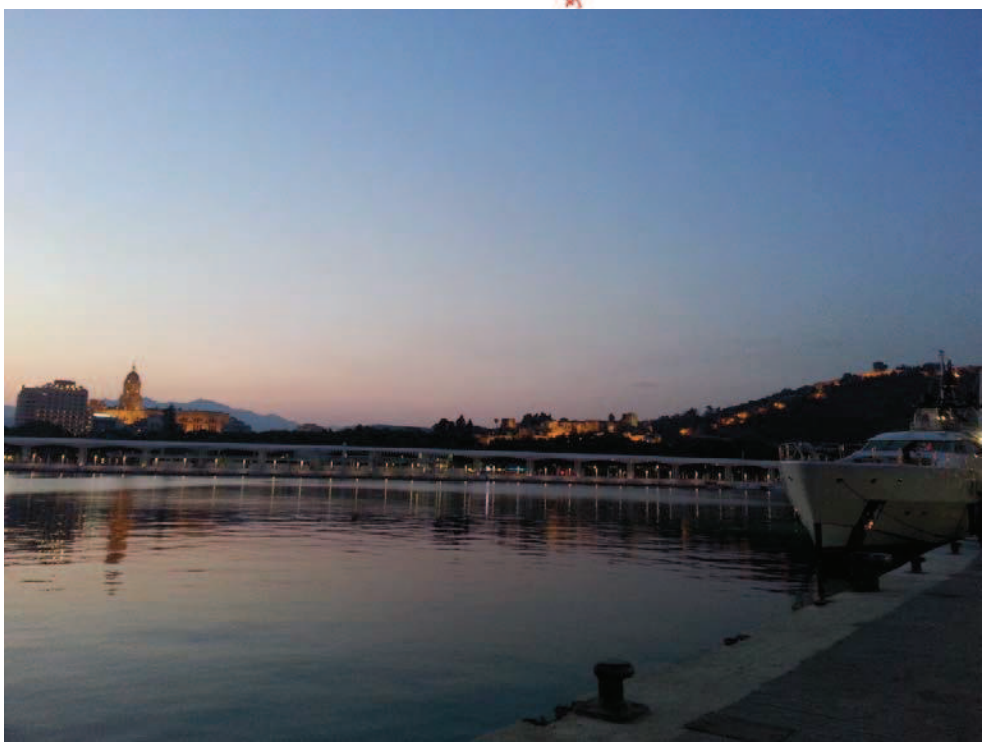
9th International Conference on *Pseudomonas syringae* and Related Pathogens

Málaga, 2nd-5th June 2015



Wednesday, 3rd June

9.00-11.00 Session I: Epidemiology and disease control.

Chairs: Dr. Boris Vitnatzer and Dr. Honour McCann.

9.00-9.30 Plenary talk. Dr. Boris Vinatzer. (Virginia Tech, USA) p. 13

"Genome similarity-based codes to precisely classify and name pathogens that cause emerging infectious diseases of humans, animals and plants."

9.30-10.00 Plenary talk. Dr. Honour MaCann (Massey University, New Zealand) p.14

"*Evolution and population genomics of Pseudomonas syringae pv. actinidiae* ‘‘

10.00-10.15 Short talk. Dr. Stefania Tegli (University of Florence, Italy) p.15

"*Virulence inhibiting peptides for the environmentally friendly control of plant diseases caused by Pseudomonas syringae*"

10.15-10.30 Short talk. Dr. Joel Vanneste (Ruakura Research Centre, New Zealand) p.16

"*Recent development in control options for bacterial canker of kiwifruit caused by Pseudomonas syringae pv. syringae*"

10.30-10.45 Short talk. Dr. David Baltrus (University of Arizona, USA) p.17

"*A programmable, selective, phage-derived bacteriocin locus conserved across Pseudomonas syringae*"

10,45-11.00 Short talk. Dr. Amandine Cunty (INRA, France) p.18

"*Multilocus VNTR analysis of P. s. pv. actinidae and pv. actinidifoliorum strains isolated from symptomatic kiwifruit*"

11.00-11.30 Coffee

11.30-13-30 Session II: Pathogenesis.

Chairs: Dr. Cayo Ramos and Dr. Yuki Ichinose.

Virulence inhibiting peptides for the environmentally friendly control of plant diseases caused by *Pseudomonas syringae*

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The control and management of bacterial diseases of plants still rely mainly on applications of copper and antibiotics. In EU Member States, antibiotics are not allowed for plant protection, while copper is among the very few chemicals still authorised also in organic agriculture. However, its use was recently strictly regulated in EU for its ecotoxicological negative effects and for its impact on the increase of antibiotic-resistant bacteria into agroecosystems, with risks for human and animal health. A promising alternative to cop-per was proposed against *Erwinia amylovora* (Yang et al., 2014), but no sustainable options are available yet for the control of plant pathogenic bacteria belonging to the *Pseudomonas syringae* group. In this work we propose an innovative strategy, based on the design and use of peptides targeting the translocation of bacterial pathogenicity and virulence effectors by the Type Three Secretion System (T3SS), highly conserved and essential for the pathogenicity of Gram-negative bacteria, both of plants and of mammalian hosts including humans (Chatterjee et al., 2013). As a result of their distinguishing hall-mark, these virulence inhibiting peptides (VIPs) compromise the T3SS injection of T3 effectors into plant cells, instead of bacterial viability, thus to avoid or decrease the risk to develop any VIPs resistance. Using *P. savastanoi*, *P. syringae* pv. *tabaci* and *P. syringae* pv. *actinidiae* as model systems, VIPs were demonstrated to compromise in vitro and in vivo bacterial pathogenicity on hosts, and HR on Tobacco. No negative side-effects on model membranes and Ca-ATPase were found. VIPs-induced inhibition of T3SS assembly was confirmed by autoagglutination and Congo Red assays. The interaction between VIPs and their T3SS target was investigated by mutagenesis, and by combining electrochemical impedance spectroscopy and surface plasmon resonance measurements. VIPs effectiveness was also demonstrated by VIPs transient expression in *Nicotiana tabacum* challenged by *P. syringae* pv. *tabaci*.

Key Words: T3SS, virulence-inhibitors, oligopeptides, copper resistance, *P. syringae*.

REFERENCES

YANG, F.; KORBAN, S.S.; PUSEY, P.L.; ELOFSSON, M.; SUNDIN, G.W.; ZHAO, Y. (2014): Small-molecule inhibitors suppress the expression of both type III secretion and amylovoran biosynthesis genes in *Erwinia amylovora*. Molecular Plant Pathology, 15 (1), 44-57.
CHATTERJEE, S.; CHAUDHURY, S.; MCSHAN, A.C.; KAUR, K.; DE GUZMAN, R.N. (2013): Structure and biophysics of type III secretion in bacteria. Biochemistry, 52 (15), 2508-2517.

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