

Dipartimento di Sanità Pubblica Veterinaria e Sicurezza Alimentare

Reparto di Zoonosi Virali

PROGETTI DI RICERCA INTERNAZIONALI

EC FP7 Project number: 213178

<http://www.eurovital.org/>



**“Integrated Monitoring and Control of Foodborne Viruses
in European Food Supply Chains”**

Coordinator: Nigel Cook, FERA, UK

Vice Coordinator: Franco Maria Ruggeri, ISS

VITAL is a €3.87M EU-supported project which will provide Europe with a framework for monitoring and risk modeling, and procedures for control of foodborne virus contamination, which will be applicable to any virus, whether existing, emerging or re-emerging, that poses the danger of being transmitted by food.

Scientists will use advanced methods for virus detection throughout selected food supply chains from farm to market, to gather data on virus contamination of food and environmental sources which is suitable for quantitative viral risk assessment. Supply chains will be monitored for the presence of indicator viruses commonly found where faecal contamination has occurred. These viruses can be distinguished into strains of human and animal origin, which will indicate contamination from a specific source. Modeling tools will then be developed to define the quantitative viral risk for each scenario, and to assist in identifying the potential barriers against it. Expert stakeholders from the food industry will provide information on existing control measures, evaluating the new scientific findings and communicating them to the food industry, to help produce food safety guidelines including viral hazard analyses.

EC FP7 Project Number: 211757

http://ec.europa.eu/research/health/infectious-diseases/emerging-epidemics/projects/169_en.html

ARBO-ZOONET

“International Network for Capacity Building for the Control of Emerging Viral Vector Borne Zoonotic Diseases”

Coordinator: Michèle Bouloy, Institut Pasteur, FR

Partner: Franco Maria Ruggeri, ISS

ARBOZOOTNET is a €998,470 EU-supported Collaborative Project with a duration of 36 months (started on May 1, 2008), investigating emerging vectorborne and zoonotic viruses. West Nile (WN) fever, Crimean-Congo haemorrhagic fever (CCHF) and Rift Valley fever (RVF) are arthropod-borne diseases of domestic and wild animals that can affect humans, posing a great threat to public health because of their epidemic et zoonotic potential. Their geographical distribution has expanded greatly in recent decades. WN outbreaks have occurred in Europe, CCHF is endemic in many countries including Europe, and RVF which was endemic/epizootic in the African continent, spread for the first time in Yemen and Saudi Arabia in 2000, causing two simultaneous outbreaks.

The ARBO-ZOONET project aims at creating common knowledge of these diseases, as well as sharing and exchanging data, expertise, experiences and scientific information. The surveillance systems will be maintained and expanded, monitoring disease occurrence and vaccine use. The disease detection and control tools will be introduced, distributed and harmonised. The consortium will also disseminate knowledge and train staff of relevant third countries. The project partners think it is also important to interlink different scientific disciplines which approach the problems from different angles.

<http://www.eurorota.net/>



“Rotavirus Surveillance in Europe: Determining the Diversity of Co-circulating Rotavirus Strains in Consecutive Rotavirus Seasons”

Coordinator: Jim Gray, HPA, UK

Partner: Franco Maria Ruggeri, ISS

EUROROTANET is a network of European laboratories collaborating in a study which will gather comprehensive information on the rotavirus types co-circulating throughout Europe, including both urban and rural settings, and encompassing at least 3 consecutive rotavirus seasons pre-vaccine introduction and 3 post-vaccine introduction.

The aims of EUROROTANET are:

1. Develop methods and algorithms for effective rotavirus typing (G and P) and characterisation (including VP6 and NSP4 genotypes).
2. Describe in detail the molecular epidemiology of rotavirus infections in Europe, during consecutive rotavirus seasons, through genotyping of rotavirus-positive samples collected throughout each country.
3. Monitor the effectiveness of current genotyping methods and respond to evolutionary changes associated with genetic drift and shift.
4. Monitor the emergence and spread of novel rotavirus strains within Europe.
5. Develop the infrastructure that may serve as a platform for future surveillance activities and nested studies for evaluating:
 - The effectiveness of a rotavirus vaccine in the general population, through monitoring the reduction in disease associated with common rotavirus types.
 - The possible vaccine-induced emergence of antibody escape mutants.
 - The possible emergence in the general population of genotypes other than those included in the vaccine.
 - The possible emergence in the general population of reassortants between vaccine and naturally circulating wildtype strains.

ITALY-USA COLLABORATIVE PROGRAMME

“Molecular and Antigenic Evolution of Rotavirus Strains of Human and Animal Origin”

Coordinator: Franco Maria Ruggeri, ISS

The project is aimed at identifying and characterizing rotavirus strains with possible zoonotic potential, and investigates rotaviruses isolated from humans and animals in collaboration with the US NIH, and several other national and international expert laboratories.

Rotavirus is a major cause of severe acute gastroenteritis among children, with a death toll of over 600,000 individuals per year particularly in developing countries and more than two episodes per child before age 5 in industrialized areas. Rotaviruses are also widespread in most animal species, representing the leading cause of neonatal death in bovines. Recent knowledge on the changing molecular epidemiology of rotaviruses with the emergence of new sero/genotypes is a challenge to vaccine development, and urges studies on circulating strains of human and animal origin to identify novel molecular and antigenic variants.

The aims of the project are:

1. Implement the available panels of molecular and immunological tools for rotavirus genotype and serotype characterization.
2. Establish pilot surveillance and virological systems for rotavirus infection in hospitalized children with diarrhea and domestic animals.
3. Build a sero/genotype and genomic sequence database of rotavirus strains for viral evolution studies.
4. Describe the antigenic and genetic diversity of the pool of circulating rotavirus to evaluate the suitability of vaccine formulas.

PROGETTI DI RICERCA NAZIONALI

Ministero della Salute – Direzione Generale
della Ricerca Scientifica e Tecnologica

Ricerca Finalizzata – Programma straordinario

“Sviluppo di un sistema diagnostico per la rilevazione di agenti zoonosici batterici e virali e dei loro fattori di patogenicità da applicare nella filiera di produzione del suino”

Responsabile scientifico: Giacomo Migliorati, IZSAM

Partner: Franco Maria Ruggeri, ISS

Il progetto vede la collaborazione di diversi Enti del SSN e Università, e intende sviluppare un sistema diagnostico in *microarray* per la rilevazione e identificazione di agenti patogeni e loro fattori di patogenicità, da applicare nella filiera di produzione del suino, per monitorare l'igiene del processo produttivo e l'efficacia delle misure igieniche applicate.

In particolare lo studio è focalizzato sulla ricerca di microrganismi a trasmissione zoonotica o emergenti, sia batterici (*Salmonella*, *L. monocytogenes*, *Y. enterocolitica*) che virali (virus dell'epatite E, Rotavirus, Calicivirus enterici del suino).

Gli obiettivi specifici sono:

1. Produzione di anticorpi monoclonali per la concentrazione selettiva dei microrganismi mediante immunocattura dalle matrici.
2. Ottimizzazione delle procedure di estrazione, purificazione e amplificazione di acidi nucleici genomici virali.
3. Validazione della piattaforma *Microarray* con metodi molecolari standard (RT-PCR, Real-time PCR, sequenziamento nucleotidico) ai fini dell'identificazione rapida di virus del suino a trasmissione zoonotica o alimentare.
4. Studi pilota di monitoraggio nei livelli di allevamento (feci), macellazione (tamponi di carcassa), lavorazione (carne fresca) e distribuzione (insaccati crudi o altri RTE).

Ricerca Finalizzata – Programma straordinario

“Valutazione della prevalenza della circolazione di virus influenzali aviari e suini in allevatori e in animali”

Responsabile scientifico: Nicoletta Vonesch, ISPESL

Partner: Livia Di Trani, ISS

La diffusione di virus influenzale A/H5N1 ad alta patogenicità (HPAI) in Europa attraverso gli uccelli migratori, ha aumentato il timore di trasmissione del virus alle popolazioni aviarie domestiche, con conseguente rischio di trasmissione diretta all'uomo, dimostrata dai casi umani di infezione da virus A/H5N1 registrati negli ultimi anni in paesi del Sud Est asiatico e in Europa. Diversi e documentati sono i casi di passaggio all'uomo di virus HPAI, e un'indagine siero-epidemiologica in lavoratori del settore avicolo in Italia nel corso di focolai virus HPAI e a bassa patogenicità (LPAI) ha dimostrato che anche virus LPAI sono in grado di infettare l'uomo.

In tale contesto, il Progetto prevede uno studio diretto a identificare la risposta immunitaria contro virus influenzali aviari in categorie diverse di lavoratori, esposti al rischio per contatto con animali appartenenti sia alle specie aviarie domestiche, che alle specie selvatiche.

Sono previste le seguenti attività:

1. Indagine sierologica diretta all'identificazione di anticorpi specifici verso virus influenzali aviari circolanti in allevamenti delle regioni Veneto, Lombardia ed Emilia e Romagna. La popolazione umana oggetto di studio consisterà di circa 500 addetti del settore avicolo, a contatto con pollame infetto da virus dell'influenza aviaria e di circa 350 soggetti controllo.
2. Studio sulla persistenza di anticorpi verso i virus influenzali nell'uomo. A tal fine, i soggetti del primo campionamento, risultati positivi per la presenza di anticorpi specifici, verranno sottoposti a ulteriori prelievi per determinare la persistenza nel tempo dell'immunità umorale.