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A quantitative and histopathological analysis of West Nile virus infection in the central nervous system of mice with and without disease

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Our previous research has shown that West Nile disease differs between inbred mouse strains. We hypothesized that mice with subclinical infection would have lower viral titers, faster viral clearance, and fewer lesions in central nervous system (CNS) tissue than mice with disease. Viral load and histopathologic results were compared between tissues from C57BL/6 (B6) mice, a strain more resistant to disease, and C3H mice, a more susceptible strain. Fifty-two mice of each strain were inoculated subcutaneously with 10^3 PFU West Nile virus (WNV). Six to eight mice from each strain were sacrificed based on clinical score on days 7, 8, 9, 10, and 14 post-inoculation (p.i.). Of the total mice sacrificed at each time point, three were subclinical, and three to six exhibited clinical signs. CNS tissues were harvested for viral titration and histopathology. We have previously shown that neuroinvasion occurs in all mice 3 days p.i. with similar kinetics in both strains up through day 7 p.i.. After 8 days p.i. diseased mice had greater viral titers when compared to subclinical mice, especially in the more susceptible C3H strain. Virus persisted in the CNS of all mice up to day 14 p.i.. Encephalitis was observed in both clinical and subclinical mice and was most frequent in B6 mice. In summary, WNV was detected in the CNS of all mice, but greater viral titers and decreased histologic lesions were observed in mice with disease. These data suggest that viral load in the CNS correlates with disease severity, but not pathology.