Caspase-3/-8/-9, Bax and Bcl-2 expression in the cerebellum, lymph nodes and leukocytes of dogs naturally infected with canine distemper virus

H.L. Del Puerto¹, A.S. Martins², L. Moro¹, A. Milsted³, F. Alves², G.F. Braz⁴ and A.C. Vasconcelos¹

¹Departamento de Patologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brasil
²Departamento de Fisiologia e Biofísica, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brasil
³Department of Biology, University of Akron, Akron, OH, USA
⁴Escola de Veterinária, Departamento de Medicina Veterinária Preventiva, Universidade Federal de Minas, Belo Horizonte, MG, Brasil

Corresponding author: H.L. Del Puerto
E-mail: helendelpuerto@hotmail.com

Received October 22, 2009
Accepted November 17, 2009
Published January 26, 2010

ABSTRACT. Canine distemper is an immunosuppressive disease caused by the canine distemper virus (CDV). Pathogenesis mainly involves the central nervous system and immunosuppression. Dogs naturally infected with CDV develop apoptotic cells in lymphoid tissues and the cerebellum, but this apoptotic mechanism is not well characterized. To better understand this process, we evaluated the expression of Bax, Bcl-2, and caspase-3, -8 and -9, by evaluating mRNA levels in the peripheral blood, lymph nodes and cerebellum of CDV-infected (CDV+) and uninfected (CDV-) dogs by real-time polymerase chain reaction (PCR). Blood samples from 12 CDV+ and 8 CDV- dogs, diagnosed by reverse transcription-PCR, were subjected to hematological analysis and apoptotic gene expression was evaluated using real-time-PCR. Tissues
from the cerebellum and lymph nodes of four CDV+ and three CDV-
dogs were also subjected to real time-PCR. No significant differences
were found between CDV+ and CDV- dogs in the hemotological results
or in the expression of caspase-3, -8, -9, Bax, and Bcl-2 in the peripheral
blood. However, expression of Bax, caspase-3, -8 and -9 was significantly
higher in the cerebellum of CDV+ compared to CDV- dogs. Expression
of caspase-3 and -8 was significantly higher in the lymph nodes of CDV+
compared to CDV- dogs. We concluded that infection with CDV induces
apoptosis in the cerebellum and lymph nodes in different ways. Lymph
node apoptosis apparently occurs via caspase-3 activation, through the
caspase-8 pathway, and cerebellum apoptosis apparently occurs via
caspase-3 activation, through the caspase-8 and mitochondrial pathways.

**Key words:** Apoptosis; Canine distemper virus; Caspases;
Cerebellum; Lymph nodes; Real-time PCR