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Integrins as cellular receptors for West Nile virus

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The underlying mechanisms allowing *West Nile virus* (WNV, Flaviviridae) to replicate in a large variety of different arthropod, mammal and bird species are largely unknown. Attachment to cell surface receptors as initial interaction of the virus with its host cell is discussed to partly determine cell and host tropism. A factor for the broad host range is presumably embedded in highly conserved proteins relevant for viral entry and replication. Only few studies have addressed this issue with regard to receptor usage by WNV. The study by Chu and Ng, 2004, suggested the importance of integrin αvβ3 as a putative receptor for WNV, whereas Medigeshi et al., 2008, concluded from their data that WNV entry is independent of integrin αvβ3.

The objective of our study is to identify factors which determine the susceptibility of vertebrate species to WNV infection, starting with receptor binding and virus entry. A cell culture model was established to clarify the potential role of integrins as receptors for WNV. Embryonic mouse fibroblasts lacking either the integrin subunit αv, β1 or β3 and wildtype cells were isolated and infected with four different WNV strains representing two lineages. All cell lines were permissive but showed significant differences in virus replication capacity compared to wildtype cells. Replication efficiency also depended on the specific WNV strain and had no correlation with the lineage. Current investigations are aimed at the functional rescue by expressing the missing integrin subunit in the corresponding cells. Additionally, the possible participation of heparan sulfate in WNV binding is addressed.

Chu, Justin Jang-Hann and Ng, Mah-Lee, (2004), J Biol Chem. 279,54533
Medigeshi, Guruprasad R., et al., (2008), J Virol. 82,5212