Academic Institutes

Dr. Adriano Casulli (Project Coordinator)
Istituto Superiore di Sanità - Italy
www.iss.it

Dr. Enrico Brunetti
Università degli Studi di Pavia - Italy
www.unipv.eu

Dr. Maria del Mar Siles-Lucas
Agencia Estatal Consejo Superior de Investigaciones Científicas - Spain
www.csic.es

Prof. Carmen-Michaela Cretu
Spitalul Clinic Colentina Bucuresti - Romania
www.spitalul-colentina.ro

Prof. Okan Akhan
Hacettepe Üniversitesi - Turkey
www.hacettepe.edu.tr

Prof. Kamena Vutova
Hospital for Active Treatment of Infectious and Parasitic Diseases "Prof. I. Kirov" - Bulgaria
www.sbalipb.bg

Prof. Gulay Vural
Namık Kemal Üniversitesi - Turkey
www.nkuen.nku.edu.tr

SMEs

Dr. Paola Cesaroni
Alta Ricerca e Sviluppo in Biotecnologie S.R.L.U. - Italy
www.altaweb.eu

Dr. Arantxa Cortes Ruiz
Vircell S.L. - Spain
en.vircell.com

Dr. Adriano Casulli, PhD
WHO Collaborating Centre for the Epidemiology, Detection and Control of Cystic and Alveolar Echinococcosis;
Department of Infectious Diseases;
Istituto Superiore di Sanità
Viale Regina Elena, 299
00161 Rome
ITALY
adriano.casulli@iss.it

Human Cystic Echinococcosis Research in Central and Eastern Societies

EU contribution: 2,861,500 €
Total costs: 3,879,712 €

www.Heracles-fp7.eu
Heracles - ALLIANCE

HERACLES Consortium is made up of nine partners, of which seven are academic institutions, one is a small-medium enterprise and one is a service provider company. Five countries are represented: Bulgaria, Italy, Romania, Spain, and Turkey. All academic partners are internationally recognised groups with important scientific background in the field of cystic echinococcosis (CE).

The Consortium is supported by the HERACLES extended network which enlarges the capacity of the core partners of the project. The HERACLES extended Network is represented by 60 centres from 30 European and Asian countries. The aim of this network is to support core activities within HERACLES, such as registering patients in the European Register of CE (ERCE), providing parasitic and human blood samples to the Echino-Biobank, and cooperating in research studies on serology and molecular epidemiology of CE. The ultimate goal is to promote health equity on CE providing common background, tools and access to biological and medical knowledge for the centres involved in the HERACLES extended Network.

Heracles - International IMPACT

Current core achievements of HERACLES project during the period 2013-2018 were:

WP1 - BURDEN OF DISEASE
- The biggest research-based abdominal US screenings (2014-15) were conducted on 24,693 people in 50 villages and 15 provinces/distritics of Bulgaria, Romania, and Turkey. Adjusted prevalence of abdominal CE was: 0.41% in Bulgaria, 0.41% in Romania, and 0.59% in Turkey. The estimated number of individuals who may be infected with CE in rural areas is around 7,872 in Bulgaria, 37,229 in Romania, and 106,237 in Turkey. This is the first "original research" ever published by The Lancet Infectious Diseases (2018, Jul;18(7):769-778) on echinococcosis (www.heracles-fp7.eu/heracles_survey.html).
- The prospective, observational, European Register of Cystic Echinococcosis (ERCE) was created as a case series for CE clinical management and public awareness with around 2,000 patients from 30 centres enrolled so far (www.heracles-fp7.eu/erce.html).

WP2 - NEW MOLECULAR-BASED TOOLS
- Creation of the Echino-BioBank as a registered repository of parasitic and human blood samples to standardize research on CE and sustain experimental and clinical studies in this field with around 4,500 biological samples.
- Production, testing and validation of recombinant antigens (B1t, B2t, 2B2t, Ag5t, MDH, CaBP, AFP and DiPol) in ELISA and VirClia© for human serology. These antigens showed better performance than hydatid fluid when tested for the follow-up of patients with CE after treatment and show potential to be included in a Point of Care-Lab on a Chip (PoC-LoC) device.
- Biggest study on genotyping of Echinococcus granulosus strains represented by 742 samples collected from 26 countries.
- First time demonstration of the presence of parasite and host derived exosomes in hydatid fluid from fertile cysts by proteomic analysis (Vet Parasitol. 2017;236:22-33).
- Development of an efficient method to isolate different extracellular vesicles in human plasma and to distinguish proteins enriched in exosomes. Quantitative proteomic analysis identified potential biomarker candidates in plasma samples from patients with CE.

WP3 - HOST-PARASITE INTERPLAY
- Biggest study on genotyping of Echinococcus granulosus strains represented by 742 samples collected from 26 countries.
- First time demonstration of the presence of parasite and host derived exosomes in hydatid fluid from fertile cysts by proteomic analysis (Vet Parasitol. 2017;236:22-33).
- Development of an efficient method to isolate different extracellular vesicles in human plasma and to distinguish proteins enriched in exosomes. Quantitative proteomic analysis identified potential biomarker candidates in plasma samples from patients with CE.

WP4 - BIOAVAILABILITY OF DRUGS
- Health education on CE was provided to local rural communities (citizens, experts, public health authorities, policy makers) through meetings, local TVs, newspaper interviews, advertisements, and informative material during the ultrasound (US) survey sessions.
- Training to general practitioners and specialist physicians on CE were provided to experts working in endemic areas, as they are crucial to fight this disease.
- Peer-reviewed scientific papers published so far: >50 (http://www.heracles-fp7.eu/publications.html)

WP5 - TRAINING AND DISSEMINATION
- Creation of the HERACLES’ Extended Network on cystic and alveolar echinococcosis in animals and humans with 60 centres involved from 30 countries (http://www.heracles-fp7.eu/interactive_map.html).
- Health education on CE was provided to local rural communities (citizens, experts, public health authorities, policy makers) through meetings, local TVs, newspaper interviews, advertisements, and informative material during the ultrasound (US) survey sessions.
- Training to general practitioners and specialist physicians on CE were provided to experts working in endemic areas, as they are crucial to fight this disease.
- Peer-reviewed scientific papers published so far: >50 (http://www.heracles-fp7.eu/publications.html)

The tools developed within HERACLES will support governments, the European Commission and international agencies (ECDC, EFSA, WHO) to harmonize data collection, monitoring and reporting of CE. Results of HERACLES US screenings should be of use to support public health stakeholders to plan interventions, including preliminary cost-benefit analyses, in the perspective of complying with the WHO roadmap for CE control. In addition, laboratory-based results will open new opportunities for the diagnosis and understanding of E. granulosus biology and epidemiology. We see this as a breakthrough in the current scenario of CE.

With the aim of improving surveillance of CE, we encourage governments and international agencies to lobby the European Commission to champion new health policies for the notification of human and animal CE.