

**SUMMARY REPORT**

The 7th International *Giardia* and *Cryptosporidium* Conference (IGCC), organized for the first time in France by the Parasitology Laboratory of the University Hospital of Rouen and the CNR-Laboratoire expert Cryptosporidioses (designated by an international scientific Committee) took place at the Faculty of Medicine and Pharmacy of Rouen from 23th to 26th June 2019. The modalities for the organization of the Conference can be found on the Conference website, which remains accessible to date at https://en.rouentourisme.com/7thigcc/

The IGCC has become an established reference in the field of *Giardia* and *Cryptosporidium* studies. From the outset, the IGCC has provided researchers with a unique opportunity to meet up and share knowledge, and the 7th Conference was no exception in providing a framework for discussion of latest research findings with a truly interdisciplinary perspective.

**1. PRESIDENCY AND ORGANIZING COMMITTEE**

The Conference was chaired by Loïc Favennec, Professor of the Faculty of Medicine and Pharmacy, University of Rouen Normandie, Hospital Practitioner and Head of the Centre National de Référence-Laboratoire expert Cryptosporidioses, Rouen University Hospital.

The organisers represented all French research teams currently involved in studies on human and veterinary *Cryptosporidium/Giardia* infections, and members of several public institutions:

-Rouen Normandie and Reims-Champagne Ardennes Universities, EA 7510,

-Centre National de Référence–Laboratoire expert Cryptosporidioses, Rouen, and associate Laboratory, Dijon University Hospital

-UMT Protorisk

-Ecole Nationale Vétérinaire d’Alfort

-CNRS (UMR 6143, Morphodynamique continentale et côtière, Rouen)

-INRA (UMR ISP-213, Nouzilly)

-Société Nationale des Groupements Techniques Vétérinaires (SNGTV)

**2. SCIENTIFIC COMMITTEE**

The Scientific Committee was composed of recognized international experts in the field of giardiosis and cryptosporidiosis:

* André Buret University of Calgary, Alberta, Canada
* Simone Caccio, Istituto superiore di Sanità, Roma, Italy
* Gabriela Certad, Institut Pasteur de Lille, France
* Rachel Chalmers, UK *Cryptosporidium* Reference Unit, Swansea, UK
* Gilles Gargala, CNR Cryptosporidioses Université de Rouen Normandie, France
* Nathalie Kapel, Université Paris Descartes, France
* Titia Korbeek – RIVM , National Institute for Public Health, Utrecht,  NL
* Fabrice Laurent, INRA Nouzilly, France
* Ynes Ortega, University of Georgia, Griffin, GA, USA
* Bruno Polack, Ecole Nationale Vétérinaire d’Alfort, France
* Boris Striepen, University of Pennsylvania, Philadelphia, PA, USA
* Staffan Svärd, Uppsala University, Sweden
* Giovanni Widmer, Tufts university, Boston, MA, USA

**3. CONTRIBUTORS**

**3.1. Opening ceremony and session presidencies**

-Pr. B. Veber, Doyen, UFR Santé, Université de Rouen Normandie

-Pr. L. Marpeau, Président de la CME, CHU de Rouen

-Pr. M. Guerbet, Directeur du Département Pharmacie, Vice Doyen de l’UFR Santé, Université de Rouen

-V. Desjardins, Directrice générale du CHU de Rouen

-P. Moguerou, Directeur de la recherche et de la valorisation, Universoté de Rouen Normandie

Session chairpersons :

-Pr Jean Jacques Ballet, EA 7510, Université de Rouen Normandie

-Pr Sophie Candon, UMR INSERM1234, Université de Rouen Normandie

-Dr Damien Costa, EA 7510, Université de Rouen Normandie

-Pr Loïc Favennec, EA 7510, Université de Rouen Normandie

-Dr Matthieu Fournier, UMR CNRS 6143, Université de Rouen Normandie

-Dr Gilles Gargala, EA 7510, Université de Rouen Normandie

-Pr Nathalie Kapel, Université Paris Descartes, France

-Pr Martin Kvac, Institute of Parasitology ASCR, České Budějovice

-Dr Stéphanie La Carbona, ACTALIA

-Dr Marco Lalle, Istituto Superiore di Sanita, Roma, Italie.

-Dr Rachel Letellier, UMR INSERM 1073, Université de Rouen Normandie

-Pr Li Hua Xiao, South China Agricultural University, Gwangdong China

-Pr Jerry E. Ongerth, Environmental Engineering, University of Wollongong, NSW, Australia

-Dr Romy Razakandrainibe, EA 7510, Université de Rouen Normandie

-Pr Lucy Robertson, Faculty of Veterinary Medicine, Oslo, Norway

-Pr Guillaume Savoye, Vice-doyen recherche, UFR Santé, UMR INSERM 1073, Université de Rouen Normandie

-Dr Isabelle Tournier, UMR INSERM 1245, Université de Rouen Normandie

-Dr Karin Troell, National Veterinary Institute , Sweden

-Pr Isabelle Villena, EA 7510, Université de Reims Champagne Ardennes

**3.2. Financial contributions**

* Région Normandie
* Métropole Rouen Normandie
* European Society for Clinical Microbiology and Infectious Disease

**3.3. Provision of infrastructure**

-Université de Rouen Normandie, Faculté de Médecine et Pharmacie

-Municipalité de Rouen : Halle aux Toiles (gala dinner)

**3.4. Provision of equipment**

-UMR CNRS 6143, Université de Rouen Normandie : poster presentation display material

-CHU de Rouen and URF de Droit gestion, University of Rouen Normandie : poster boards

-CHU de Rouen: small writing materials

-Rouen Tourisme et Congrès : tourist information

-Université de Rouen Normandie: wifi management on the site

**3.5. Provision of staff**

Rouen Tourisme et Congrès :, management of registrations, abstracts, website management, financial management in association with the University Rouen Normandie, participant reception desk and wifi on the site

- Rouen Normandy University

* financial management in association with Rouen Tourisme et Congrès
* security personnel
* UFR Sciences, Université Rouen Normandie : reprographic personnel
* Usher

- Rouen University Hospital

* part-time secretariat (CNR-Laboratoire expert Cryptosporidioses)
* Direction de la communication

- Rouen City Hall

* welcome cocktail for participants

3.6. **Volunteer contributors to the practical and material organization**

Researchers, hospital doctors, PhD students, residents in Medicine and Pharmacy, and technician from the University Hospital and the University of Rouen, as well as external persons in charge of missions, have been mobilized for several years in order to prepare the 7th IGCC, and, on the Conference site, have ensured the optimal management of all practical and material constraints..

**4. PROGRAMME**

Topics of the 7th IGCC have included all aspects of host-parasite relationships (including microbiotic interactions), from basic research to applications in human and veterinary medicine, and the environmental issues raised by waterborne parasites and their epidemiological “one health” consequences.

The final programme was drawn up on the proposal of the experts of the Scientific Committee on the basis of the topical presentations: original basic and translational/clinical and environmental research related to *Giardia duodenalis*, *Cryptosporidium* spp. or *Cyclospora cayetanensis*).

The IGCC brought together 237 researchers from 34 nationalities representing more than 100 research teams showing the dynamism of international research on that topic. The most represented nations outside France were the United States, Great Britain, Australia and Brazil.

The program consisted if 13 keynote lectures by recognized experts in the field and 196 communications presented in workshops as oral presentations, and displayed as poster exhibits.

Despite the limited time (4 days) of the Conference and the high number of presentations (209), one co-author of each paper was given the opportunity to present orally his work to allow frank and fruitful discussion.

As during the previous IGCC, the presentation of the 4th Huw Smith Award for research on *Cryptosporidium* and *Giardia* provided the welcomed opportunity to highlight the achievements of a young researcher.

All Conference announcements, lectures, abstracts, presentations and question-and-answer periods were **in scientific English**.

**Sunday Presentations**

9h00-12h30 **REGISTRATION ON SITE**

12h30-13h30 **Lunch on site**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **ORAL SESSION AMPHI 350 : «OMES» 1** | 13h30 – 16h00 Chair : SVARD S - LALLE M |
| 13h30-13h50 | Su-O1 | [Omics as a tool to understand giardiasis](#p16) | Svard S |
| 13h50-14h02 | Su-O2 | [The new *Giardia intestinalis* and *Giardia muris* genomes](#p17) | Xu, F, Jerlström-Hultqvist J, Jiménez-González A, Einarsson, E, Ástvaldsson, Á, Peirasmaki, D, Eckmann, L, Andersson, O. J, Svärd, G. S. |
| 14h02- 14h14 | Su-O3 | [Re-discovery of *Giardiavirus:* genomic and functional in deep analysis of different *Giardiavirus* strain in naturally infected *Giardia duodenalis* isolates](#p18) | Marucci G., Bertuccini L., Cecchetti S., Zullino I., Dayaram A., McEwen G., Greenwood A.D., Lalle M. |
| 14h14-14h26 | Su-O4 | [Annotation of the *Giardia* proteome through structure-based homology and machine learning](#p19) | Ansell BRE, Pope BJ, Georgeson P, Emery-Corbin SJ, Jex AR |
| 14h26-14h38 | Su-O5 | [Exploring genomic variation in *Giardia duodenalis* using well characterised reference isolates](#p20) | Jex AR, Fang X, Xu F, Wiesz F, Tichkule S, Ansell B, Emery S, Müller N, Lalle M, Cacciò S, Svärd , Gasser RB |
| 14h38-14h50 | Su- O6 | [Investigation of a waterborne outbreak of giardiasis in Italy by comparative genomics](#p21) | Sannella AR, Zuccaro V, Bruno A, Novati S, Grande R, Maserati R, Lalle M, Cacciò SM |
| **14h50-15h00** |  | **10-minute Break** |  |
| 15h00-15h12 | Su- O7 | [Whole genome sequencing of assemblage C and D of *Giardia* *intestinalis* from the dog](#p22) | Kooyman F, Wagenaar J, Zomer A |
| 15h12-15h24 | Su- O8 | [Characterization of flavohemoprotein in *Giardia* isolates](#p23) | Saghaug CS, Klotz C, Kallio JP, Pedersen TOE, Rafferty S, Aebischer A, Langeland N and Hanevik K |
| 15h24-15h36 | Su- O9 | [Mitosomal dynamics in *Giardia intestinalis*](#p24) | Voleman L. Tůmová P. Wanner G. Doležal P |
| 15h36 -15h48 | So- O10 | [Whole Genome Sequencing of *Giardia duodenalis* Isolates from a Cat and a Dog](#p25) | Maloney J., Molokin A., Santin M |
| 15h48-16h00 | Su- O11 | [Unusual localization and potential functions of three paralogs of a heme protein in *Giardia intestinalis*](#p26) | Yee J, Dayer G, Sajer B, Pyrih J,Tachezy J,Rafferty S |
| **16h00-16h24** |  | **Coffee break** | 16h00–18h22 Chair: ORTEGA PIERREZ G  BALLET JJ |
| 16h24-16h36 | Su- O12 | [Crypto and GiardiaDB.org: free, online resources bringing Omics to every scientist](#p27). | Warrenfeltz S, Kissinger JC |
| 16h36-16h48 | Su- O13 | [Allele Sequence Heterozigosity and recombination patterns detected by Multiplex PCR amplification and Massive Parallel Sequencing of single cysts of *Giardia duodenalis* assemblage B.](#p28) | Gabín-García L.B. Bartolomé C. Llovo J. Méndez S. Sobrino, B. Maside, X |
| 16h48-17h00 | Su- O14 | [Variation in Promoter Sequences Drives Differential Expression of GLORF-C4 in the Human Infective Assemblages of *Giardia duodenalis*](#p29) | Black, A. Mousley, C; Paget, T. Steuart, R |
| 17h00-17h12 | Su- O15 | [The two nuclei of *Giardia intestinalis* during mitosis.](#p30) | Tůmová, P, Wanner, G, and Nohýnková, E |
| 17h12-17h24 | Su- O16 | [The protein methylation network in the early-branching protozoan parasite, *Giardia duodenalis*](#p31) | Emery-Corbin SJ, Tichkule S, Balan B, Strohlein A, Cooper C, Ansell BRE, Baker L, Vuong D, Lacey E, Svärd SG, Jex AR |
| 17h24-17h36 | Su- O17 | [High-resolution, quantitative proteome of *Giardia duodenalis* during encystation](#p32) | Balan B, Emery-Corbin S , Sandow J. Webb A , Jex A |
| **17h36-17h46** |  | **10-minute break** |  |
| 17h46-17h58 | Su- O18 | [Impact of early-life exposure to *Cryptosporidium parvum* infection on intestinal homeostasis at adulthood](#p33). | Lacroix-Lamandé S, Ménard S, Baillou A, Virologeux-Payant I, Sallé G, Olier M, Nicolosi A, Pezier T, Laurent F. |
| 17h58-18h10 | Su- O19 | [Role of Paneth cells during infection of neonatal mice by *Cryptosporidium parvum*](#p34)*.* | Nicolosi A, Pezier T, Guesdon W, Pedron T, Laurent F, Lacroix-Lamandé S. |
| 18h10-18h22 | Su- O20 | [Identification of heparin-binding proteins in *Cryptosporidium parvum*](#p35) | Yin J, Wang D, Zhang T, Gao X,Jiao X,Zhang N, Lu H |

**Monday Presentations**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **ORAL SESSION AMPHI 350- HOST PARASITE INTERACTIONS** | 8h00-9h20 :Chair : LAURENT F. CANDON S. |
| 8h00-8h20 | Mo-O1 | [How innate immune responses shape *Cryptosporidium* infection](#p38) | Laurent F. |
| 8h20-8h32 | Mo- O2 | [Shifts in Treg/Th17 balance correlate with differential susceptibility to infection with *Giardia muris*](#p39) | Yordanova, A. I., Heimesaat, M. M, Hartmann, S., Rausch S. |
| 8h32-8h44 | Mo- O3 | [Variability in giardiasis: roles for immune responses and microbiota](#p40) | Singer, S.M, Li, E, Keselman, A, Maloney, J, Zachary, E, Coelho, C, da Silva Lanna, M. C Fink, M |
| 8h44-8h56 | Mo- O4 | [Temporal and spatial analysis of the intestinal IL-17A response following a *Giardia* infection](#p41) | Paerewijck O, Gagnaire A, Maertens B Geldhof P. |
| 8h56-9h08 | Mo- O5 | [Transcriptional Profiling of Differentiated CaCo-2 Intestinal Epithelial Cells Response to *Giardia Intestinalis* during Early Onset of in vitro Interactions: Insights into the Pathways of Cytokine Production and Regulation](#p42) | Maayeh S, Knörr L, Sköld K, Hoeppner Mp, Grabherr M, Stadelmann B, Svärd Sg |
| 9h08-9h20 | Mo- O6 | [Human small intestinal organoids - a new model to investigate *Giardia* sp. infection](#p43) | Kraft MR, Klotz C, Aebischer T |
| **9h20-9h40** |  | **OPENING CEREMONY** | 9h40-10h30 Chair : WIDMER G. GARGALA G. |
| 9h40-9h52 | Mo- O7 | [*In vivo and in vitro* studies of the host-parasite interactions of *Spironucleus salmonicida* and the Atlantic salmon](#p44) | Ástvaldsson A, Stairs C, Xu F, Haag L, Alfjorden A, Janson E, Svärd, SG |
| 9h52-10h04 | Mo- O8 | [Deprivation of dietary fiber enhances susceptibility of mice to cryptosporidiosis](#p45) | Oliveira, B.C.M, Bresciani, K.D.S, Widmer, G. |
| 10h04-10h16 | Mo- O9 | [Domesticating a parasite: developing a genetically tractable natural mouse model of cryptosporidiosis](#p46) | Sateriale A, Slapeta J, Baptista RP, Engiles JB, Jodi A. Gullicksrud GT, Herbert GT, Brooks CF, Kugler EM, KissingerJC, Hunter CA, and Striepen B. |
| 10h16-10h30 | Mo- O10 | [The sporozoite-trophozoite transition in *Cryptosporidium* – the role of sugar metabolism, calcium signalling and redox potential](#p47) | Paziewska-Harris, A, Thomas, JR, Lugonja, B, Cable, J. |
| **10h30-10h50** |  | **Coffee break with croissants** | 10h50-12h22 Chair : BURET A.G STRIEPEN B. |
| 10h50-11h10 | Mo-O11 | [Symptom variability in *giardiasis* : Why](#p48)? | Buret A. |
| 11h10-11h22 | Mo- O12 | [Prolonged duodenal mucosal lymphocyte alterations in patients with and without post-giardiasis functional gastrointestinal disorders](#p49) | Dizdar V, Hausken T , Laerum OD , Langeland N, Hanevik K. |
| 11h22-11h34 | Mo- O13 | [Impact of *Giardia* on the intestinal lipid metabolism](#p50). | Maertens B. |
| 11h34-11h46 | Mo- O14 | [Heterogeneity of *Giardia lamblia* Peripheral Endocytic Compartments revealed by Super Resolution Microscopy](#p51) | Santos, R, Faso, C, Hehl, AB. |
| 11h46-11h58 | Mo- O15 | [Disc-o-fever: getting down with *Giardia’s* groovy microtubule using new molecular genetic tools](#p52) | Hagen K.D., Williams J.A., Hilton N.A., C. Nosala, Dawson S.C. |
| 11h58-12h10 | Mo- O16 | [Enolase of *Giardia duodenalis*: a moonlighting protein secreted as monomer by trophozoites activates host cell plasminogen and induces a necroptotic-like damage in epithelial Cells](#p53) | Barroeta-Echegaray E, Fonseca-Liñán R, Argüello-García R, Rodríguez Muñoz R, Bermúdez RM and Ortega-Pierres G |
| 12h10-12h22 | Mo- O17 | [Molecular analysis of the *Cryptosporidium* life cycle progression](#p54) | Striepen B. |
|  |  | **POSTER SESSIONS** |  |
| 12h40-13h00 | **Amphi 100 A** | ***GIARDIA* AND *CRYPTOSPORIDIUM* ENVIRONMENTAL STUDIES (1)** | Chair : FOURNIER M. RAZAKANDRAINIBE R. |
| 12h40-12h45 | MoA- P1 | [Monitoring of *Cryptosporidium oocysts* and *Giardia* cysts in the Nakdong River in Korea](#p56) | Cho PY, Yang HW, Nam SW, Jang SW. |
| 12h45-12h50 | MoA- P2 | [Detection of *Cryptosporidium and Giardia* in Oysters by Nested-PCR and Sequence Analysis in Portugal](#p57) | Santos A, Ruano F, Grade A, Meireles AS, Gomes G, Lindo M, Faria CP, Sousa MC |
| 12h50-12h55 | MoA- P3 | [Diagnostics of *Cryptosporidium* spp. From water basins in košice region using artemia franciscana metanauplii](#p58) | Hatalová, E., Valenčáková, A., Kalinová J., Špalková M. |
| 12h55-13h00 | MoA- P4 | [Novel Water Treatments for the Zoonotic Waterborne Pathogen *Cryptosporidium*](#p59) | Lugonja B, Paziewska-Harris A, Williams CF,Cable J |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Amphi 100 B** | ***GIARDIA :* CELL BIOLOGY - 1** | 12h40-14h00 Chair :  BURET A.G. SVARD S. |
| 12h40-12h45 | MoB- P1 | [The immunological interplay between *Giardia duodenalis* and *Toxoplasma gondii* during murine co-infection](#p61) | Coelho C.H. |
| 12h45-12h50 | MoB- P2 | [*Giardia lamblia* modulates LPS-induced pro-inflammatory response in macrophages through cleavage of NF-κB p65RelA by proteases](#p62) | Faria CP, Neves BM, Lourenço A, Cruz MT, Martins JD, Silva A, Pereira S, Sousa MC |
| 12h50-12h55 | MoB- P3 | [Biochemical characterization of *Giardia* heme proteins](#p63) | Rafferty S. Nezamololama N. Crowley E. Gordzevich R. Yee J. Deol H. Meiering E. |
| 12h55-13h00 | MoB- P4 | [*Giardia intestinalis* peripheral vesicles harbor multivesicular bodies over the parasite life cycle](#p64) | Midlej V, De Souza W and Benchimol M |
| **13h00-14h00** |  | **Lunch on site** |  |
|  |  | **POSTER SESSIONS** |  |
| 14h00-15h00 | **Amphi 100 A** | ***GIARDIA* AND *CRYPTOSPORIDIUM* ENVIRONMENTAL STUDIES (2)** | Chair : FOURNIER M. RAZAKANDRAINIBE R. |
| 14h00-14h05 | MoA- P5 | [First detection of zoonotic *Cryptosporidium parvum* in red-eared slider turtle of invasive alien species in water environment in poland](#p66) | Kaupke A , Rzeżutka A, |
| 14h05-14h10 | MoA- P6 | [*Cryptosporidium* spp. (Apicomplexa: Cryptosporidiidae) in Passeriformes birds and biology of novel *Cryptosporidium* great-tit genotype and *Cryptosporidium* swallow genotype](#p67) | Holubová N, Limpouchová Z, Sak B, Veselý P, Halajian A, Moriarty E, Kváč M, |
| 14h10-14h15 | MoA- P7 | [Diversity of *Cryptosporidium* spp. in Rattus norvegicus in the Czech Republic](#p68) | Kváč M, Ježková J, Horčičková H, Holubová N, McEvoy J, Sak B. |
| 14h15-14h20 | MoA- P8 | [Diversity of *Cryptosporidium* spp. in East- and West-European house mice](#p69) | Kváč M, Ježková J, Rašková V, McEvoy J, Piálek J, Sak B. |
| 14h20-14h25 | MoA- P9 | [Novel *Cryptosporidium* genotypes in wild and cultured trout](#p70) | Couso-Pérez, S, Ares-Mazás, E and Gómez-Couso, H |
| 14h25-14h30 | MoA- P10 | [First report of *Cryptosporidium parvum* GP60 genotypes (IIaA15G2R1 and IIaA16G3R1) in wild ponies from northern Iberian Peninsula](#p71) | Couso-Pérez, S, Bárcena-Varela de Limia, F, Ares-Mazás, E and Gómez-Couso, H. |
| 14h30-14h35 | MoA- P11 | [First report of *Cryptosporidium parvum* subtype IIaA16G3R1 in cervids](#p72) | Pires TeixeiraWF, Leite de Oliveira M, De Faria Peres PH, Bertequini Nagata W, Nicoleti Santana B, Oliveira BCM, Barbanti Duarte JM, Vasconcelos Meireles M, Zanetti Lopes WD, Saraiva Bresciani KD |
| 14h35-14h40 | MoA- P12 | [First report of parasites of the *Cryptosporidium genus* in *Mazama americana, Mazama nana* and *Blastocerus dichotomus*](#p73) | Pires TeixeiraWF, Leite de Oliveira M, De Faria Peres PH, Bertequini Nagata W, Nicoleti Santana B, Oliveira BCM, Barbanti Duarte JM, Meireles VM, Zanetti Lopes WD, Saraiva Bresciani KD |
| 14h40-14h45 | MoA- P13 | [Prevalence, molecular identification and risk factors for *Cryptosporidium infection* in edible marine fish: a survey across sea areas surrounding France](#p74) | Gantois, N; Follet, J; Hammouma-Ghelboun, O.; Guyot, K.; Benamrouz-Vanneste, S; Fréalle, E; Seesao, Y; Delaire, B; Creusy, C; Even, G; Verrez-Bagnis, V; Ryan, U; Gay, M; Aliouat-Denis, C.M; Viscogliosi, E; Certad, G. |
| 14h45-14h50 | MoA- P14 | [*Giardia* spp. infection in a population of crested porcupine *(Hystrix cristata* L., 1758) from central Italy](#p75) | Perrucci S., Berrill F., Coppola F., Maestrini M., Felicioli A. |
| 14h50-14h55 | MoA- P15 | [Molecular identification of *Giardia microti* in captive vole *Microtus guentheri* (Mammalia: Rodentia) from Italy](#p76) | De Liberato C., Montalbano Di Filippo M., Sagrafoli D., Ferraro D., Berrilli F. |
| 14h55-15h00 | MoA- P16 | [Molecular epidemiology of giardiosis in Cuban paediatric population and its association with clinical data](#p77). | Jerez Puebla, LE, Núñez FA ,Rojas LR, Martínez IS, Ayllón LV, Atencio IM, Müller N |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Amphi 100 B** | ***GIARDIA :* CELL BIOLOGY (2)** | 14h00-15h00 Chair : LETELLIER M. BURET A.G. |
| 14h00-14h05 | MoB- P5 | [Functional polymorphism of arginine deiminase, a putative *Giardia duodenalis* virulence factor](#p79) | Klotz, C. Marek, S. Schramm, S. Ewald, C. Aebischer, T. |
| 14h05-14h10 | MoB- P6 | [A new model based on human intestinal organoids to investigate *Giardia duodenalis* intestinal barrier interaction: Characterization of differentiation and cell type composition](#p80) | Holthaus, D. Kraft, MR. Schulzke, JD. Aebischer, T Klotz, C. |
| 14h10-14h15 | MoB- P7 | [Novel insights in the structural organization of the *Giardia intestinalis* cytoskeleton](#p81) | Ana Paula Rocha Gadelha AP, Benchimol M, De Souza W. |
| 14h15-14h20 | MoB- P8 | [The role of the Microribbon-Crossbridge Complex in the Structure and Function of *Giardia’*s Ventral Disc](#p82) | Hilton, NA, Dawson, SC. |
| 14h20-14h25 | MoB- P9 | [Defining in vivo *Giardia* physiology and commensal microbiota dysbiosis associated with parasite density during infection in mice](#p83) | Starcevich, H, Nosala, C, Dawson, S.C. |
| 14h25-14h30 | MoB- P0 | [Comparison of mucin expression in non-mucinogenic cells infected with *Giardia lamblia*](#p84) | Tsantarlis, K; Tonelli, R.R . |
| 14h30-14h35 | MoB- P11 | [Metabolic stress in *Giardia-*infections: in vivo importance of arginine for parasite and host](#p85) | Ehret T, Klotz C, Aebischer T. |
| 14h35-14h40 | MoB- P12 | [Phosphoinositide-binding proteins mark, shape and functionally modulate highly-diverged endocytic compartments in the parasitic protist *Giardia lamblia*](#p86) | Faso, C, Cernikova, L, Hehl AB. |
| 14h40-14h45 | MoB- P13 | [Structural inheritance of microtubule organelles in *Giardia*](#p87) | Williams, Joseph A., McInally, Shane G., Dawson, Scott C. |
| 14h45-14h50 | MoB- P14 | [Functional polymorphism of arginine deiminase, a putative *Giardia duodenalis* virulence factor](#p88) | Klotz, C. Marek, S; Schramm, S; Ewald, C. Aebischer, T. |
| 14h50-14h55 | MoB- P15 | [High Cysteine Proteins play a major role during *Giardia intestinalis* interactions with host intestinal epithelial cells](#p89). | Peirasmaki D, Ferella M, Höppner M, Campos S, Ankarklev J, Stadelmann B, Grabherr M, Svärd SG. |
| 14h55-15h00 | MoB- P16 | [HuTu-80 cells as a model for *Giardia lamblia* infection](#p90) | Souza, J. B. ,Tonelli, R. R. |
|  |  | **ORAL SESSION AMPHI 350 : «OMES» 2** | 15h00-16h08 Chair : KAPEL N. WIDMER G. |
| 15h00-15h20 | Mo- O18 | [Towards the development of nutritional interventions for cryptosporidiosis](#p92) | Widmer G |
| 15h20-15h32 | Mo- O19 | [Genome evolution in *Cryptosporidium parvum*](#p93) | Wang, T, Zhang, Z, Wang, Y, Roellig, D, Guo, Y, Feng, Y, Xiao, L. |
| 15h32-15h44 | Mo- O20 | [Developing in vitro tools for investigating host-parasite interactions in *Cryptosporidium* spp](#p94). | Josse, L, Bones A. J, Miller C.N, Purton T.J, Kváč M, Tsaousis A.D |
| 15h44-15h56 | Mo- O21 | [Genetic basis for virulence differences of various *Cryptosporidium parvum c*arcinogenic isolates](#p95) | Audebert C, Bonardi F, Caboche S, Guyot K, Touzet H, Merlin S, Gantois N, Creusy C, Meloni D, Mouray A, Viscogliosi E, Certad G, Benamrouz-Vanneste S, Chabé M. |
| 15h56-16h08 | Mo- O22 | [Comparative genomics of *C. hominis* IbA10G2 isolates from Europe](#p96) | Alako BTF, Liu X, Sannella AR, Chalmers RM, Robinson G, Morris A, Harrison PW, Cochrane G, Cacciò SM |
| **16h10-16h30** |  | **Coffee break** | 16h30- 17h50 Chair : TOURNIER I. CACCIO S. |
| 16h30-16h50 | Mo- O23 | [Comparative genomics of *Cryptosporidium* : the current picture](#p97) | Caccio S. |
| 16h50-17h02 | Mo- O24 | [Strand-specific RNA Sequencing in *Cryptosporidium parvum* Suggests Widespread and Developmentally Regulated Long Noncoding RNA Transcription and Intron encoded Small RNAs](#p98) | Li, Y, Baptista, R.P, Sateriale, A, Striepen, B and Kissinger, J.C. |
| 17h02-17h14 | Mo- O25 | [Development of SureSelect target enrichment for whole genome sequencing of *Cryptosporidium directly* from stool samples](#p99) | Asis Khan, Eliza Carneiro Alves Ferreira, and Michael E. Grigg |
| 17h14-17H26 | Mo-026 | [*Cryptosporidium parvum* exports proteins into the cytoplasm of the epithelial host cell](#p100) | Dumaine J , Sateriale, A, Reddy, A , Striepen, B. |
| 17h30-17h50 | Mo- O27 | [*Cryptosporidium* and colon cancer: is there a causal link?](#p101) | Certad G. |
| **19h30** |  | **Reception at the Rouen City Hall (Hotel de Ville)** |  |

**Tuesday Presentations**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **ORAL SESSION – AMPHI 350 –EPIDEMIOLOGY – 1** | 8h00-9h20 Chair : CHALMERS R.M. COSTA D. |
| 8h00-8h20 | Tu-O1 | [A UK perspective on tools for identifying, investigating and preventing *Cryptosporidium* outbreaks](#p104) | Chalmers R |
| 8h20-8h32 | Tu- O2 | [Epidemiology and distribution of *Giardia duodenalis* Genotypes in humans in Metropolitan Sydney, Australia](#p105) | Zajaczkowski, P. Mazumdar, S. Conaty, S. Ellis, J. T. Fletcher-Lartey, S. M. |
| 8h32-8h44 | Tu- O3 | [Occurrence and molecular characterization of *Giardia duodenalis* and *Cryptosporidium* spp. in a large asymptomatic school children population in the Madrid area. Central Spain](#p106) | Muadica AS, Reh L, Köster PC, Hernández de Mingo M, Bailo B, Esther Chércoles R, Balasegaram S, Verlander N, Carmena D |
| 8h44-9h56 | Tu- O4 | [Novel multi-locus genotypes of G*iardia duodenalis* isolates among children in rural communities in southern palawan, philippines](#p108) | Briones, J.G., Rivera, P.T, Kawazu, S., , Bascos, D.M. , Rivera, W.L., Cochon, K.L., Bertuso, A.G., Reyes, J. |
| 8h56-9h08 | Tu- O5 | [Recirculation of *Giardia duodenalis* genotype A in children after treatment with metronidazole: reinfection or parasitic resistance?](#p109) | Fantinatti M, Oliveira LAPL, Cascais T, Austriaco-Teixeira P, Verrissimo E, Bello AR, Da-Cruz AM. |
| 9h08-9h20 | Tu- O6 | [*C. hominis* waterborne outbreak in a french military camp, 2017](#p110) | Costa D, Razakandrainibe R, Tong C, Watier S, Holterbach L Merens A, . Petit C, V. Pommier de Santi V, Gargala G, Favennec L. |
| **9h20-9h30** |  | **10-minute break** | 9h30-10h18 Chair: CHALMERS R.M. XIAO L |
| 9h30-9h42 | Tu- O7 | [*Cryptosporidium* spp. Infection and carriage in rural Madagascar: cluster detection among humans and animals](#p111) | Krumkamp R; Melhem S, Rakotozandrindrainy R, May J, Eibach D |
| 9h42-9h54 | Tu- O8 | [The role of protozoan genotypic diversity in humans: Implications for the epidemiology of cryptosporidiosis and giardiasis in New Zealand](#p112) | Ogbuigwe, PC; Garcia-R, JC.; Knox, M.A.; Biggs, P.J.; Pita, A.; French, N.; Hayman, D. |
| 9h54-10h06 | Tu- O9 | [Transmission networks of *Cryptosporidium* spp. in rural sub-Saharan Africa: a multi-country study](#p113) | Eibach D, Kramkamp R, Caccio S, Adegnika A, Amuasi J, Lusingu J, Rakotozandrindrainy R, May J, |
| 10h06-10h18 | Tu- O10 | [Cryptosporidiosis outbreak within a middle school in western France, november 2017](#p114) | Loury P, Favennec L, Razakandrainibe R, Gross L, Dugast F, Dalle F, De Rougemont A, Polack B, Giraudeau D, Valot S, Costa D, Hubert B, |
| **10h20-10h40** |  | **Coffee break with croissants** | 10h40-11h36 Chair : KORTBEEK L.M. SAVOYE G. |
| 10h40-11h00 | Tu- O11 | [*Giardia* and *Cryptosporidium* : should we always consider both?](#p115) | Kortbeek L.M. |
| 11h00-11h12 | Tu- O12 | [Health Sequelae of Human Cryptosporidiosis – a 12 month prospective follow-up study](#p116) | Carter B, Stiff RE, Elwin K, Hutchings HA, Mason B, Davies AP, Chalmers RC, |
| 11h12-11h24 | Tu- O13 | [Three year population based *Cryptosporidium* studyin the Nederlands :: risk factor and long term sequela](#p117) | Kortbeek L.M, Igloí Z, Nic Lochlainn L , Roelfsema J, Schimmer B, Mooij S, van Pelt W, Franz E |
| 11h24-11h36 | Tu- O14 | [Intestinal epithelial cell damage and plasma cytokines levels can be related to giardiasis in Brazilian pre-school children](#p118) | Cascais T, Austriaco-Teixeira P, Fantinatti M, Silva-Freitas ML, Santos-Oliveira JR, Coelho CH, Singer SM, Da-Cruz AM, |
| **11h36-11h46** |  | **10-minute break** | 10h46-12h46 Chair : ROBERTSON L. FAVENNEC L |
| 11h46-11h58 | Tu- O15 | [Validation of a multilocus variable number tandem repeat scheme for *Cryptosporidium parvum* subtyping during outbreak investigations](#p119). | Pérez-Cordón G, Robinson G, Chalmers RM. |
| 11h58-12h10 | Tu- O16 | [Global population structure and genetic diversity of *Cryptosporidium hominis*](#p120) | Tichkule S, Cacciò S, Mueller I, Bahlo M, Eibach D, Jex A |
| 12h10-12h22 | Tu- O17 | [Human microsporidiosis in France in 2018 : Data from the French microsporidiosis network](#p121). | Nourrisson C, Moniot M, Bonnin V, Delbac F, Dalle F, Favennec L, Poirier P ; French Microsporidiosis Network |
| 12h22-12h34 | Tu- O18 | [Using biofilms to monitor *Cryptosporidium* contamination in surface water](#p122) | Jellison K, Cannistraci D, Fortunato J, Hall L |
| 12h34-12h46 | Tu- O19 | [Evolution of anthroponosis in *Cryptosporidium*](#p123) | Nader JL, Mathers TC, Ward BJ, Pachebat JA, Swain MT, Robinson G, Chalmers RM, Hunter PR, Oosterhout CV, Tyler KM |

|  |  |  |  |
| --- | --- | --- | --- |
| **13h00-14h00** |  | **Lunch on site** | 14h00-15h08 Chair : ORTEGA Y CACCIO S |
| 14h00-14h20 | Tu-O20 | [The detection and persistence of *Cyclospora* *cayetanensis*](#p124) | Ortega Y. |
| 14h20-14h32 | Tu- O21 | [Opportunistic intestinal protozoan and coccidian infection among various groups of immunocompromised patients in Nepa](#p125)l | Bahadur SJ, Sapana S, Sony S, Rajendra G, |
| 14h32- 14h44 | Tu- O22 | [Profiling the diversity of *Cryptosporidium* species and genotypes in wastewater treatment plants in Australia using next generation sequencing](#p126) | Zahedi, A, Gofton, A, Greay, T, Monis, P, Oskam, C, Ball, A, Bath A, Watkinson, A, Robertson, I, Ryan, U. |
| 14h44-14h56 | Tu- O23 | [Development and Application of Bioinformatics Tools: Automation of Species/Genotype Identification and Genetic Subtyping of *Cryptosporidium*](#p127) | Yanta CA, Bessonov K, Robinson G, Guy RA. |
| 14h56-15h08 | Tu- O24 | [A New Protocol for Molecular Detection of *Cyclospora cayetanensis* as contaminants of Berry Fruits](#p128) | Temesgen T, Tysnes K, Robertson L. |
| **15h08-15h28** |  | **Coffee break** | 15h28-16h28 Chair : VILLENA I |
| 15h28-15h40 | Tu- O25 | [Prevalence of *Giardia* and *Cryptosporidium* in the Viennese urban water bodies: a first overview](#p129) | Cervero-Aragó, S. Sommer, R. Lindner, G. Hafeli, .; Knetsch, S. Lettl, A. Derx, J. Walochnik, J. |
| 15h40-15h52 | Tu- O26 | [The impact on water quality from improved land management decisions for *Cryptosporidium* control in a catchment with a history of public water supply contamination](#p130) | Wells B, Shaw H, Hotchkiss E, Gilray J, Green J, Katzer F, Wells A and Innes E, |
| 15h52-16h04 | Tu- O27 | [*Cryptosporidium* and *Giardia* in Dairy Calves--30 years of observation](#p131) | Ongerth, J.E. |
| 16h04-16h16 | Tu- O29 | [*Cryptosporidium* in water: what makes a good method for genotyping?](#p133) | Elwin, K, Robinson, G. Chalmers R. |
|  |  | **POSTER SESSIONS** |  |
| 16h30-17h15 | **Amphi 100 A** | **EPIDEMIOLOGY - 2** | 16h30-17h15 Chair : LA CARBONA S. ORTEGA Y. |
| 16h30-16h35 | TuA- P1 | [Prevalence of *Cryptosporidium* spp, *Giardia duodenalis* and *Toxoplasma gondii* in three leafy green vegetables usually consumed in Marrakech region, Morocco](#p135). | Berrouch S, Amraouza Y, Escotte-Binet S, Razakandrainibe R, Favennec L, Hafid J, Villena I |
| 16h35-16h40 | TuA- P2 | [Monitoring of *Cryptosporidium parvum* in fruits, vegetables, herbs and sprout seeds](#p136) | Bartosova B, Slana I, Moravkova M, Slany M. |
| 16h40-16h45 | TuA- P3 | [Presence of *Giardia intestinalis* in ready to eat foods of plant origin](#p137) | Slana I, Bartosova B, Moravkova M, Slany M |
| 16h45-16h50 | TuA- P4 | [Investigation on *Cyclospora cayetanensis* in fresh produce in Italy](#p138) | Barlaam, A., Tefera, T, Sannella, A.R, Marangi, M., Cacciò S.M, Tysnes K., Robertson L., Iangaspero, A. |
| 16h50-16h55 | TuA- P5 | [Presence of *Giardia intestinalis* in ready to eat foodstuff](#p139) | Slana I, Bartosova B, Moravkova M, Slany M, |
| 16h55-17h00 | TuA- P6 | [*Cyclospora cayetanensis* infections in Sweden – underdiagnosed or uncommon?](#p140) | Beser, J and Bergstrand, T |
| 17h00-17h05 | TuA- P7 | [Multi-locus genotyping provides epidemiological insights about a potential common source of infection with *Enterocytozoon bieneusi microsporidia* in a hematological unit.](#p141) | Desoubeaux G, Nourrisson C, Moniot M, De Kyvon M, Bonnin V, Ertault De La Bretonnière M, Morange V, Bailly E, Lemaignen A, Morio F, Poirier P |
| 17h05-17h10 | TUA- P8 | [Evaluation of a ceramic candle filter to remove *Cryptosporidium* oocysts in drinking water](#p142) | Abeledo-Lameiro, M.J; Cañizo-Outeiriño, A; Couso-Pérez, S; Ares-Mazás, E; Gómez-Couso, H. |
| 17h10-17h15 | TuA- P9 | [Molecular characterization of *Cryptosporidium* in Algerian HIV/AIDS patients](#p143) | Malika S; Costa D; Fatiha R;  Favennec F; Hamoudi Haiet A; Razakandrainibe R |
|  | **Amphi 100 B** | **CELL BIOLOGY - 3** | 16h30-17h25 Chair : CERTAD G. LAURENT F. |
| 16h30-16h35 | TuB- P1 | [Investigations on co-infections with Bovine corona virus and *Cryptosporidium* parvum using in vitro methods: experimental setup and preliminary results](#p145) | Shakya R, Myrmel M, Makvandi-Nejad S, Markussen T, Robertson LJ |
| 16h35-16h40 | TuB- P2 | [The challenge of inferring host shifting in *Cryptosporidium* parasites with complex life cycles and population strategies](#p146) | Juan C. Garcia-R, Murray P. David T. S. Hayman |
| 16h40-16h45 | TuB- P3 | [Role of Paneth cells during infection of neonatal mice by *Cryptosporidium parvum.*](#p147) | Nicolosi A, Pezier T, Guesdon W, Pedron T, Laurent F, Lacroix-Lamandé S, |
| 16h45-16h50 | TuB- P4 | [*Cryptosporidium parvum* can subvert the host immune response through manipulation of CRAMP expression during neonatal infection.](#p148) | Guesdon W, Pezier T, Diana J, Tottey J, Laurent F Lacroix-Lamandé S |
| 16h50-16h55 | TuB- P5 | [Influence of prior excystation procedures on *Cryptosporidium parvum* proliferation in HCT-8 host cell culture](#p149) | Kubina S, Razakandrainibe R, Costa D, Diawara E.H.I, La Carbona S, Villena I. Favennec L. |
| 16h55-17h00 | TuB- P6 | [Identification and localization of the *Cryptosporidium parvum* Gigantic Extracellular protein (CpGE)](#p150) | Nakamuran A, Passerò I, Bertuccini L, Barca S and Tosini F |
| 17h00-17h05 | TuB- P7 | [Challenge accepted: consistent, comparative and evidence-based genome assembly and annotation for the three closely-related species, *Cryptosporidium parvum*, *C. hominis* and *C. tyzzeri*](#p151) | Baptista, R.P, Li, Y, Sateriale, A, Ansell, B, Jex, A, Sanders, M, Brooks, K, Tracey, A, Berriman, M, Striepen, B, Cotton, J.A and Kissinger, J.C. |
| 17h05-17h10 | TuB- P8 | [*Giardia:* A natural CERN Laboratory to Study Evolution of Complex Cellular Events](#p152) | Dutta S1, Sarkar S2, Chauhan R1 |
| 17h10-17h15 | TuB-P9 | [Epidemiology of human cryptosporidiosis cases in immunocompromised patients in France, 2015-2018](#p153) | Costa D, Cryptoanofel members, Razakandrainibe R, Villier V, Dalle F, Gargala G, Favennec L, |
| 17h15-17h20 | TuB-P10 | [*Giardia:* an under-reported foodborne parasite](#p154) | Ryan U, Hijjawi N, Feng Y, Xiao L |
| 17h20-17h25 | WeB- P15 | [Characterization of the proteome and dynamics of encystation specific vesicles of *Giardia intestinalis*](#p220)*.* | Markova L, Vinopalova M, Najdrova V, Dolezal P. |
| **17h30-18h00** | **Amphi 350** | **ROUND TABLE ON FOODBORNE ASPECTS** | Robertson L. La Carbona S. Hijjawi S. |
| **20h00** |  | **Gala Dinner, Halle aux Toiles, Rouen** |  |

**Wednesday Presentations**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **ORAL SESSION – AMPHI 350 - ANIMAL INFECTION EPIDEMIOLOGY - 1** | 8h00-8h56 Chair : POLACK B. ONGERTH J.E. |
| 8h00-8h20 | We- O1 | [Giardiosis in domestic mammals: clinical importance and public health consequence](#p157) | Polack B. |
| 8h20-8h32 | We- O2 | [Long-term monitoring of *Cryptosporidium* in animals inhabiting drinking water catchments in three states across Australia](#p158) | Zahedi A, Monis P, Gofton A, Oskam C, Ball A, Bath A, Bartkow M, Robertson I, Ryan U, |
| 8h44-8h56 | We- O3 | [Genetic diversity of *Cryptosporidium* in fish](#p159) | Ryan U, Palermo U, Boland,S , Zahedi,A , Lymbery A, Okam C. |
| 8h44-8h56 | We- O4 | [Propagation of *Cryptosporidium baileyi* and *C. parvum i*n chickens following in ovo inoculation](#p160) | Holubová N, Sak B, Kváč M, |
| **8h56-9h18** |  | **20-minute break** | 8h18- 9h06 Chair : XIAO L. RAZAKANDRAINIBE R. |
| 9h18-9h30 | We- O5 | [*Cryptosporidium* spp. (Apicomplexa: Cryptosporidiidae) in Psittaciformes birds and biology of *Cryptosporidium* avian genotype III](#p161) | Kváč M, Zikmundová V, Sak B, McEvoy J, Holubová N. |
| 9h30-9h42 | We- O6 | [What is the source of *Cryptosporidium parvum* infection for beef and dairy calves?](#p162) | Shaw H, Thomson S, Innes EA, Katzer F, |
| 9h42-9h54 | We- O7 | [Occurrence and zoonotic potential of *Cryptosporidium* in horses from the Netherlands](#p163) | Uiterwijk M, Dam C, Roelfsema J, Broens E, Hordijk J, Cuperus T, van der Giessen J |
| 9h54-10h06 | We- O8 | [Wildlife vectors of *Cryptosporidium parvum* as contributors to parasite transmission between farms and to water sources](#p164) | Wells B, Paton C, Bacchetti R, Shaw H, Gilray, J, Katzer F and Innes E |
| **10h10-10h30** |  | **Coffee break with croissants** | 10h30-11h18 Chair : CHALMERS R.M. POLACK B. |
| 10h30-10h42 | We- O9 | [Identification of *Cryptosporidium parvum* subtype diversity using next generation sequencing in pre-weaned calves in Argentina](#p165) | Santin M., George N. , Molokin A, Maloney J, Lombardelli J, Encinas M, M Lujan TomazicM M, Garro C , Tiranti K, Schnittger L |
| 10h42-10h54 | We- O10 | [Molecular identification, genotyping, and subtyping of individual *Cryptosporidium* oocysts isolated from bovine faeces with special reference to zoonotic significance](#p166) | Gharieb R M. A, Bowman D D, Liotta J L , Xiao L |
| 10h54-11h06 | We- O11 | [*Cryptosporidium* and *Giardia* in Dairy Calves--30 years of observation](#p167) | Ongerth, J.E |
| 11h06-11h18 | We- O12 | [MCS6-7 sequences as markers of the bovine origin of *Cryptosporidium parvum* isolates from infected bovines and humans](#p168) | Razakandrainibe R; Costa D; Diawara I E; Lecomte M; Gargala G; Favennec L |
|  |  | **POSTER SESSIONS** |  |
| 11h30-12h50 | **Amphi 100 A** | **ANIMAL INFECTION EPIDEMIOLOGY - 2** | 11H30-12h50 Chair : KORTBEEK L.M., KVÁČ M. |
| 11h30-11h35 | WeA- P1 | [Molecular characterization of *Crypstosporidium* isolates from diarrheal dairy calves in France](#p170) | Mammeri M, Chevillot A, Chenafi I, Julien C, Vallé I, Polack B, Follet J, Adjou, K.T. |
| 11h35-11h40 | WeA- P2 | [Molecular characterization of zoonotic *Cryptosporidium* and *Giardia duodenalis* pathogens in Algerian sheep](#p171) | Sahraoui L , Thomas M, Chevillot A, Mammeri M, Polack B, Vallée I, Follet J, Ain-Baaziz H Adjou, K.T. |
| 11h40-11h45 | WeA- P3 | [Prevalence of potentially zoonotic assemblages of *Giardia duodenalis* in domestic and wild animals in Scotland](#p172). | Bartley PM, Chia SL, Roehe BK, Bacchetti R, Wells B, Innes EA and Katzer F. |
| 11h45-12h50 | WeA- P4 | [Zoonotic species *Cryptosporidium* parvum in cattle in Slovakia](#p173) | Mravcová K, Štrkolcová G, Goldová M, Rastislav M. |
| 11h50-11h55 | WeA- P5 | [Occurrence of *Cryptosporidium* suis in Italian pig farms](#p174) | Cervone M, Cacciò S, Fichi G, Perrucci S. |
| 11h55-12h00 | WeA- P6 | [A snapshot of *Cryptosporidium* spp infection in livestock in France: Public health risk concern](#p175) | Razakandrainibe R, Costa D, Leméteil D Camuset P,   Berthet H, Gargala G, Favennec L |
| 12h00-12h05 | WeA- P7 | [Evaluation for associations amongst *Giardia duodenalis* Assemblages and fecal score of dogs.](#p176) | Scorza AV, Buch J,Franco P, Mc Donald C, Lappin M R.. |
| 12h05-12h10 | WeA- P8 | [The assemblages of *Giardia duodenalis* circulating among humans and animals in Slovakia](#p177) | Štrkolcová G, Mravcová K, Goldová M, Mucha R |
| 12h10-12h15 | WeA- P9 | [Investigations on zoonoticcryptosporidiosis in Northern Ethiopia](#p178) | Tesama KYT, Tysnes KR, Debenham JJ, Nødtvedt A, Terefe G, Robertson LJ. |
| 12h15-12h20 | WeA- P10 | [Frequency and molecular diversity of *Giardia duodenalis* and *Cryptosporidium* spp. in captive non-human primates and their keepers in Spain and rescued wild chimpanzees (*Pan troglodytes*) in Sierra Leone](#p179) | Köster PC, Alameda A, Salimo Muadica A, Hernández de Mingo M, Bailo B, Lapuente J, Calero-Bernal R, Carmena D. |

|  |  |  |  |
| --- | --- | --- | --- |
| 12h20-12h25 | WeA- P11 | [Transmission of *Cryptosporidium parvum* from cattle to a veterinary student in Slovakia](#p180) | Mravcová K , Štrkolcová G, Goldová M, Mucha R. |
| 12h25-12h30 | WeA- P12 | [Multilocus sequence typing strategies for the characterization of *Giardia duodenalis* Assemblage A isolates from human and animals in Italy](#p181) | Montalbano Di Filippo M, De Liberato C, Di Cave D, Berrilli F. |
| 12h30-12h35 | WeA- P13 | [Cryptosporidiosis in non-human primate in Ethiopia a Public health problem](#p182) | Wortea Hailu A; Costa D; Petros B; Adamu H; Favennec L; Razakandrainibe R |
| 12h35-12h40 | WeA- P14 | [Interreg 2 seas Project : Health For Dairy Cows, H4DC](#p183). | Tsaousis A.D, Vlandas A, Vuylsteke I, Canniere E, Dellevoet M, Roemen J, Barbier-Bourgeois A, Leruste H, Roblin M, Windal F, Benabiles H, Hammouma O.Deweer C.Tyler K.Hunter P.Follet J |
| 12h40-12h45 | WeA- P15 | [*Cryptosporidium* horse genotype infection in immunocompromised child with Crohn's disease](#p184). | Kopacz Ż., Kicia M., Akutko K., Iwańczak B., Sak B., Hendrich A.B., Kváč M. |
| 12h45-12h50 | WeA- P16 | [Tools for understanding the public health risks of *Cryptosporidium* in swimming pools](#p185) | Chalmers RM. Johnston R . Luxford M . Miller R |
|  | **Amphi 100B** | **DIAGNOSIS AND THERAPY - 1** | 11h40–12H55 Chair : STRIEPEN B. FAVENNEC L. |
| 11h40-11h45 | WeB- P1 | [The enteric syndrome in calves, the consequence of infections with *Cryptosporidium parvum*, *Giardia duodenalis* and *Eimeria* spp. under production conditions, and the therapeutic efficacy of Azithromycin](#p187) | Iacob O., Nica V., Nica E., Miron L.D, Roman C,. Mîndru R, Lupu A. |
| 11h45-11h50 | WeB- P2 | [Drug Susceptibility Testing in *Giardia lamblia:* Cysteine strongly affects the effectivities of Metronidazole and Auranofin, a novel and promising antimicrobial](#p188) | Leitsch D |
| 11h50-11h55 | WeB- P3 | [Anti-*Giardia duodenalis* activity of nicotinamide](#p189) | Lagunas-Rangel F. A., Bazán-Tejeda M. L., García-Villa E., Bermúdez-Cruz R. M. |
| 11h55-12h00 | WeB- P4 | [Cell-penetrating peptide dramatically improves the efficacy of Nitazoxanide in the inhibition of *Cryptosporidium parvum* growth](#p190) | Nguyen-Ho-Bao T, Daugschies A , Kamena F |
| 12h00-12h05 | WeB- P5 | [Histone deacetylase inhibitors affect growth and cell organization of of *Giardia intestinalis* trophozoites](#p191) | Gadelha APR; Oliveira RVF ; Huber K Bracher F Benchimol M de Souza W |
| 12h05-12h10 | WeB- P6 | [Efficacy of anti-diarrheal traditional plant used in Côte d’Ivoire against *Cryptosporidium parvum* in both in vitro and in vivo model](#p192) | Tuo K, Chevillot A, Mammeri M, Ndocho T, Bolou E, Vallee I, Adjou K, Toure A, Polack B, Jambou |
| 12h10-12h15 | WeB- P7 | [Is Cryptosporidium parvum able to induce intestinal neoplasia in vitro?](#p222) | Sawant M , Baydoun M, Creusy C , Gantois N , Chabé M, Mouray A , Viscogliosi E , Certad G , Benamrouz-Vanneste S |
| 12h15-12h20 | WeB- P8 | [Standardization of single-tube nested real-time PCR and genetic sequencing for detection and species characterization of avian *Cryptosporidium* spp.](#p194) | Santana, BN.; Nascimento, IG; Meireles, MV |
| 12h20-12h25 | WeB- P9 | [a four-plex qpcr-hrm assay for the detection and quantification of human diarrhea parasites](#p195) | Lamien-Meda A, Leitsch D, Schneider R, Walochnik J, Auer H, Wiedermann U |
| 12h25-12h30 | WeB- P10 | [Validation and application of a salivary antibody assay for measuring exposure to *Cryptosporidium*](#p196) | Elwin K. Puleston R. Chalmers R.M. |
| 12h30-12h35 | WeB- P11 | [Evaluation of LAMP detection of *Giardia* DNA for microfluidic environment](#p197) | Hartdégen M. Farkasvölgyi K. Iván K. Laki A.J. Plutzer J |
| 12h35-12h40 | WeB- P12 | [Validation of a semi-quantitative real-time PCR assay for the diagnosis and the monitoring of *Giardia intestinalis* infection in canine faeces samples according to the French standard NFU47-600-2](#p198) | Thomas M., Va F, Polack B., Ciancia C., Klubkova V., Pelletier C., Sellal E., Bellier S. |
| 12h40-12h45 | WeB- P13 | [Effect of potassium dichromate medium on preservation of *Giardia duodenalis* cysts in faecal specimens of three different livestock species](#p199) | Benhassine, S, Baroudi, D, Hadjoudja, M, Hakem, A, Köster, C. P, Bailo, B.Carmena, D. |
| 12h45-12h50 | WeB- P14 | [Evaluation of the FTD stool parasites Fast track diagnostic kit](#p200) | Costa D, Razakandrainibe R, Villier V, Dalle F, Gargala G, Favennec L |
| **12h55-13h10** |  | **HUW-SMITH AWARD CEREMONY** |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **13h10-14h00** |  | **Lunch on site** |  |
|  |  | **POSTER SESSIONS** |  |
| 14h00-15h00 | **Amphi 100 A** | **EPIDEMIOLOGY - 3** | 14h00-15h00 Chair : KORTBEEK L.M. TROELL K. |
| 14h00-14h05 | WeA- P17 | [Cohort study of associations between intestinal protozoa infection and intestinal barrier function, nutritional status, and neurodevelopment in infants in São Tomé.](#p202) | Garzón M |
| 14h05-14h10 | WeA- P19 | [Retrospective analysis of *Cryptosporidium species* in Western Australian human patients (2015-2018), and emergence of the *C. hominis* IfA12G1R5 subtype](#p204) | Braima K, Zahedi A, Oskam C, Reid S, Pingault N, Xiao L, Ryan U. |
| 14h10-14h15 | WeA- P20 | [*Cryptosporidium chipmunk* genotype I – an emerging cause of human *cryptosporidiosis* in Sweden](#p205) | Beser J, Ydring E, Killander G, Bujila I, Nordahl M, Troell K and Lebbad M |
| 14h15-14h20 | WeA- P21 | [Presence and molecular characterization of *Giardia duodenalis* and *Cryptosporidium* spp. in asymptomatic schoolchildren and symptomatic subjects seeking medical attention in the province of Zambezia, Mozambique](#p206) | Salimo Muadica A, Köster PC, Hernández de Mingo M, Bailo B, Paulos S, Fuentes I, Carmena D |
| 14h20-14h25 | WeA- P22 | [Genetic diversity of *Giardia duodenalis* and *Cryptosporidium* spp. in symptomatic individuals attending public hospitals in Spain. A multicentre study](#p207) | Köster PC, Pérez-Ayala A, Jiménez AB, Molina A, Trelis M, Ruiz G, García-Hortelano M, Mellado MJ, Cuadros J, Martínez Ruiz R, Guerrero M, Azcona Gutiérrez JM, Merino FJ, Paulos S, Hernández de Mingo M, Bailo B, Salimo Muadica A, Fuentes I, Carmena D |
| 14h25-14h30 | WeA- P23 | [The epiCrypt study protocol: investigating household transmission of *Cryptosporidium* in England and Wales](#p208) | McKerr C, Chalmers RM, Elwin K, Vivancos R, O’Brien SJ, Christley RM, |
| 14h30-14h35 | WeA- P24 | [Cryptosporidiosis in French nationals traveling abroad (2015-2018)](#p209) | Costa D Cryptosporidiosis french national network, Gargala G,Dalle F, Razakandrainibe R, Favennec L |
| 14h35-14h40 | WeA- P25 | [Epidemiology of human giardiasis. A 14 years survey](#p210) | Codrean GA, Gorcea AM, Negrut MN, Csep NA, Indries FM, Cozma PA, Dumitrascu LD, Junie LM, |
| 14h40-14h45 | WeA- P26 | [Genetic Diversity of *C. hominis* in an Urban Slum Population in Southern India](#p211) | Rao Ajjampur SS, Ward H and Kang G |
| 14h45-14h50 | WeA- P27 | [Epidemiological characteristics of cryptosporidiosis cases in France, 2015-2018](#p212) | Costa D Cryptosporidiosis french national network, Gargala G,Dalle F, Razakandrainibe R, Favennec L |
| 14h50-14h55 | WeA-P28 | [Evaluation of the immunochromatographic tests Crois Giardia-Strip and Crypto-Strip for the detection of *Giardia Lamblia* and *Cryptosporidium parvum* in stools](#p213) | Kaoutar O T, Hind es, Sanaa I, Maha SA |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Amphi 100 B** | **CELL BIOLOGY - 4** | 14h00-15h00 Chair :**STRIEPEN B. GARGALA G.** |
| 14h00-14h05 | WeB- P16 | [Understanding metronidazole resistance in *Giardia duodenalis*: Identifying patterns by transcriptomics combined with biochemical analysis of two oxygen-insensitive nitroreductases](#p214) | Krakovka S; Svärd SG |
| 14h05-14h10 | WeB- P17 | [*Giardia* 14-3-3 protein post-translational modifications: Assemblage specificity and correlation with cell growth](#p215). | Lalle M., Camerini S., Salzano A.M., Cecchetti S., Marucci G., I. Zullino |
| 14h10-14h15 | WeB- P18 | [Epigenetic control of gene expression during differentiation of *Giardia intestinalis*](#p216) | Rojas-Lopez L, Einarsson E, Ulf Ribacke , and Svärd SG. |
| 14h15-14h20 | WeB- P19 | [High-resolution, quantitative proteome of *Giardia duodenalis* during encystation](#p217) | Balan B, Emery-Corbin S, Sandow J, Webb A, Jex A |
| 14h20-14h25 | WeB- P20 | [Characterization of the secreted cysteine protease CP17516 as a potential virulence factor](#p218) | Grüttner J, Liu J, Svärd SG |
| 14h25-14h30 | WeB- P21 | [How does ISC system work in the mitosomes of *Giardia intestinalis*?](#p219) | Motyckova A, Stairs C, Najdrova V, Horackova V, Dolezal P. |
| 14h30-14h35 | WeB- P22 | [Characterization of the proteome and dynamics of encystation specific vesicles of *Giardia intestinalis*](#p220)*.* | Markova L, Vinopalova M, Najdrova V, Dolezal P. |
| 14h35-14h40 | WeB- P23 | [Novel protein of *Giardia intestinalis* links the function of the mitosomes and the encystation specific vesicles](#p221). | Vinopalová M , Voleman L, Pelc J, Marková L, Najdrová V. Doležal P |

|  |  |  |  |
| --- | --- | --- | --- |
| 14h40-14h45 | WeB- P24 | [Multicentric evaluation of the real-time PCR assay Amplidiag Stool Parasites for Cryptosporidium spp. detection in human stools *Cryptosporidium* National Network](#p201) | Razakandrainibe R., Frealle E. Nourrisson C., Valot S, Dutoit E, , Kapel N., Poirier P. Dalle F., Favennec L., Cryptoanofel Cryptosporidium National Network. |
| 14h45-14h50 | WeB- P25 | [Is oxygen a crucial factor for the survival of *Cryptosporidium* during solar water disinfection?](#p223) | Abeledo-Lameiro, M.J; Campos-Ramos, R; Ares-Mazás, E; Gómez-Couso, H, |
| 14h50-14h55 | WeB- P26 | [Study of DNA repair protein recruitment and chromatin remodeling during DNA Double-Strand Break repair process in *Giardia duodenalis*](#p224) | E͟s͟p͟i͟n͟o͟z͟a͟-C͟o͟r͟o͟n͟a͟, S͟, García-Huerta, E, Bermúdez-Cruz, R.M |
|  |  | **ORAL SESSION AMPHI 350 - DIAGNOSIS AND THERAPY - 2** | 15h00-15h56 Chair : FAVENNEC L. |
| 15h00-15h20 | We-O13 | [Detection of Gia*rdia duodenalis and Cryptosporidium spp*. in stools : Is microcopy still accurate ?](#p227) | Favennec L |
| 15h20-15h32 | We- O14 | [The CerTest VIASURETM PCR simplex and multiplex assays for the detection of *Giardia intestinalis*, *Entamoeba sp* and *Cryptosporidium sp*.: Comparative evaluation with two commercial multiplex PCR kits and routine in-house simplex PCR assay](#p128) | Basmaciyan L, Francois A, Vincent A, Valot S, Costa D, Morio F, Favennec L and Dalle F. |
| 15h32-15h44 | We- O15 | [Auramine-phenol staining and light-emitting diode fluorescence microscopy and a rapid dipstick test for detection of *Cryptosporidium infection*: a diagnostic accuracy study in a university hospital and a rural health centre in Ethiopia](#p229) | Johansen Ø H., Abdissa A, Zangenberg M, Mekonne Z, Eshetu B, Bjørang O, Alemu Y, Sharew B, Langeland N, Robertson L, Hanevik K. |
| 15h44-15h56 | We- O16 | [Integrated selective *Cryptosporidium* EWOD concentrator](#p230) | Lejard-Malki R, Follet J. Vlandas A. Senez V |
| 15h56-16h10 |  | **Coffee break** | 16h10-17h30 Chair : STRIEPEN B. GARGALA G. |
| 16h10-16h30 | We-O17 | [Therapeutic aspects of cryptosporidiosis](#p231) | Gargala G |
| 16h42-16h54 | We- O19 | [New potent and selective anti-*Giardia* compound series](#p233) | Hart CJS, Riches A, Ryan J, Abraham S, Abraham R and Skinner-Adams TS |
| 16h54-17h06 | We- O20 | [Metronidazole drug-resistance in *Giardia*: emerging roles of epigenetic and post-translational modifications and sub-species variation](#p234) | Emery-Corbin SJ, Louise Baker L, Ansell BRE, Mirzaei M, Haynes PA, Lacey E, McConville MJ, Svärd SG, Jex AR |
| 17h06-17h18 | We- O21 | [Developing Therapeutics to Reduce *Cryptosporidium Morbidity* and Mortality Among Children in Low-Resource Settings](#p235) | De Hostos, E. L. |
| 17h18-17h30 | We- O22 | [Parenteral aminoxanide as a novel route to treat cryptosporidiosis](#p236) | Diawara HI Razakandrainibe R, RossignolJF. Stachulski AW, Le Goff L, François A, Favennec L. GargalaG. |

**5. 7th IGCC; CONTEXT**

**5.1. Giardiasis et cryptosporidiosis**

Giardiasis has long been known as a common cause of human diarrhea, especially among travelers. In cattle, it causes diarrhoea and growth retardation in calves, and weight loss by anorexia in adults, and can be a source of human contamination. It is generally sensitive to anti-Giardia duodenalis chemotherapy. However, knowledge of epidemiology and prévention procedures for giardiasis remains notoriously limited, especially as cases of resistance to drug agents are regularly reported.

Human and animal cryptosporidiosis remain a concern.

In humans, cryptosporidiosis was recognized as an emerging disease in the late 1970s in connection with the spread of HIV infection, a poorly controlled cause of immune deficiency before the appearance of combination antiviral therapy. In developed regions, it remains a cause of death in immunodeficient patients, particularly immunosuppressed patients transplanted with solid organs. In less developed regions, cryptosporidiosis remains a cause of morbidity and mortality in young children (the second leading cause of neonatal mortality from diarrhoea worldwide after rotavirus). To date, there is no thoroughly efficient, curative or preventive anticryptosporidial treatment. While cryptosporidiosis remains largely under-diagnosed, epidemiological surveillance centers (such as the Centre National de Référence-Laboratoire expert Cryptosporidioses in France) are gradually being set up particularly in order to detect outbreaks and contribute to their management

In cattle, calf cryptosporidiosis is a major cause of morbidity and mortality due to diarrhoea for which veterinarians and breeders remain helpless. Farm animals, especially cattle, are a major source of parasite spreading and human contamination.

**5.2. Waterborne transmission of *Giardia* et *Cryptosporidium***

*Cryptosporidium* and *Giardia* are ubiquitous, waterborne, anthropozoonotic protozoan pathogens. In the environment, cysts/oocysts diffuse into soils, especially calcareous soils where *Cryptosporidium* oocysts can survive for years. They are resistant to cold and common disinfectants such as bleach. Water of environmental origin is the main source of contamination for humans and livestock (and wild animals), which in turn contaminate the environment. Sources of human water contamination include comsumption and recreational waters (swimming...), as well as food contaminated by watering, and washing water, and outbreaks of foodborne cryptosporidiosis are being reported more and more frequently.

**6. 7Th IGCC ; ACHIEVEMENTS, IMPACT AND PROSPECTS**

**6.1. Scientific breakthroughs and achievements**

The Conference provided an opportunity for researchers to present their recent results, which reflect remarkable progress. The quality of works shared and discussed during the Conference insures important progress for participant laboratories.

The most innovative results ‘(which will be presented by the members of the Scientific Council in an article in preparation to be published in the international journal "Parasite") are as follows:

**6.1.1. *Molecular understanding of the mechanisms of infection and their clinical consequences:*** long-term sequelae of infections (inflammatory bowel diseases such as Crohn's disease)

**6.1.2. *Diagnosis of infections;*** discrepancies between biological diagnostic methods used by laboratories worldwide; differences between sequencing methods, high-throughout sequencng (NSG) allowing the diagnosis of infections by several mixed species while the dominant strain only is determined using the Sanger technique

**6.1.3. *Human and animal epidemiology:***

**-** new sources of potential contamination: fish and seafood, turtles, and travel related contamination pathways (tourists, migrants...)

- in several European countries, recent predominance of *C. hominis* over *C.* *parvum*, and differences between Europe and the rest of the world in parasitic species diversity

- infectivity of *C. hominis* in mice, cattle, kangaroos

- absence of *Giardia* and *Cryptosporidium* carrying bybirds (except *C*. *meleagridis)*

- pregnant cows or cows with a cakf are not the main source of *Cryptosporidium* infection of calves

- genetic stability of *Cryptosporidium* on farms over long periods of time

- confirmed outbreaks of foodborne giardiasis and cryptosporidiosis

- contamination of water supplies by wildlife species and their control to prevent the spread of human and animal infections

- important role of biofilms as reservoirs of parasites in aqueous media

- a "one health" approach to monitoring sources of contamination (humans, animals, environment) for appropriate preventive interventions

**6.1.4. *Treatment and prevention methods***

- protocols for effective treatment of the sources of infection

- promising new therapeutic agents

**6.2. Awareness and impact**

**6.2.1. *Notoriety of the IGCC***

The 7th IGCC has attracted many researchers from research teams all over the world: scientists, doctors, veterinarians. Their number reflected the success of the IGCC and confirmed it in its status as the leading international scientific meeting in the field of giardiosis and cryptosporidiosis.

The 7th IGCC was also recognized for the involvement of its Scientific Council in the selection of candidates for the Huw Smith Award and for its presentation during the Conference.

**6.2.2. *Evaluation of the Conference by participants***

Although the interpretation of the survey results is necessarily limited given the sample selection biases (voluntary participation, status differences (student to senior), geographical diversity, experience of previous scientific meetings, etc.), the responses confirmed the IGCC as a first-class place to meet colleagues from all the world, exchange, and prepare future collaborations.

Except a few questions and indiciduals, the 50 correspondents answered the 10 questions of an anonymous online post-conference evaluation (via SurveyMonkey).

The responses highlighted the following main strengths of the Conference:

1/ the very high scientific level of the presentations

2/ the exhaustiveness and multidisciplinarity of the présentations, from basic science to epidemiological and clinical research

3/ international participation and presence of all recognized specialists

4/ the possibility of meeting and exchanging with other researchers in the field under optimal conditions

5/ catering (meals, etc...), registration fees

6/ the possibility of presenting all papers orally in workshops. This choice, assumed by the Scientific Committee, to allow in particular young researchers to present their results orally (with the award of prizes for the best presentations) has resulted in a particularly high density Conference programme. This was the object of many contradictory, positive and négative remarks relative to the constraints of an extremely dense Conference due to high number of communications (209 in 3 days ½). While some correspondents appreciated the absence of downtime and the importance given to the oresentations of young researchers, others felt that the programme was too tight and suggested alternative procedures (such as presenting the majority of the présentations as posters).

Overall, evaluations were very positive, hence to the question "Organization at meeting, please rate", the answers were 34 "very good" or "good" and 8 "average", the 8 "poor" and the "very poor" being related to point 6/ above.

To the question "Would you recommend the meeting to others? » all correspondents answered "yes" except one whose response was dependent on a change in the presentation process for poster communications.

To the question "Based on this year's conference, would you attend the next IGCC conference?", all correspondents answered « yes » with 5 exceptions, of which 3 indicated an economic incapacity (travel, registration fee), and 2 did not answer. The success of this conference prompted 2 international teams (one from China and one from Australia) to apply for the organization of the next IGCC to be held in 2021.

Details of the survey responses were shared with all members of the Scientific Committee in preparation for the next IGCC.

**6.2.3. *Organizers: Parasitology Laboratories and CNR-Expert Laboratory, University and University Hospital of Rouen***

The Rouen Hospital and University site is associated with the memory of Charles Nicolle, a Parasitologist, to whom we owe in particular the discovery of the agent of toxoplasmosis. As heirs to the pioneering work of researchers from Rouen and Caen on giardiasis and cryptosporidiosis in the 1990s, the expertise of the Rouen teams was recognized by the IGCC Scientific Committee, which entrusted them with the organization of the Conference in 2019. They have demonstrated their ability to successfully organize for the first time in Rouen an important scientific meeting of Biology and Medicine, and for the first time in France an IGCC.

The success of the 7th IGCC strengthens the Rouen University research team in pursuing their works (mechanisms and consequences of infections, epidemiology, anti-cryptosporidian agents), and the Parasitology Laboratory of the University Hospital in its mission as a CNR-Laboratoire expert Cryptosporidioses (collection of epidemiological data and characterization of outbreaks).

It helped to promote the University of Rouen Normandie as a host of high-level scientific meetings.

**6.3.3. *Public and professional impact***

It is noteworthy that in recent food and waterborne outbreaks have attracted renewed interest in giardiasis and cryptosporidiosis from both the health authorities and the general public. Normandy, an important farming and offshore fishing region, with an oceanic climate, karstic geology and coastal rivers, is particularly affected by these waterborne infections, further justifying holding the 7th IGCC in Rouen.

The IGCC has raised awareness among physicians about the frequency and potential severity of these infections, which are generally under-diagnosed and little known. Investigations on these parasites, which, cause high economic loss rates in farms, is driving a growing interest from farmers and veterinarians, as evidenced by the large proportion of participants in the 7th IGCC from teams whose research is focused on infectious animal diseases..

Similarly, the agrifood sector is interested in detecting and preventing contamination by these parasites, a source of recently documented foodborne outbreaks.

**6.3.4. *Economic impact***

For the organisation of the IGCC, Rouen Tourism and Congress and the Organising Committee made extensive use of the skills of local and regional companies, which also benefited from the stay of many participants from all over the world. These participants also frequently had the opportunity to travel in other French regions during the Conference..

The 7th IGCC demonstrated that Rouen, Normandy, is a particularly suitable site for international scientific meetings encouraging further promoting this locationsite, which provides unique academic and professional skills, as a place for international meetings.

Loïc FAVENNEC

Chairman, The 7th IGCC