



Hanna Mila,
Aurélien Grellet,
Sylvie Chastant-Maillard

NeoCare, Reproduction,
Toulouse National
Veterinary School, Toulouse
and CRECS, L'Isle Jourdain
France

h.mila@envt.fr

IMPORTANCE, COMPOSITION AND QUALITY OF CANINE COLOSTRUM

Introduction

Puppy and kitten survival over the first weeks is particularly dependent on colostrum, a specific secretion of the mammary gland produced during the first 2 days post-partum. The objective of this abstract is to describe its composition, quality and specific role for the newborn dog.

Colostrum composition

Colostrum is a source of nutrients and energy but also immune compounds, hormones and growth factors. However, its definition is based on immunoglobulins concentration. Indeed, the level of different classes of immunoglobulins changes during lactation, with almost 70% of IgG and 30% of IgA at the first day of lactation, and almost 80% of IgA and only 10% of IgG at the end of lactation ⁽¹⁾. Also, other compounds vary depending

*Table 1: Changes in the composition of canine mammary secretion during lactation (Adkins et al., 2001; *unpublished data).*

Nutrients	Day of lactation				
	1 Colostrum	3 Milk	7 Milk	14 Milk	21 Milk
Proteins (g/L)	143.0	102.3	81.7	66.8	68.4
Immunoglobulines G (g/l)*	23.8		5.9	0.6	0.6
Fat (g/L)	132.2	137.2	132.1	118.5	112.5
Lactose (g/L)	16.6	29.3	35.4	39.9	39.4
Calcium (mg/L)	1363	1366	1773	1950	1929
Phosphore (mg/L)	935	914	1166	1175	1359
Energy (kCal/L)	1831	1761	1657	1493	1444

on the stage of lactation (Table 1 ⁽²⁾), with higher protein level and higher energy provided to the newborn in colostrum compared with mature milk. Colostrum also contains non-specific antimicrobial factors such as lactoferrin, lysozyme or cytokines. Also, colostrum is rich in white blood cells. Finally, high concentrations of hormones are found in this specific mammary secretion: cortisol, thyroxine, insulin and growth hormones.

Colostrum role

One of the major role of the colostrum is energy supply. Thanks to its particularly high fat content compared with other domestic species, colostrum allows for body temperature maintenance. It provides also energy for glucose maintenance, locomotion and digestion. Finally, adequate energy intake via colostrum permits also correct body development.

Other important role of the colostrum is the passive immune transfer. In endotheliochorial dogs, only about 5-10% of immunoglobulins are of transplacental origin. Thus, majority of passive immunity is obtained after birth, via colostrum intake. Besides immunoglobulins, it provides puppies with other immune compounds, all together protecting highly susceptible newborn dog from septicemia and death. Indeed, our study demonstrates that the risk of neonatal death in puppies with passive immune failure (blood IgG at Day 2 <230 mg/dl) is 4-fold higher than in puppies with correct passive immune transfer ⁽³⁾.

Besides energetic and immune role, colostrum contributes also to the digestive tract maturation. Indeed, thanks to hormones, such as insulin and growth factors, puppies receiving colostrum had 42% increased mucosal weight compared with milk replacer fed puppies, dramatically improving their food intake, digestion and nutrients absorption ⁽⁴⁾.

Colostrum quality

Although maternal colostrum is the best nutritional solution for the newborn dog, its quality varies strongly among bitches and even among mammary glands within one

given bitch. Indeed, our studies demonstrate that the variability in IgG among bitches is of about 40% and that of the fat content of 47% ⁽¹⁾. One could imagine evaluation of the colostrum quality prior to the colostrum intake. Unfortunately, to date no easy-to-use test is available for veterinarians or breeders in order to test the canine colostrum in terms of immunological or nutritional quality.

Although the quality of canine colostrum varies strongly among bitches, colostrum intake is crucial for puppies' survival. Breeders should thus be encouraged to ensure colostrum ingestion right after birth in all puppies, as this seems to be the best strategy to decrease the level neonatal losses in breeding kennels.

References

- 1 Chastant-Maillard S, Mila H. Canine colostrum. *Veterinary Focus* 2016; 26.1:32-38.
- 2 Adkins Y, Lepine AJ, Lonnerdal B. Changes in protein and nutrient composition of milk throughout lactation in dogs. *Am J Vet Res* 2001;62(8):1266-1272.
- 3 Mila H, Feugier A, Grellet A, Anne J, Gonnier M, Martin M, Rossig L, Chastant-Maillard S. Inadequate passive immune transfer in puppies: definition, risk factors and prevention in a large multi-breed kennel. *Prev Vet Med* 2014;116(1-2):209-13.
- 4 Paulsen DB, Buddington KK, Buddington RK. Dimensions and histologic characteristics of the small intestine of dogs during postnatal development. *Am. J. Vet. Res.* 2003;64:618-626.