Exploring the pan-genome of pathogenic bacterial species for the identification of novel antimicrobial targets and vaccine candidates

The main objective of our research group is the development of new strategies to combat infections by multidrug-resistant (MDR) bacteria, in particular of the gram-negative group. The increasing emergence and spread of MDR pathogens constitutes at present one of the major threats to public health worldwide. The shortage of effective antimicrobials for the treatment of infections by MDR gram-negative bacteria is particularly critical as cases of pan-resistance accumulate. The discovery of new targets and modes of action, less propitious to the evolution of resistance, has therefore become a pressing need. In parallel, the development of prophylactic, as well as therapeutic vaccines constitutes an alternative that might offer advantages in certain cases, including endemic infections or the protection of high-risk population groups. Our team combines a range of computational and experimental techniques for the identification of antimicrobial targets with new modes of action and vaccine candidates eliciting prescribed responses. In this talk I will explain our strategy in this field with recent examples from our work, including the development of bioinformatics tools and the experimental investigation of specific drug-target and vaccine candidates.

Short Bio

Xavier Daura studied Biological Sciences at the Autonomous University of Barcelona (UAB), where he graduated in 1991 and obtained the PhD in 1996. He then joined the group of Wilfred van Gunsteren at the Swiss Federal Institute of Technology (ETH) in Zurich, a main reference in the field of computational modelling and simulation of biomolecular systems. With van Gunsteren he performed seminal work on the simulation of polypeptide folding by molecular-dynamics methods. In 2002 he was appointed as ICREA Research Professor and returned with this position to the Institute of Biotechnology and Biomedicine (IBB) of UAB, starting a new group in Computational Biology. In recent years the focus of his research has been progressively turning to the identification and development of new strategies to combat infections by multidrug-resistant bacteria, using a range of computational and experimental approaches, partly through a tight collaboration with Prof. Isidre Gibert, also at the IBB. In 2005 he was appointed Adjunct Professor at UAB to combine his research activities as an ICREA Professor with teaching at the post-graduate level. Since January 2011 he serves as Director of IBB.