Potential uses of lamellar bodies to assess canine fetal lung development
R. Scott Dove
Companion Animal Clinic, Gainesville, VA

Introduction
In 1988, Stuart Dubin used light scattering to study the refraction index of human amniotic fluid as a measure of fetal lung maturity (FLM). His observations led to the determination of lamellar body (LB) number density. Further study also indicated that lamellar bodies are similar in size to platelets.

Surfactant production is a critically timed event in late gestation. Surfactant is composed of roughly 90 percent phospholipids and 10 percent protein, and it is packaged into the layered storage granules known as LBs. The determination of the LB count in the amniotic fluid of the canine preterm fetus or in the amniotic fluid of a newborn or in the amniotic fluid that has pooled in the vaginal canal due to membrane rupture could help in the assessment and management of pregnancy, delivery and supportive care of the neonate.

In humans, neonates born late preterm or at term by elective cesarean before onset of labor are more likely to develop respiratory distress than those born vaginally. All corticosteroids can stimulate the synthesis and release of surfactants into the alveolar spaces. Corticosteroids also reduce neonatal intraventricular hemorrhage. Administration of corticosteroids to women in this risk category is the standard of care to reduce neonatal morbidity by reducing respiratory distress and atelectasis as a result of insufficient pulmonary surfactant.

Several positive factors favor the use of LB count in the management of canine pregnancies. Because LBs are the size of platelets, the platelet channels of many standard hematology analyzers are capable of accurate measurements. This makes the measurement widely available with a low degree of technical difficulty. Further, the test requires a low volume of fluid, it has a rapid turn-around time, and it has a low associated cost.

The Clinical and Laboratory Standards Institute (CLSI) approved the guidelines for LB count in November 2011, found in CLSI document C58-A.

Bitches are, at times, presented with an impending delivery and no accompanying history of progesterone or luteinizing hormone level determinations at the time of breeding. Therefore there is no accurate determination of a whelping date. Lamellar body count may be helpful in the decision to delay the labor, allow a try at natural delivery, or proceed with a cesarean section. Lamellar body count could also have a role in determining the level of medical care required in newborns that are delivered and appear preterm. Decisions regarding antibiotic therapy, oxygen therapy and corticosteroid therapy could be more accurate with LB count data.

The aim of this investigation is to determine if LB count might be useful in clinical practice.

Keywords: Lamellar body count, fetal lung maturity, neonatal management