



POSITION

Project Title/ Job position title

Surveillance of enterovirus and parvovirus infections in hospitalized neonates/ Pre-doctoral position

Area of Knowledge

Life Science Panel

Medicine, Public Health, Sports Science, Nutrition, Clinical Psychology, Healthcare Management

Research Project/Research Group Description

Background:

Neonatal acquired enterovirus (EV) and infections may lead to a severe sepsis-like disease which can include meningoencephalitis, myocarditis, pneumonia, hepatitis, and/or coagulopathy. Substantial mortality rates have been reported, and long-term sequelae may occur among survivors. Parechoviruses (PeV) belong to the same Picornaviridae family but have been identified more recently. PeV, especially type 3, can cause similar severe neonatal pathologies. Exact incidence of neonatal EV/PeV infections is unknown because surveillance studies are scarce. High pathogenicity in neonates could be associated with absence of maternal neutralizing antibody, specific serotype, different tissue tropism and immature immune system. However, pathologic mechanisms of these viruses, especially PeV-3, are not well characterized. In addition, there are few publications about seroprevalence and host susceptibility factors. Regarding treatment, there is no approved antiviral therapy for these infections. Intravenous immune globulin (IVG) is often administered to infected neonates, but available pharmacokinetic data are limited.

Aims:

The objectives of the project are:

- 1) To know the incidence of EV and PeV by routine testing of hospitalized newborns with clinical suspicion of infection
- 2) To define the clinical features and associated factors of neonatal EV/ PeV infections
- 3) To study the short-term and long-term outcomes of infants who suffered severe EV/PeV infections, and were either treated or not treated with IVG
- 4) To study the infection capacity and tropism of the PeV-3 strains
- 5) To sequence the whole genome of PeV-3 strains detected and define the pathogenic and virulence determinants

The project will be carried out at the La Paz University Hospital (patient recruitment and clinical follow-up), and at the Enterovirus Referral Laboratory of the Spanish National Centre for Microbiology (virological exams), in Madrid.

Job position description

Infectious diseases are the most frequent pathology in childhood. Our group is focused in the study of pediatric infections with special attention to those associated to viruses. Recently picornaviruses, mainly human parechovirus (PeV) and enterovirus (EV) are causing outbreaks



and a variety of neurological infections, morbidity and mortality. Surveillance of these infectious diseases is a public health concern.

This is a collaborative project, framed into IdiPaz that gathers the dynamics of two research groups: Neonatology and Pediatric Respiratory, Systemic and Neurologic Infections & Host Innume Response.

Skills:

Bio-science degrees: medicine, biology, bio-technology, chemistry.

Experience in microbiological laboratory

Personality, manner, and attitude appropriate to working in a collaborative environment

Responsibilities:

At hospital:

- 1) Patient recruitment: screening, enrolment and informed consent procedures
- 2) Collection of biological samples, clinical and epidemiological data. Statistical analyses
- 3) Patients' follow-up (IVG treated and non-treated infants)
- 4) Analysis of clinical factors associated with the host susceptibility

At laboratory:

- 1) Detection and characterization of the EV/PeV infections in biological samples using molecular methods (PCR, sequencing, phylogenetic analysis)
- 2) In vitro infectivity and replication assays in different cell lines (neurological, gastrointestinal, and pulmonary cells)
- 3) Sequencing of whole genome of PeV-3 detected strains by NGS methods.
- 4) Obtaining of PeV-3 infectious clon (reverse). Identification of virulence and pathogenicity determinants

The fellow will also be responsible of preparing presentations for seminars or congresses and write scientific reports about the main results of the study.

GROUP LEADER

Title: PhD

Full name: Cristina Calvo

Email: ccalvorey@gmail.com

Research project/Research group website:

<http://idipaz.es/PaginaDinamica.aspx?IdPag=53&Lang=EN>