Virus Receptors and Entry

0007

Integrins modulate the entry efficiency of West Nile virus into cells

*K. Schmidt[1], M. Keller[1], M. H. Groschup[1]

[1]Friedrich-Loeffler-Institut, INNT, Greifswald-Insel Riems, Germany

Background and question: The underlying mechanisms allowing West Nile virus (WNV) to replicate in a large variety of different arthropod, mammal and bird species are largely unknown but are believed to rely on highly conserved proteins relevant for viral entry and replication. Consistent with this, a previous study had postulated that integrin αvb3 functions as the receptor for WNV. However, its involvement in WNV entry has been doubted recently. The present study was designed to clarify the involvement of integrins in WNV entry.
Methods: A cell culture model was established based on specific integrin knock-out cell lines which possess a modification in the particular integrin subunit genomic sequence. Wild type and specifically integrin-deficient mouse fibroblasts lacking the integrin subunits αv, β1 or β3, respectively, allowed (i) studying the involvement of integrins, (ii) identification of the particular integrin subunit involved, and (iii) addressing their function in WNV entry. Additionally, the extent to which integrins participate in virus entry and possible differences in the binding or entry efficiencies in distinct WNV strains were investigated.
Results: All cell lines were permissive, to different extents, however, for the WNV strains used. Results clearly demonstrated that the expression of β1 and β3 integrins affected virus yields significantly positive, as it was seen in integrin β3-rescue and integrin β1-floxed cells. Efficiency of binding to the cells was not affected by integrin expression.
Conclusion: Findings strongly suggests αvβ3 integrins to be involved in WNV entry into cells. However, integrins obviously do not function at the level of WNV binding to the cell surface but rather downstream during entry or in post-entry stages.

Corresponding author:
Katja Schmidt
katja.schmidt@fli.bund.de