

We are pleased to present to the readers of *Veterinary Research* the 2009 special issue of *Veterinary Research* on “Adaptative strategies of vector-borne pathogens to vectorial transmission”.

Much recent progress has been done in the knowledge of the mechanisms that allow pathogens to better adapt to their environment. This is particularly true for vector borne pathogens which have to properly fit to their vectors and their hosts for a successful replication and transmission.

The main objective for this special issue is to review how the pathogens, their vectors and their hosts have adapted to each another for a most efficient transmission of the pathogen. It includes not only the ecological factors (temperature, humidity, altitude, etc.) and population target strategies, but also the molecular, cellular and genetic mechanisms that allow such an adaptation. Through a series of 11 invited review manuscripts we aimed at covering the various adaptive strategies of viruses (West Nile virus – WNV, African Horse sickness), bacteria (Bartonellae, tick and flea borne *Rickettsiae*, *Francisella tularensis* (the agent of tularemia), *Yersinia pestis* (the agent of plague) and Lyme borreliosis spirochetes) and parasites (*Babesia*, *Leishmania* and *Trypanosoma cruzi* – the agent of Chagas disease). We also selected examples that illustrate the role of various vectors, such as mosquitoes, sandflies, fleas, lice and ticks. It is the first time in recent years that a special issue is entirely devoted to reviewing the mechanistic, physiopathogenic and epidemiological aspects of host/vector adaptation of vector borne pathogens.

For instance, we now know that certain genes are activated for *Yersinia pestis* when the pathogen is in the flea and deregulated when in the host [3]. “Discoveries of molecular interactions involved in *Borrelia burgdorferi* transmission have accelerated recently and reveal complex interactions among the spirochete, tick, and vertebrate triad that involve multiple, redundant pathways reflecting the evolution of general and specific mechanisms by which they interact to survive and reproduce” [4]. Similarly, “since its introduction to North America in 1999, a novel WNV genotype has been identified that has been demonstrated to disseminate more rapidly and with greater efficiency at elevated temperatures than the originally introduced strain, indicating the potential importance of temperature as a selective criterion for the emergence of WNV genotypes with increased vectorial capacity. Even prior to the North American introduction, a mutation associated with increased replication in avian hosts, identified to be under adaptive evolutionary pressure, has been detected, indicating that adaptation for increased replication within vertebrate hosts could play a role in increased transmission efficiency” [1]. For Bartonellae, bacterial type IV secretion systems, which are supra-molecular transporters ancestrally related to bacterial conjugation systems, represent crucial pathogenicity factors that have contributed to a radial expansion of the *Bartonella* lineage in nature by facilitating adaptation to unique mammalian hosts. Furthermore, bacterial adhesins mediate a critical, early step in the pathogenesis of the bartonellae by binding to extracellular matrix components of host cells, which leads to firm bacterial adhesion to the cell surface as a prerequisite for the efficient translocation of type IV secretion effector proteins. Genetic diversity and strain variability also appear to enhance the ability of bartonellae to invade not only specific reservoir hosts, but also accidental hosts, as shown for *B. henselae*. Bartonellae have been identified in many different blood-sucking arthropods, in which they are typically found to cause extracellular infections of the mid-gut epithelium. Adaptation to specific vectors and reservoirs seems to be a common strategy of Bartonellae for transmission and host diversity [2].

I would like to thank all the contributors to this special issue for their hard and conscientious work and I hope that the readers will find information that fits their own centre of interest. Finally, the editors of *Veterinary Research* hope that this issue will be considered as a reference in this area.

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