Joint FAO/WHO Expert Meeting on
Shiga toxin-producing *Escherichia coli* (STEC)

Rome, 25 to 29 September 2017

Experts participating in the meeting

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**Background information**

Following the request from the 47th Session of the Codex Committee on Food Hygiene, to develop a report compiling and synthesizing the available relevant information on various aspects of STEC, FAO and WHO are convening an expert meeting. This meeting is the second in a series of activities that FAO and WHO are implementing to respond to this request.

**List of experts**

The following list of experts is proposed for the meeting. Please find below their bio-sketches. If you have any comments, please contact us at jemra@fao.org and jemra@who.int no later than 03 May 2017.

**Hiroshi ASAKURA**
Director, Division of Biomedical Food Research, National Institute of Health Sciences, Japan

Hiroshi Asakura is a Director of Division of Biomedical Food Research at the National Institute of Health Sciences in Tokyo, Japan and Visiting Professor to the United Graduate School of Veterinary Medical Sciences, Gifu University, Japan. He holds a PhD in Veterinary Medical Sciences from the Gifu University and trained as a molecular microbiologist at Max Planck Institute for Infection Biology in Berlin, Germany to unveil virulence determinants of *Helicobacter pylori*.

His current focus has been on molecular mechanisms on pathogenicity, environmental adaptation and genomic evolution of foodborne pathogens, such as Shiga toxin-producing *Escherichia coli* (STEC), *Campylobacter* spp., *Salmonella* spp., and *Listeria monocytogenes*, linking to prevent foodborne diseases. He first authored a publication in several journals about molecular epidemiological studies to characterize the virulence potentials and to track the source of food contamination of the STEC originated from a series of animal reservoirs.
Nadia BOISEN
Research Scientist, International Escherichia and Klebsiella Centre at Statens Serum Institut (SSI), Denmark, Visiting Associate Professor to the University of Virginia, Department of Pediatrics in the USA and Associate Professor at the Freie Universität Berlin, Department of Biology, Berlin, Germany

Nadia Boisen is a Research Scientist at the International Escherichia and Klebsiella Centre at Statens Serum Institut (SSI) in Copenhagen, Denmark and Visiting Associate Professor to the University of Virginia, Department of Pediatrics in the USA. Her focus has been on pathogenic mechanisms of Enteroaggregative E. coli (EAEC), specifically VT-producing EAEC. She co-first authored a publication in the New England Journal of Medicine on the origin of the vtx2a-positive O104:H4 EAEC German outbreak strain in 2011 and proposed a pathogenesis model explaining the unusually high rates of HUS associated with this strain. Recent research has focused on the application of a vtx subtyping protocol developed in collaboration with six international research and reference laboratories. Using this vtx subtyping protocol has demonstrated that HUSEC is almost exclusively associated with subtype vtx2a. In 2013, she received the research award, Sapere Aude, from the Danish Council for Independent Research in Medical Sciences. She has published numerous original papers and two book chapters. She holds a PhD in Microbiology from the University of Copenhagen as a collaboration between SSI and the University of Maryland School of Medicine.

Isabel CHINEN
Biochemist, National Infectious Diseases Institute - ANLIS “Dr Carlos G. Malbrán”, Argentina

Isabel Chinen is a Biochemist whom graduated at the Buenos Aires University in Argentina, and obtained her Master in Molecular Microbiology, from the University of San Martín / ANLIS “Dr Carlos G. Malbrán” Institute. She works at the National Reference Laboratory for the surveillance of Hemolytic Uremic Syndrome and Shiga Toxin E. coli infections (Servicio Fisiopatogenia), of the National Infectious Diseases Institute - ANLIS “Dr Carlos G. Malbrán”. Since 2004, she works in the surveillance of the foodborne pathogens as part of PulseNet Latin America and Caribbean (PNAL&C), and since 2014, she is in the coordination group. At this moment, ANLIS Institute and PNLA&C are focusing on WGS implementation, and working with different regions in the standardization of the WGS protocols to be applied in public health. Also she is in the Argentine coordination of the Pilot Project of WHO/PAHO–FDA, where the Institution is participating as an external laboratory of the Genome TRAKR Project conducted by FDA. She is an active member of the Argentina Society for Microbiology and contributes as part of the Food, Drugs and Cosmetic Division in the organization of scientific events. She is participating as member of the academic committee of the UNSAM /Malbrán Master since 2014.

Roger L. COOK
Manager of the Food Risk Assessment Team and Principal Microbiologist in the Biosecurity Science, Food Science & Risk Assessment Directorate of New Zealand’s Ministry for Primary Industries (MPI), New Zealand

Dr Cook gained a PhD in Microbiology from the University of Otago (NZ) followed by several years’ post-doctoral research at the Toronto General Hospital (Canada) and the Detroit Medical Centre (USA). On his return to New Zealand in 1990, Roger moved from a focus on sexually transmitted diseases to food as a research scientist at the Meat Industry Research Institute of New Zealand (MIRINZ) initiating an STEC research programme to support the NZ government’s market access assurances for exports of meat to the USA.

In 1995, Dr Cook joined MPI to further develop New Zealand’s STEC meat safety research programme and was instrumental in development of microbiological food safety monitoring programmes for both the export and domestic food sectors; namely the National Microbiological Database (NMD) and STEC Monitoring Programme for beef and veal. Dr Cook currently manages a team of microbiologists, toxicologists, risk modellers, and meat inspection experts that carry out food risk assessments, and develop and manage operational research programmes to inform the risk assessments. He still leads the MPI- and meat industry-funded STEC research projects and
Tim DALLMAN  
Senior Bioinformatician, Gastrointestinal Bacteria Reference Unit, Public Health England, the United Kingdom

Dr Tim Dallman trained as a bioinformatician at University College London employing machine learning techniques to improve remote homology detection for the assignment of proteins into structural and functional families.

Since joining Public Health England in 2007 he has led the development on several large scale hybrid molecular typing and epidemiological databases before taking a post as the lead bioinformatician within the Gastrointestinal Bacteria Reference Unit (GBRU) in 2010. Within GBRU Dr Dallman currently manages the Genomics Services with the goal to implement whole genome sequencing methodologies into reference microbiology. He has successfully overseen the validation and implementation of a WGS solution for *Salmonella*, *Escherichia coli*, *Shigella* and *Campylobacter* for typing, surveillance and antimicrobial resistance prediction.

He has been involved in several next generation sequencing research projects with the focus on leveraging these technologies for public health molecular epidemiology and the translation of genomic data to molecular diagnostics and typing. He has led the bioinformatics analysis of several key enteric pathogen isolates for incident investigation. He currently manages the sequencing component of a £2m FSA grant on VTEC O157:H7 “supershedding” and has published more than 50 peer-reviewed publications.

Brecht DEVLEESSCHAUWER  
Senior epidemiologist, Scientific Institute of Public Health (WIV-ISP), Brussels, Belgium; Guest lecturer in health economic evaluations, Université catholique de Louvain, Brussels, Belgium

Brecht Devleesschauwer conducts policy-driven public health research in the domain of composite measures of population health and health inequalities, and is coordinator of the Belgian national burden of disease study. Prior to joining WIV-ISP, he worked as an assistant scientist in global food safety and zoonoses at the University of Florida, USA, and has held a post-doc position at Ghent University, Belgium. He is chair of the Epidemiology working group of COST Action TD1302 CYSTINET, and was co-chair of the Risk Forecasting working group of COST Action FA1408 EURO-FBP. He was a member of the WHO Foodborne Disease Burden Epidemiology Reference Group (FERG) and participated to the FAO/WHO expert meeting on risk-based examples for control of *Trichinella* spp. and *Taenia saginata* in meat. His research activities have resulted in nearly 60 peer-reviewed papers and book chapters, and have led to new insights in the epidemiology and burden of foodborne and zoonotic diseases.

He received his Ph.D. degrees from Ghent University (Veterinary Sciences) and Université catholique de Louvain (Public Health), and M.Sc. degrees from Ghent University (Veterinary Medicine) and KULeuven (Statistics).

Peter FENG  
Research Microbiologist; Subject Matter Expert (SME) for *E. coli* and Pathogenic *E. coli*, Division of Microbiology, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration, College Park, MD. U.S.A.

Peter Feng obtained his Ph.D. in Microbiology from Iowa State University and did postdoctoral research in molecular biology at Purdue University. Prior to joining the FDA in 1988, he was Program Manager at IGEN Inc. in charge of developing pathogen detection assays using monoclonal antibodies and DNA. He holds patents on the use of electrochemiluminescent markers and on pathogen detection. He has 26 years of research expertise on Shiga toxin-producing *E. coli* (STEC) including molecular characterization of strains and virulence, evolutionary emergence of
Eelco FRANZ
National Institute for Public Health and the Environment (RIVM), Centre for Infectious Disease Control, Netherlands.

Dr E. (Eelco) Franz holds Masters in Biology (2002, University Utrecht, The Netherlands) and a PhD in microbial risk assessment (2007, Wageningen University, The Netherlands). Between 2007 and 2010 he had a three year post-doc at RIKILT – Institute for Food Safety (Wageningen University, Wageningen, The Netherlands), working on modelling food safety risks. From 2010 he works at the National Institute for Public Health and the Environment (RIVM), Centre for Infectious Disease Control. From 2010 to 2016 he worked in the food safety unit as research leader with the general aim to integrate molecular and phenotypic microbial data into risk assessment models. In addition, was responsible for the National Reference Laboratory for pathogenic E. coli in The Netherlands. He served as ad hoc member of WHO, FAO and ECDC working groups. Per September 2016 he is Head of the Department Epidemiology and Surveillance of Gastroenteritis and Zoonoses. This department analysis and controls the public health regarding gastrointestinal infection and zoonoses, using surveillance and epidemiological research.

Pina FRATAMICO
Agricultural Research Service, Eastern Regional Research Center (ERRC), USDA, USA.

Pina Fratamico received a Ph.D. in Microbiology and Immunology in 1990. She joined the USDA, Agricultural Research Service, Eastern Regional Research Center (ERRC) as a post-doctoral fellow, and then became a staff scientist in 1992. She is currently the Research Leader of the Molecular Characterization of Foodborne Pathogens Research Unit at the ERRC, leading a group of scientists who conduct basic and applied research focusing on development of quantitative multiplexed field portable detection systems and on biofilm formation and persistence of foodborne pathogens in food and processing environments, as well as research on utilization of arbuscular mycorrhizal fungi to enhance crop growth, yield, and quality. Her personal research focuses on detection, identification, and typing of food-borne pathogenic bacteria and genomic and proteomic analyses to investigate stress responses and virulence. Her research focuses on pathogenic E. coli, primarily Shiga toxin-producing E. coli (STEC). She works with regulatory agencies, the food industry, and various companies on the development of methods for detection and identification of STEC, some of which are used for regulatory testing. She has authored 184 publications, including 118 peer-reviewed journal articles and 34 book chapters. She has 2 patents, and she has edited/co-edited 8 books. She is a Fellow of the Institute of Food Technologists and the American Academy of Microbiology. She serves on the Editorial Board of 4 journals, and she is an Academic Editor for PLOS ONE.
Dr. Alexander Gill holds a Ph.D. in Food and Nutritional Sciences from the University of Manitoba (2006). Following his doctorate he was employed at Health Canada as a post-doctoral fellow and since 2008 as a research scientist, leading the Verotoxigenic Escherichia coli (VTEC) laboratory. The VTEC laboratory conducts research to support public health efforts to reduce the impact of VTEC illness in Canada. The research activities of Dr. Gill include the development of detection methodologies for VTEC, technologies for the decontamination of foods, VTEC virulence markers, VTEC survival during food production and dose exposure in foodborne VTEC outbreaks. He has authored >25 publications on VTEC and food bacteriology.

Dr. Gill is a founding member of the Canadian Federal VTEC Research Network. He was a member of the organising committee for the 2010 Verotoxigenic E. coli Risk Identification and Risk Management Workshop held in Gatineau, Quebec, and a contributing editor to the report produced from that meeting. He has served as a member of the STEC Working Group for the AOAC International Stakeholder Panel on Alternative Methods (2012), the Alberta Government Strategic Pathogen Reduction Working Group (2012-2013) and ISO Technical Advisory Group 18 on Shiga toxin-producing Escherichia coli (2016).

Patricia M. Griffin is Chief of the US Centers for Disease Control and Prevention’s (CDC) epidemiology group that conducts surveillance and investigations of bacterial enteric diseases. She attended medical school and trained in internal medicine at the University of Pennsylvania; she trained in gastroenterology at Brigham and Women’s Hospital and in epidemiology at CDC.

Dr. Griffin oversees surveillance and investigation of sporadic illnesses in the United States caused by enteric bacteria and hemolytic uremic syndrome. Her group conducts analytic studies and investigations of illnesses caused by Campylobacter, Clostridium botulinum, E. coli, Listeria, Salmonella, Shigella, Vibrio, and other enteric bacteria. They use surveillance data to estimate the incidence and the number and of illnesses, hospitalizations, and deaths caused by foodborne pathogens. The group also conducts surveillance for antibiotic resistance among human Salmonella and Campylobacter isolates, and determines sources of and risk factors for resistant pathogens. Dr. Griffin oversaw most CDC-led investigations of outbreaks caused by bacterial enteric pathogens for 20 years. Her group analyzes data from past and current foodborne disease outbreaks, and uses these data to create models to estimate the proportion of illnesses due to each food category.

Dr. Griffin is an author of over 225 peer-reviewed publications. She received CDC’s Shepard Award for the best scientific paper in 1990 and the CDC Shepard Lifetime Scientific Achievement Award in 2015. She is an adjunct professor in the Emory University Rollins School of Public Health, a member of the International VTEC/STEC Symposium Steering Committee, a fellow of the Infectious Diseases Society of America, and a member of the American Epidemiological Society.

Karen Keddy qualified as a medical microbiologist in 1996 and was tasked with setting up a national reference centre for bacterial enteric pathogens, the Centre for Enteric Diseases (CED) of the National Institute for Communicable Diseases, South Africa. She initiated laboratory-based surveillance for enteric pathogens through the GERMS-SA programme, including non-typhoidal Salmonella and Shigella, diarrhoeagenic Escherichia coli, Campylobacter, Listeria, typhoid fever and cholera. She has supervised post-graduate students in various projects on bacterial enteric pathogens at both MSc and PhD level. Karen Keddy was a member of Global Foodborne Diseases Network (WHO), and is a member Global Task Force on Cholera Control (GTFCC) and other expert committees on matters relating to waterborne and foodborne disease, she has consulted on antimicrobial resistance in enteric pathogens and has run numerous training programmes for enteric pathogens on behalf of WHO and consulted to the FAO on whole genome sequencing and shiga-
toxigenic E. coli and to various NGOs on enteric pathogens over the last 20 years. She is an ad hoc attendee of the annual European Centre for Disease Prevention and Control Food and Waterborne Diseases and Zoonoses Network meeting. Dr Keddy has published on both epidemiological and microbiological aspects of the enteric bacteria in South Africa and globally.

Geoffrey MAINDA
District Veterinary Officer in the Government of the Republic of Zambia.

Geoffrey gained a PhD in Veterinary Public Health and Epidemiology from Roslin Institute of the University of Edinburgh (2013-2016). His main interest is on molecular epidemiology of bacterial zoonotic food borne pathogens. He has particularly been working on the emergence and spreading of antimicrobial resistance using E. coli as study model organism among the dairy herds and humans in central Zambia. In addition, Geoffrey has been studying to understand the molecular epidemiology and risk factors associated with pathogenic E. coli particularly the Shiga toxin producing E. coli (STEC) and their phylogenetic and geographical relationships.

He co-authored a Nature paper (Scientific Reports), “Phylogenomic approaches to determine the zoonotic potential of STEC isolated from Zambian dairy herds”. In this paper, he reported that the isolation of STEC was common (11%) from faecal samples among the dairy cattle of Zambia, but none of them encoded a Type 3 Secretion System (T3SS) based on detection of intimin (eae) and sepL alleles as both genes are present on the locus of enterocyte effacement that encodes the system. These findings contribute to the understanding of the epidemiology of STEC in regions where little information is available.

Upon the completion of his PhD, he worked within the University of Edinburgh as a postdoc research fellow (PDRF) for 7 months to investigate on the dynamics of antimicrobial resistance genes at a pig farm in UK on a Natural Environmental Research Council (NERC) grant.

Geoffrey has now returned back home to Zambia (December 2016) where he is utilizing his expertise and skills he gained during his PhD and postdoc periods to set up systems particularly concerning food safety programmes within the Ministry of Fisheries and Livestock. He is currently serving as a member of the National Antimicrobial Resistance Committee that was mandated to draft a National Action Plan (NAP) for antimicrobial resistance monitoring in Zambia. Geoffrey is a core team member Within the Ministry of Fisheries and Livestock of Zambia that is responsible for the FAO funded project to carry out surveillance of AMR from the livestock point of view. He has also set up strong research collaboration with scientists at the University of Zambia, School of Veterinary Medicine, where he has continued to investigate the molecular epidemiology of STEC in food of animal origin, livestock, humans and non-human primates.

Shannon MAJOWICZ
Infectious disease epidemiologist and Assistant Professor in the School of Public Health and Health Systems, University of Waterloo, Ontario, Canada.

Dr Majowicz is an infectious disease epidemiologist and Assistant Professor in the School of Public Health and Health Systems (University of Waterloo, Ontario, Canada). Her research focuses on the epidemiology of foodborne and enteric diseases (including burden, risk factors, vulnerabilities, and interventions), and the application of systems approaches to public health practice. She has expertise in public health surveillance, including the under-reporting and ascertainment of enteric illnesses within populations. She has led international teams in estimating the global burden of non-typhoidal salmonellosis, and Shiga toxin-producing E. coli infection, in consultation with the World Health Organization’s Global Burden of Foodborne Diseases initiative. Prior to joining the University of Waterloo, she spent 12 years as an epidemiologist with Health Canada and the Public Health Agency of Canada, where her applied research focused on determining the burden and severity of enteric infections in the Canadian population.

Dr Majowicz has (co-)authored over 50 peer-reviewed publications, and her work has been used to improve public health surveillance in Canada, and inform various prevention activities. She is an Associate Editor at the journal Epidemiology & Infection, and holds degrees in Bio-medical Science (BSc) and Epidemiology (MSc, PhD), from the University of Guelph (Canada).
Stefano MORABITO
Unit of Food-borne Zoonoses of the Department of Veterinary Public Health and Food Safety of the Istituto Superiore di Sanità in Rome, Italy.

Dr Stefano Morabito is senior scientist at the Unit of Food-borne Zoonoses of the Department of Veterinary Public Health and Food Safety of the Istituto Superiore di Sanità in Rome, Italy. He is the Director of the European Union Reference Laboratory for E. coli and conducts researches on STEC and other pathogenic E. coli since 1996. His interests include the molecular bases of virulence of STEC O157 and other STEC, with particular emphasis on the genomic asset of the strains causing severe disease in humans. Other research areas include the emergence of the different STEC clones as well as the characterisation of E. coli toxins and their capability to disseminate among the different E. coli groups. He is author of more than 70 peer-reviewed publications and edited the book “Pathogenic Escherichia coli, molecular and cellular microbiology”, published by Caister Academic press.

He acts as reviewer for a number of scientific journals and sits in the editorial board of the scientific journals Euroreference and Journal of Medical Microbiology and Diagnosis and is chair of the local organizing committee for the international symposium on STEC, VTEC 2018.

Sara Monteiro PIRES
Senior Scientist, DTU Food (National Food Institute, Technical University of Denmark) – Denmark.

Sara Pires is a senior scientist at the Risk Benefit Group of the National Food Institute, Technical University of Denmark. She is a DVM from the Faculty of Veterinary Medicine of Lisbon, Portugal, and has a PhD in Epidemiology from the University of Copenhagen, Denmark. Her main research area is the public health impact, epidemiology and control of food-associated diseases. She has focused on applying health metrics and burden of disease models, on developing methods for attributing foodborne human illness to the responsible sources, and quantitative risk assessments. Sara Pires is currently coordinating the Danish Initiative to estimate the burden of foodborne diseases, and rank foodborne diseases and foods at the National Food Institute. She was a member of the World Health Organization’s initiative to estimate the global burden of foodborne diseases (Foodborne Disease Epidemiology Reference Group; FERG). She has also participated in WHO’s Global Foodborne Infections Network (GFN), and in expert groups of the European Food Safety Authority (EFSA).

Yemi OGUNRINOLA
Vice President of Food safety & Quality Assurance for Vantage Foods, BC, Canada.

Dr Yemi Ogunrinola is the Vice President of Food safety & Quality Assurance for Vantage Foods—a further processor of fresh meats operating four state-of-the-art Case-Ready plants in Canada and USA. He earned his doctoral degree on E.coli O157:H7 control in ground beef at Kansas State University and a Postdoctoral fellow at the University of Idaho with research on Listeria and Salmonella.

An avid promoter of excellence in food safety research and applied knowledge for what he classified as the “leaders and professional think-tank of tomorrow”, Dr Ogunrinola has served and continues to serve in avenues that promote students and young professionals growth—a Mentor in MEaTnet (http://meatnet.ualberta.ca/) with active roles in both international and food/meat industry’s bodies—members of PDGs of IAFP, IFT, BIFSCO, and AMSA and provided internships opportunities to students.

Has published and presented scientific and professional tailored practical information on HACCP/FSEP, food safety, quality, and sanitation at industry’s annual meetings and food safety summits—(IAFP, IFT) and guest speaker at BC-IAFP, BC-IFT, 3M Sanitation and Food safety events. As the Chief Scientific Officer for Vantage Foods, he led the team to achieve BRC, ISO17025 accreditation and other recognitions at multiple Vantage locations. Unequivocally team-centric.
Flemming SCHEUTZ
Head, The International Collaborating Centre for Reference and Research on *Escherichia* and *Klebsiella*, Department of Bacteria, Parasites and Fungi, Statens Serum Institut, Artillerivej 5, Copenhagen S, Denmark.

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Dr Scheutz’ fields of expertise include identification, subtyping, characterisation and epidemiology of pathogenic *E. coli.*

Through collaboration with David A. Rasko and Jason W. Sahl (Department of Microbiology and Immunology, Institute for Genome Sciences, University of Maryland School of Medicine) he was among the first to publish the genome sequence of the Stx-producing EAEC O104:H4 strain that caused a large outbreak in Germany in 2011 using the PacBio platform. By also sequencing six similar O104:H4 strains from the collection at the WHO Centre we were able to illustrate the origin of the outbreak strain.

In 2012, Flemming Scheutz first-authored what has become the standard nomenclature and protocol for subtyping the *stx* genes in Shiga toxin-producing *E. coli* (STEC). Together with Katrine G. Joensen he published two papers on how to use whole genome sequencing of *E. coli* strains for both virulence- and O:H serotyping. These four publications have more than 1,100 citations.

Positions:
National focal point and expert consultant for ECDC on VTEC and Molecular surveillance.
Member of the Coordination Group advising the Food and Waterborne Disease surveillance unit at the European Centre for Disease Control (ECDC) in Stockholm, 2008-2012.
Member of the International VTEC symposium steering committee since 2009.

His laboratory is contracted as the microbiological support laboratory for ECDC and organises the annual External Quality Assurance (EQA) programmes for the sero- and virulence typing of VTEC.
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Potjanee SRIMANOTE
Head, Molecular Microbiology Laboratory, Graduate Program in Biomedical Sciences, Faculty of Allied Health Science, Thammasat University, Thailand.

Dr Potjanee Srimanote received her Ph. D. from School of Molecular and Biomedical Science, University of Adelaide, South Australia in 2003. Currently, she works in Molecular Microbiology Laboratory, Graduate Program in Biomedical Sciences, Faculty of Allied Health Science, Thammasat University, Thailand. She is a national inspector for ISO15189 accreditation (Diagnostic laboratory service) since 2013. She has responsible for Molecular diagnosis of STEC and other enteric bacteria at Faculty of Allied Health Science, Thammasat University since 2007. She is trained in Molecular pathogenesis of shiga toxigenic E. coli and Streptococcus suis, Good laboratory practices for laboratory animals. Dr Potjanee Srimanote studies have provided the information regarding the molecular, diagnosis, epidemiology and pathogenesis of Gram negative enteric bacteria and zoonotic bacteria Streptococcus suis. She has proposed to employ various phenotypic and genotypic assay for the evaluation of pathogenic potential of shiga toxigenic E. coli in Thailand. Dr Srimanote has over 50 scientific publications to her credit.

Roberto VIDAL ALVAREZ
Associate Professor, Head Laboratory of Pathogenic Escherichia coli (LPE), Institute of Biomedical Sciences, Faculty of Medicine, Universidad de Chile, Independencia 1027, Santiago de Chile.

Dr Vidal develops his interest in bacterial pathogenesis while he performed his Masters in Microbiology (1998) and later his PhD in Biological Sciences (2002) at the Universidad de Concepción, Chile. In 1999, he was hired as Junior Faculty by the Microbiology and Mycology Program at the Faculty of Medicine, Universidad de Chile. In this institution, he received the support from two outstanding clinicians, Dr Valaria Prado and Dr Miguel O’Ryan (both members of the Chilean Academy of Medicine), focusing in a more basic-clinical research. In 2009 was promoted to Associate Professor. He served as Program Director since 2014 to 2017. He has gained experience in the study of clinical and molecular epidemiology of intestinal infections caused by diarrheogenic *Escherichia coli* (DEC), improving and develop the first method based
on multiplex PCR protocol for DEC detection. His work has been aimed mainly on shiga toxin producing *E. coli* (EHEC/STEC), enterotoxigenic *E. coli* (ETEC) and adherent invasive *E. coli* (AIEC). Recently, using sera from pediatric patients with Hemolytic Uremic Syndrome (HUS) in addition to peptide array technology, he has detected novel antigens which are currently being evaluated for a chimeric vaccine against STEC strains, funded by two national grants. (FONDEF ID16/10140 entitled “Formulation of chimeric proteins as a strategy for the development of a new vaccine against Shiga Toxin-producing *Escherichia coli* (STEC)” and FONDECYT 1161161 entitled “Characterization of new genetic markers encoded within an undescribed Locus of Adherence and Autoaggregation (LAA) present in emerging clinically relevant shiga toxin-producing *E. coli* strains”). Furthermore, he has worked in determining the magnitude of STEC colonization in animal reservoirs (cows and swine) in Chile. He has published more than 50 peer-review manuscripts and two book chapters (related to pathogenic *E. coli*) in Latin America in topics related to microbial pathogenesis, molecular epidemiology, and virulence factors’ characterization.

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