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OMICS Group has organized 500 conferences, workshops and national symposiums across the major cities including San Francisco, Las Vegas, San Antonio, Omaha, Orlando, Raleigh, Santa Clara, Chicago, Philadelphia, Baltimore, United Kingdom, Valencia, Dubai, Beijing, Hyderabad, Bengaluru and Mumbai.
Expression of cytokines in tissues and correlation with histopathological changes in dengue fatal cases from Brazil

Dr. Marciano Viana Paes
Research in Public Health

Laboratory of Biotechnology and Physiology of Viral Infections /IOC/FIOCRUZ
Dengue

- Etiological agent: dengue virus
- Serotypes: DENV-1, DENV-2, DENV-3, DENV-4
- Genus: Flavivirus
- Family: Flaviviridae
- Transmitting agent of the disease: Aedes aegypti
Countries / areas at risk of dengue transmission 2012 (WHO)

2011 (Introduction of DENV4)

2012 (January / March)
Nearly 77,000 reported cases


Clinical Aspects

Dengue with or without Warning Signs

Asymptomatic

Symptomatic

Fever undifferentiated

Dengue fever (DF)

Dengue Hemorrhagic (DHF)

Dengue with Complications

Severe dengue

Without hemorrhage

With hemorrhage unusual

Without shock

With Shock Syndrome (DSS)
Main Symptoms:
- fever
- headache
- retro-orbital pain
- vomit
- myalgia
- joint pain
- arthralgia
- rash

Main Symptoms:
- hemorrhagic manifestations
- thrombocytopenia
- hepatomegaly
- fluid accumulation
- alterations of consciousness
- heart failure
Pathology of the DENV

Replication
- monocytes/macrophages
- and dendritic cells

Endothelial cells → Tissue Mφ → Liver → Bone marrow/stromal cells

Hemorrhage
Plasma Extravasation
Shock

Apoptosis and necrosis
Production of chemical mediators and cytokines
Suppression of hematopoiesis
Activation of lymphocytes

Endothelial dysfunction (vascular permeability)
Clotting disorder
Cytokine storms

Modified from Martina et al., 2009
The study of histopathology aspects is difficult in dengue of fatal cases

- Studies with autopsies in fatal cases have been performed in only a small number of these patients, all over the world, specially in Brazil.
C.A. Basílio-de-Oliveira1, G.R. Aguiar3, Baldanza M.S.3, O.M. Barth2, W.A. Eyer-Silva1 and M.V. Paes2

1- Gaffrée and Guinle Teaching Hospital, Federal University of Rio de Janeiro; 2- Virology Department, Oswaldo Cruz Institute, Fiocruz-RJ; 3- São Vicente Hospital; Rio de Janeiro, RJ, Brazil
Pathological changes

Basilio-de-oliveira et al., 2005
Histopathological changes and viral antigens

Isolation of DENV-3 C6/36

Basilio-de- oliveira et al., 2005
The pathology of dengue in human fatal cases regarding histopathology, ultrastructure and virus replication in multiple organs.

Póvoa TF\textsuperscript{1}, Alves AMB\textsuperscript{1}, Basilio-de-Oliveira CA\textsuperscript{2}, Nuovo GJ\textsuperscript{3}, Chagas VLA\textsuperscript{4} and Paes MV\textsuperscript{1}*
Histopathology and Ultrastructural aspects: Liver

Póvoa et al., 2014, Plos One
Replication: liver

Imunohistochemistry anti- DENV (NS3)

In situ Hybridization (with RNA negative strand)

control  DENV

Póvoa et al., 2014, Plos One
Replication: lung

Imunohistochemistry
anti- DENV (NS3)

In situ Hybridization
(with RNA negative strand)

Póvoa et al., 2014, Plos One
Histopathology and Ultrastructural aspects: Heart

Povoá et al., 2014 Plos One
Replication: Heart

Imunohistochemistry anti- DENV (NS3)

In situ Hybridization (with RNA negative strand)

Póvoa et al., 2014, Plos One
Histopathology and Ultrastructural aspects of kidney

Póvoa et al., 2014, Plos One
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