Caribbean.

References:

Michelet L, Delannoy S, Devillers E et al. High-throughput screening of tick-borne pathogens in Europe. Front. Cell. Infect. Microbiol. 4, 103 (2014).

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Welcome
10th Annual Meeting EPIZONE "Going Viral"

It is a great honour and a privilege for me to give you all our warmest welcome to the Xth Annual Meeting of EPIZONE, the first to be celebrated in Spain. INIA-CISA, as the host institution, has been fully committed on this challenge from the beginning, and we do hope that the final result will be satisfactory for participants, sponsors and organizers. We wish to thank specially to them, as this event could not be possible without any of these essential parts. The financial support from sponsors, the availability and contributions from keynote speakers, the high scientific level of oral and poster presentations from participants and, at the end, curious, active and interested assistants, will contribute to the success of the meeting. From the organizing committee I want also to thank the EPIZONE secretariat and coordinator for their continuous help and implication in the effort. Finally, my gratitude to the people at the local and international scientific and organizing committees that have been working together very hard to yield a balanced, wide-scoped and intense (maybe too intense?) programme. Special thanks to Jovita Fernandez Piñero, who has been in charge of many tasks, and has fulfilled a brilliant labour. And will not forget about the enthusiastic Young Epizone people; thank you for your work and for organizing such a well-designed session.

Under the general title of "Going Viral", and from a *One Health* perspective, we have outlined three concentric circles defining the main topics:

Topic I: Animal Health in a changing World, dealing with global threats for animal health.

Topic II: Threats at the European border, paying attention to diseases in the neighbouring areas.

Topic III: Current challenges inside Europe, where the main diseases affecting the European countries will be discussed.

As in previous EPIZONE meetings, diagnostics, intervention strategies, epidemiology and surveillance, risk analysis and some other aspects will be approached by recognized experts in specific sessions. Many diseases which are familiar to us will receive attention, from Foot and Mouth Disease to West Nile Virus Disease or the more recent episodes by Lumpy Skin Disease, Pest des Petits Ruminants and some others. African Swine Fever and Bluetongue have been the most "popular" diseases among contributors, this revealing their current relevance.

I hope that the efforts of contributors, sponsors, participants and organizers will provide an opportunity for the "epizootic community" to work together, to plan new initiatives, to interact and to share a good time in Madrid.

Victor Briones

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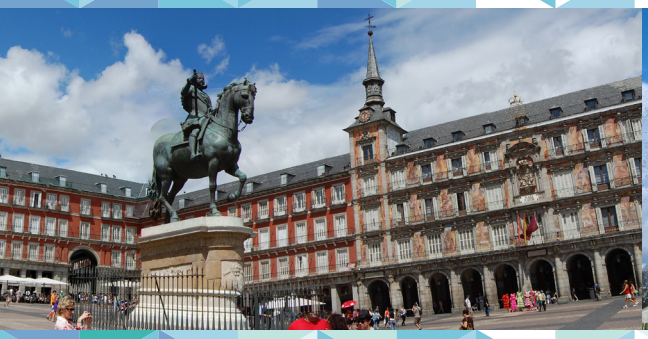

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