

**P0072**

**Paper Poster Session**

**Emerging and pre-emerging viruses**

**Possible aetiology of Guillain-Barré syndrome following a Zika epidemic in French Polynesia: analysis of 42 cases**

Jean Neil<sup>1</sup>, Valerie Choumet<sup>\*2</sup>, Susan Halstead<sup>3</sup>, Emmanuel Fournier<sup>4</sup>, Frederic Ghawche<sup>5</sup>, Stephane Lastere<sup>5</sup>, Hugh Willison<sup>3</sup>, Lucile Musset<sup>4</sup>

<sup>1</sup>*Hôpital Pitié Salpêtrière, Paris, France*

<sup>2</sup>*Pasteur, Infection Epidemiology, Paris, France*

<sup>3</sup>*Institute of Infection, Immunity and Inflammation, Glasgow, United Kingdom*

<sup>4</sup>*Groupe Hospitalier Pitié-Salpêtrière, Paris, France*

<sup>5</sup>*Centre Hospitalier Territorial de la Polynésie Française, Papeete, French Polynesia*

**Background:** Since October 2013, the largest documented outbreak of Zika virus (ZIKV) infection was recorded in French Polynesia (FP). Immediately after this epidemic, an unexpected number (42 cases) of Guillain-Barré Syndrome (GBS) were hospitalized in Papeete hospital. The monthly rate showed a clear increased incidence from baseline (15 cases for 100,000 persons) since the global rate of GBS is 0.6–4/100,000 person/year worldwide. EMG assessments were consistent with acute motor axonal neuropathy (AMAN). Moreover, since February 2013, a dengue serotype 3 (DENV3) epidemics is spreading in FP. Besides, given the crossreactive immune response between DENV and ZIKV, serological diagnosis of ZIKV infection and of previous expositions to any DENV serotype could not be established for all these patients. This cross reactivity is the evidence of this sequential infection. Our study focuses on the consequences of this sequential infection as etiological basis of this neurological syndrome, which may probably involve both humoral and cell-mediated immune responses mediated by antibody dependent enhancement phenomenon (ADE).

**Material/methods:** Electrophysiological assessment was performed using standard electromyography.

Current biology and serological tests about usual aetiologies of GBS were performed. The sera of these 42 patients, and 20 sera from Polynesians healthy donors, were tested in two different laboratories against glycolipids of the myelin sheath, by two different approaches:

- an ELISA test against a panel of single gangliosides
- a new combinatorial microarray able to identify antibodies to 78 different heteromeric glycolipid complexes and their 13 individual glycolipid components.

Sera from GBS patients, showing reactivity against gangliosides were tested by Western Blot towards viral proteins (ZIKA and DENV) and compared with sera from patients with isolated positive serology DENV without neurological disorder.

Sera were collected and tested at the onset of the neurological impairment (T0) and, 3 months later (T90).

**Results:** The clinical phenotype of the GBS patients' group was an acute motor axonal neuropathy (AMAN). By ELISA, 23 sera had reactivity against different gangliosides, including GA1. By combinatorial microarray, 15 patients and 1 control had significant level binding to single glycolipids and/or glycolipid complexes in which GA1 was also detected.

**Conclusions:** We report the absence of molecular mimicry mechanism as the aetiological basis of neurological syndrome. We consider the occurrence of an immunological relationship between these arboviral infections and GBS, based on the following parameters: clinical feature (all GBS were AMAN), ethno specificity (all patients are Polynesians from Asian lineage), and sequential infections (DENV3 epidemics occurred before ZIKV epidemics for all GBS patients). We propose that the "antibody dependent enhancement" (ADE) phenomenon, characteristic of flavivirus infections might be involved in the development of GBS, which is probably a complication of ZIKV concomitantly with the circulation of DENV serotypes.