Clinical Microbiology: Open Access
ISSN: 2327-5073

Clinical Microbiology: Open Access

Cotar, Clin Microbial 2013, 2:1
DOI: 10.4172/2327-5073.1000e106

Editorial Open Access

An Introduction to My Research Interests

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During the PhD thesis Dr. Ani Ioana Cotar investigated a novel anti-pathogenic strategy, represented by the study of the influence of soluble molecules accumulated in the supernatant of a probiotic strains of *Lactobacillus paracasei* subsp. *paracasei* culture, isolated from newborn faeces, on the virulence and quorum-sensing (QS) genes expression in *S. aureus* and *Ps. aeruginosa* strains isolated from hospitalized patients. The results presented in the PhD thesis have been obtained using the financial support of two research projects of the Department of Microbiology and Immunology from the Biology Faculty**,** in which she worked as key researcher: Grant CEEX_MII 1640/2005 "*Aplications of QS mechanisms in the development of new anti-infectious strategies*" and grant CNCSIS 187/2007 "*The role of Ps. aeruginosa bacterial pheromones in the modulation of host-bacterial cell interaction during the infectious process*". During performing the PhD thesis she also acquired experience in new research fields: antibiotic resistance, i.e. the investigation of resistance mechanisms in clinical and environmental isolates as well as their genetic determinants**;** bacterial virulence**,** i.e. phenotypic investigation of the microbial virulence potential, the detection of the virulence genes and of their regulators; study of the virulence and QS regulators expression in the presence of *microbicidal* (new antimicrobial agents, plant extracts, probiotics)/ *anti-pathogenic ones* (quorum sensing inhibitors, heat shock proteins immunization) for the development of new anti-infectious strategies; the investigation of host-infectious agent (highlighting ways of communication between bacterial and eukaryotic host cells); investigation of bacterial interactions with inert substrata in order to select biomaterials with potential use in medicine**.** During postdoctoral fellowship she acquired experience in new research fields: investigation of therapeutic or prophylactic alternative**s** for fighting resistant bacteria**;** optimizing the methodology for *in vitro* and *in vivo* selection of probiotics, prebiotics and plant extracts with antimicrobial activity; the study of interactions of different types of nanoparticles obtained from biodegradable natural polymers with prokaryotic and eukaryotic cells, in planktonic and adhered state, in order to achieve optimized surfaces with anti-biofilm properties, of systems for stabilizing active principles with antimicrobial activity, and of systems for controlled release of antibiotics. All these research fields are reflected by articles published in ISI journals and journals indexed in international database. Also, the obtained results have made the subject of many posters and communications presented to national and international conferences.

In "Cantacuzino" Institute, where she is working, has actively participated to the laboratory diagnosis of some bacterial vector-borne infections (Mediterranean spotted fever), respiratory bacterial infections (Q fever, psittacosis, legionellosis, infections with *Mycoplasma pneumoniae*), and sexually transmited infections having as etiological agents *Chlamydia trachomatis, Ureaplasma urealyticum* and *Mycoplasma hominis*.

As young researcher she worked in the teams of different research projects gained by competition in "Cantacuzino" Institute, and in the Department of Microbiology and Immunology of the Faculty of Biology, University of Bucharest. In the projects developed in "Cantacuzino" Institute as Scientific researcher in the Vector-Borne Diseases Laboratory and Medical Entomology, she was a key member of the research team in two grant projects: Grant PN 06-15 01 01/2006,"*Advanced methods for the surveillance of emerging viruses*", Grant CEEX 86/2006, "*Multidisciplinary research on emerging zoonotic viruses (avian influenza, viral hemorrhagic fevers and viral neurological infections): the innovative approach of surveillance at multiple interfaces: human health, animal health, wildlife, environment'*, her task being the performance of different diagnosis methods of emerging viruses, especially for the differential diagnosis of hantavirus infections by testing the biological samples for detection of *Coxiella burnetii.* In other project, Grant CEEX 164/2006, "*Controlling the vertical transmission of pregnancy-associated infections by pregnant women and neonates testing through modern methods and techniques of serology and molecular biology in order to validate a cost-effective algorithm of diagnosis*"**,** her task was to perform different methods for the laboratory diagnosis of *Chlamydia trachomatis* in biological samples taken from pregnant women. Also, at the end of the project she participated in the elaboration of a guide for laboratory diagnosis of pregnancy-associated infections, in particularly those determined by *Chlamydia trachomatis.* Also, between 2009-2011, Dr. Ani Ioana Cotar participated as a key member in the research team of two projects: Grant PN III (PN 09 22 01 02/2009). "*The development of the capacity for laboratory diagnosis of vector borne and environment transmitted infections*", and Grant PN II (42-119/2008) *"Bacterial infective endocarditis—development of a functional model for surveillance and characterization of etiological organisms involved in BIE based on molecular and immunological methods*", having as task to develop and optimize the molecular diagnosis methods of four bacterial pathogens (*Legionella spp.*, *Coxiella burnetii*, *Rickettsia conorii* and *Borrelia burgdorferi*) (PCR, *real-time* PCR, sequencing). The last project was finalized by the publication of an ISI paper, Dr. Ani Ioana Cotar being the first author, in which there were described for the first time the blood culture-negative endocarditis (BCNE) cases with *C. burnetii* in Romania, confirmed by direct sequencing.

Dr. Ani Ioana Cotar is routinely performing molecular biology techniques (nucleic acids extraction; PCR; reverse transcription PCR; Real Time PCR; gene expression quantification; cloning; molecular typing techniques [MLST, SBT, MLVA, rMLST; nucleic acids sequencing (Dye terminator chemistry; 3100-Avant Genetic Analyzer, Applied Biosystems); analysis of nucleic acids sequences]. She got acquainted with these techniques by attending the following postgraduate courses**:** *"Sequence-Based Typing Methods for Microorganisms"*(25-28 September 2012), *Tracing of Viral Infections by molecular biology Techniques - RT-PCR, sequencing* (24-28 November 2008), *PCR Course* (1-5 October 2007). Her experience in performing molecular techniques was

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Received January 08, 2013; **Accepted** January 08, 2013; **Published** January 11, 2013

Citation: Cotar AI (2013) An Introduction to My Research Interests. Clin Microbial 2: e106. doi:10.4172/2327-5073.1000e106

confirmed by the excellent results obtained in the external quality control tests performed by her: sequence based typing (SBT) and PCR EQA for *Legionella*, organized by the Health Protection Agency from London, UK.

As recognition of her results, Dr. Ani Ioana Cotar received The Prize of the Romanian Society for Microbiology conferred for a poster presented in the XII National Microbiology Meeting- "*New scientific data obtained for multidisciplinary surveillance of some zoonotic viruses*". She has published 20 papers (6 in ISI journals, as first author, 14 published in extenso in journals indexed in international database), she participated with 49 oral communications/posters in different scientific events, either national (Annual National Conferences of Microbiology and Epidemiology, Romanian Society for Cell Biology at 25 years, Anniversary workshop "From Basic Science to Therapeutic Applications", National Congress of Laboratory Medicine, and international (Meeting of Balkan Clinical Laboratory Federation, Rower Conference on occupational health and safety economics, FEBS Congresses, International Congress of Bacteriology and Applied Microbiology, Balkan Conference of Microbiology); She participated to 17 specialization courses, and was a team member in 15 projects, out of which one FP7.