SYMPOSIUM OVERVIEW:
ZIKA VIRUS DIAGNOSTICS: PITFALLS AND SOLUTIONS

Since it is difficult to differentiate Zika virus (ZIKV) infections clinically from infections with dengue and chikungunya viruses, which are endemic in the same geographical regions, specific test systems are imperative. In laboratory testing, serology is an important supplement to direct detection and provides a much longer diagnostic window. A newly developed ELISA for the detection of anti-ZIKV antibodies shows unmatched specificity towards other flavivirus infections and a sensitivity of up to 100% (if IgM and IgG antibodies are evaluated in parallel). In this symposium approaches for the serological detection of Zika virus infections are discussed and scientific data on the highly specific Anti-Zika-Virus ELISA are presented.

ANTI-ZIKA VIRUS ELISA BASED ON NS1 REVEALS VIRTUALLY NO CROSS-REACTIVITY WITH OTHER FLAVIVIRUS INFECTIONS OR VACCINATIONS

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Introduction: The causal link between Zika virus (ZIKV) infection and neurological implications (Guillain-Barré syndrome, microcephaly in unborn children) requires reliable diagnostics for this infectious disease. Serodiagnosis has been challenging due to a high degree of cross-reactivity between antibodies against flaviviruses. We aimed at developing serological diagnostics which perform sensitive and maximum specific even in patients with a history of other flavivirus infections and/or vaccination.

Method & Materials: Sera from 29 ZIKV-infected patients, characterised by the Bernhard-Nocht Institute for Tropical Medicine, and 799 healthy individuals as well as a panel of 299 samples with high titer IgM and/or IgG against Dengue, West Nile, Japanese encephalitis, Yellow fever, Tick-borne encephalitis or Chikungunya virus due to infection or vaccination were tested for anti-ZIKV IgM and IgG using an ELISA (Euroimmun AG) based on recombinant ZIKV non-structural protein 1 (NS1).

Results: Among 29 patients with ZIKV infection, 28 revealed anti-ZIKV IgM and/or IgG, yielding a combined sensitivity of 96.6% and a specificity of 99.7% for either Ig class with respect to healthy individuals. 297 out of 299 samples having IgM and/or IgG against other flaviviruses or Chikungunya virus were tested negative for anti-ZIKV antibodies; only one sample for IgM (anti-West Nile virus) and one for IgG (anti-Japanese encephalitis virus) revealed a positive result yielding a specificity of 99.7% for both IgM and IgG.

Conclusion: ELISA based on recombinant ZIKV NS1 antigen turned out to be highly sensitive and almost 100% specific for serological diagnosis of acute and past ZIKV infections even in patients who have been previously exposed to other flaviviruses by infection or vaccination. Notably, samples from patients with Dengue virus

infection did not show any cross reactivity with the anti-ZIKV ELISA, irrespective of the disease stage and IgM and IgG titers.