

## Relationship between general and type 2 parvovirus-specific passive immune transfer in puppies

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*Dr. Hanna MILA<sup>1</sup>, Dr. Aurélien Grellet<sup>1</sup>, Dr. Alexandre Feugier<sup>2</sup>, Dr. Costantina Desario<sup>3</sup>, Prof. Nicola Decaro<sup>3</sup>, Prof. Canio Buonavoglia<sup>3</sup>, Dr. Claire Mariani<sup>2</sup>, Prof. Sylvie Chastant Maillard<sup>1</sup>*

*1. NeoCare, Reproduction, Ecole Nationale Vétérinaire, UMR INRA/ENV 1225 IHAP, Toulouse, France, 2. Royal Canin, Aimargues, France, 3. University of Bari*

### Introduction

Colostrum is the major source of passive immunity in dogs, as only 5-10% of serum maternally derived antibodies acquired before two days of age originate from the transplacental transfer. Passive immune transfer is usually evaluated via serum immunoglobulin G concentration (IgG) and not by the evaluation of antibodies against specific pathogens, such as i.e. canine parvovirus type 2 (CPV2). **This study aimed to evaluate the relationship between global immunity (serum IgG concentration) and specific immunity (serum CPV2 antibody titer) in puppies at 2 days of age and at the immunological gap (28 days of age).**

### Materials and methods

A total of 169 puppies from 34 litters (14 breeds) within one multi-breed kennel were included in this study. Circulation of CPV2 within the kennel was proven. Blood was collected from puppies from the jugular vein, at 2 and 28 days of age. Haemagglutination inhibition test was performed on serum in order to evaluate the serum CPV2 specific maternally derived antibody titer (CPV2 MDA). CPV2 antibody titer at Day 2 >1:160 was considered as the minimal protective titer[1]. Serum IgG concentration [IgG] was assayed by ELISA (Dog IgG Quantitation Kit, Bethyl Lab, Montgomery, USA); [IgG] >2.3 g/L was considered as the minimal protective concentration[2]. Spearman's rho test was used to evaluate relationship between [IgG] and CPV2 MDA and khi2 was used to compare prevalence of protection against CPV2.

### Results

Among 169 puppies included in the study, 151 survived until Day 2 (89.3%), and 127 survived until Day 28 (75.1%).

At D2, median [IgG] was 6.0 g/L [interquartile range: 3.6; 9.9 g/L] and CPV2 MDA was 1:320 [1:80; 1:640] with moderate correlation between both parameters ( $\rho=0.71$ ;  $p<0.001$ ). Prevalence of deficit in passive immune transfer was 17.9% (27/151). Among puppies with [IgG]  $\leq 2.3$  g/L, all (100%) were below the minimal protective CPV2 MDA level vs 29% (36/124) of puppies with [IgG] >2.3 g/L ( $p<0.001$ ). Among puppies with CPV2 MDA <1:160 ( $n=63$ ; 41.7% of the puppies), 42.8% were in global deficit of passive immune transfer ([IgG]<2.3 g/L).

At D28, median [IgG] was 1.7 g/L [1.4; 2.0 g/L] and CPV2 MDA titer was 1:40 [1:20; 1:80], with no correlation observed between the two parameters ( $\rho=0.14$ ;  $p=0.91$ ). Only 13.4% of puppies were still protected against CPV2.

### Conclusion

This study confirms the high prevalence of deficit of passive immune transfer in puppies, general and specific. It also highlighted a large variation in both parvovirus specific antibody transfer and global IgG transfer among puppies as early as 2 days after birth. Identification of puppies in general passive immune transfer by IgG assay is a non sensitive method to identify puppies in immune deficit regarding CPV2.

[1] Mila et al. *J Nutr Sci* 2014; 3(e54): 1-4. [2] Mila. et al. *Prev Vet Med* 2014; 116: 209-213

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