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Canine distemper: Early immune responses in the CNS (14-Aug-1999)

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Abstract
Initial non-inflammatory demyelination in canine distemper virus infection (CDV) develops against a background of severe immunosuppression and is therefore thought to be virus induced. However, recently we found a marked invasion of T cells throughout the central nervous system (CNS) in dogs with acute distemper despite drastic damage to the immune system. In the present study we attempted to find an explanation for this phenomenon. This was done by immuno-phenotyping of lymphocytes, especially different T cell subsets in peripheral blood, cerebrospinal fluid (CSF), lymphnodes and CNS tissues following experimental CDV challenge in vaccinated and non-vaccinated dogs. The vaccinated dogs developed viraemia, but in contrast to unprotected dogs were not immunosuppressed and exhibited a strong antiviral immune response following challenge with the virulent CDV. In unprotected dogs rapid and drastic lymphopenia was initially due to depletion of T cells. B cell depletion occurred later and was less pronounced. CD4+ T cells were more sensitive and depleted earlier and for a longer time than CD8+ cells in peripheral blood. T cells invaded the CNS. In the unprotected dogs we could observe an increase in the T cell to B cell and CD8+ to CD4+ ratios in the CSF already 6 days PI. In addition the number of T cells in the CNS parenchyma had increased significantly in all dogs as compared to normal controls. In conclusion, the present study has shown that the CD8+ lymphocyte population is relatively protected in CDV infection. This observation helps to explain why an intrathecal T cell response can occur despite detrimental damage to the immune system. Upregulation of T cells in the CNS could to a certain extent be explained by CDV induced T cell activation, since this phenomenon was also seen in challenged protected animals. T cell activation alone is, however, not sufficient to cause massive intrathecal surge of T cells as observed in demyelinating lesions. The latter appears to require expression of CDV in the nervous system.