# Ovulation Timing and Preventing Fading Puppies

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The causes of "Fading Puppy Syndrome," where puppies inexplicably begin to fail and die within a few days of birth, is still poorly understood. Breeders valiantly try heroic measures to save the puppies - a few puppies might make it, but many, if not most, may still slip through a breeder's fingers like so many grains of sand.

But new research about dogs, combined with established knowledge about farm animal breeding, has led to new ideas that could stop **some** cases of Fading Puppy Syndrome before they start.

Most mammals (animals that drink their mother's milk as babies) are born with incomplete immune systems. They are not capable of developing their own immunity and they would almost certainly die unless they got immunity from an external source. So they rely on "passive immunity" to survive. Passive immunity simply means immunity derived from another individual.

Human babies acquire passive immunity while still in the womb. The maternal antibodies cross the placenta to the infant, and the baby is born with some protection from disease. Dogs have a different method of granting passive immunity to their offspring. Puppies (like calves, piglets, foals, and kittens) receive little or no maternal antibodies while in the womb – little or no maternal antibodies cross the placenta to the puppies, and the puppies are born with very little or no immunity to disease. They rely on drinking their mother's colostrum after they are born to gain the antibodies they need to survive.

**Colostrum – It's a Two Part Story**

Just to review, colostrum is the first milk the bitch produces in the first few hours after whelping. One of colostrum's principal functions is to pass on maternal antibodies to the puppies. Whatever the bitch has immunity to, her puppies will also have immunity to, if they drink her colostrum in a timely fashion. There's a big catch, however. The reality is that "gut closure" (the time when the puppies' intestinal walls close and are no longer able to absorb colostrum) begins within just a couple of hours of birth. In a recent study, 22 Beagle puppies were given colostrum at 0, 4, 8, 12, or 24 hours after birth. The puppies' immunoglobulins were measured, and the results are startling:

- There was a significant fall off in absorption of immunoglobulins after only four hours after birth.
- Absorption fell steadily with each hour.
- By the time the puppies were 12 hours old, there was very little, if any, absorption of immunoglobulin.

The takeaway? Your ***goal*** is to get every puppy nursing on colostrum within the first four hours of his life. But, it is also ***crucial*** that each puppy actually ingests the colostrum in the first 12 hours of life.

**How Crucial is Colostrum Ingestion?**

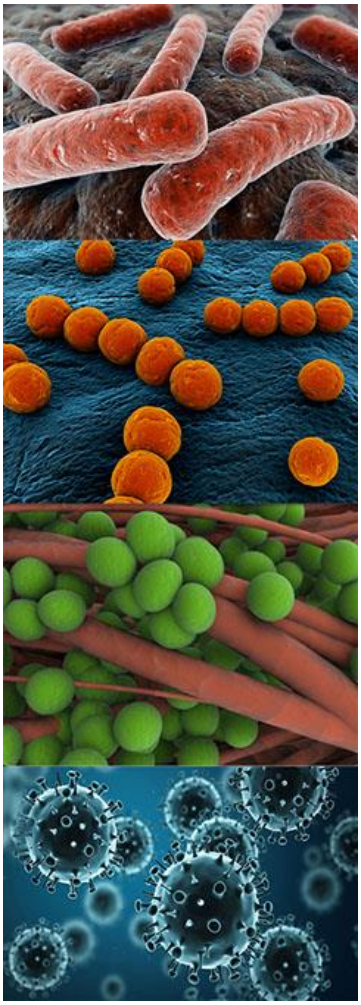
A 2014 study by Royal Canin looked at the correlation between how many antibodies a puppy had at two days old (serum immunoglobulin concentration) and the neonatal death rate. The results are dramatic and quite clear - low antibody levels at two days old have a very strong correlation with neonatal death rate. 195 puppies from 34 litters of 12 different breeds in a French breeding facility were included in the study. Blood was drawn on the puppies at two days old and antibodies measured. The correlation between neonatal survival and antibody levels at two days old is striking:

- 95% of the puppies with antibody levels above 230 mg/dl at two days old survived to three weeks old.
- Only 56% of puppies with antibody levels below 230 mg/dl at two days old survived to three weeks old.

**Why Should This Matter So Much?**

"Fading Puppy Syndrome" is a catch all phrase applied to any neonatal puppy that dies from unknown and uncontrollable causes. There are lots of reasons a puppy might "fade" including congenital abnormalities, constipation, chilling, hypoglycemia, inadequate maternal care and/or lack of competent breeder or veterinary intervention. But the Royal Canin study seems to indicate that the lion's share of fading puppies are fading because their low antibody levels made them unable to fight off routine viruses and bacteria to which all puppies are exposed at birth.

**The "Big Four"**



In the Royal Canin study, 91% of neonatal deaths occurred in the first week of life, which is a typical pattern for "fading puppies." The most common culprits in early neonatal deaths in the study were the "Big Four":

- E Coli
- Streptocuccus sp
- Staphylococcus sp
- Herpesvirus

The truth is that most puppies are exposed to the "Big Four," either in the birth canal or shortly thereafter in the environment. Things like E Coli, staph and strep naturally occur in the birth canal of a normal and healthy bitch. Puppies get banged up coming down the birth canal and their umbilical cords are lovely hosts for bacteria. There's all kinds of exposure and perfect conditions for opportunistic infection in the birth process.

While it's certainly good practice to provide a clean whelping environment, it's laughable to think that you can provide a truly sterile environment for your puppies. The only real defense against these pathogens is the passive immunity the puppies derive from their mother. So it would appear that getting passive immunity into our puppies via colostrum is the single greatest factor within our control in reducing neonatal deaths.

**How Do You Know If Your Puppies Have Sufficient Antibody Levels?**

Interestingly (and unfortunately for us), the Royal Canin study found that you can't predict a puppy's antibody level by testing his mother's antibody level. There was no correlation found between the 34 dams' antibody concentration levels and those of their offspring. However, the Royal Canin study found that simply weighing puppies in the first two days of life is a reliable predictor of antibody concentrations. Puppies who did not gain weight in the first two days of life also had low antibody levels. This is consistent with well-established research in the cattle and swine industries. However, unlike the cattle and swine industries, we still don't have data on exactly how much weight gain is necessary to cross the "magic" 230 mg/dl threshold. The Royal Canin study did demonstrate that weight gain in the first 2 days has a direct correlation with a puppy's antibody concentration, but they did not draw a specific conclusion about what a safe weight gain would be.

The practical take-away for breeders is, while it's normal for a puppy to lose some weight in the first day after birth, we would be well advised to consider that a puppy that does not gain weight by the end of 48 hours may have dangerously low serum immunoglobulin concentration. Your supplementation options are limited: In the first few hours of life, you can feed your puppies a few drops of plasma from a healthy adult dog, which isn't necessarily practical, plus, after gut closure has begun (approximately 4-12 hours), the plasma should be injected into the puppies abdominal cavity which would have to be done by an experienced vet. If the bitch has colostrum, but for some reason the puppy is not nursing in the first 4 hours, you can express colostrum and feed it to the puppy. This method will quickly convince you of the need for someone to invent a dog-milking machine!

**Where Does Ovulation Timing Come In?**

If there's one thing you might have noticed, once a puppy "misses" his golden window to take in colostrum naturally, you're playing catch up with some labour intensive, scary, and not 100% proven tools. So your first concern as a breeder should be to try to get the puppies on the ground and nursing in a timely fashion. *Early colostrum intake leads to vigorous puppies.*

As it turns out, when an animal struggles for a long time in labour, or never goes into real labour, her offspring may be unable to benefit from colostrum after birth. It's thought that the stress and lack of oxygen (hypoxia) from prolonged labour may trigger premature gut closure, but the mechanisms for this are still not well known. However, it is a very well-known fact in livestock industries that dystocia (prolonged or difficult labour) is likely to reduce passive immunity transfer, and the Royal Canin study cited dystocia as one of the common causes of decreased passive immunity transfer in dogs.

Timely veterinary intervention and/or breeder assistance has been shown to improve outcomes in livestock industries, and dog breeders would be well advised to adopt the same "best practices." However, before you can know when to intervene, you have to know when your bitch is due. That is where ovulation timing comes in.

**Ovulation Timing**

It's vitally important for breeders to understand that breeding dates do not control due dates. Bitches have a gestation of 63 days from ovulation (or 65 days from LH surge). 90% of bitches will whelp in this time frame +/- two days. Breeding dates are irrelevant. It's very well accepted science that it is ovulation, not breeding dates, that determines the bitch's due date.

If you have not done ovulation timing, you have no reliable way of predicting when your bitch is due. Your breeding date might have been very early and you might be thinking that your bitch is not due yet, when she actually could be 4 or 5 days overdue.

The puppies could be suffering from hypoxia and stress without you realizing it. And if they suffer from hypoxia and stress, they may not be able to get passive immunity. Finally, without that passive immunity, they won't be able to fight off commonplace bacteria and viruses, and they can die.

A lot of breeders feel that ovulation timing is a waste of time and money because those breeders have no problem getting their bitches pregnant without doing ovulation timing. But I'd like to encourage you to look at ovulation timing in a new light, as a basic health protocol that could save the life of your dam and her puppies.

While dystocia certainly can have a negative impact on passive immunity acquisition, intervening with a cesarian section presents its own set of problems. Some bitches are reported to have delayed milk production after cesarian sections, and some cesarian section puppies are noticeably more listless and slow to nurse, all of which wreck havoc with timely colostrum absorption. But are the C sections themselves always to blame?

**Symptoms or Causes?**

Before you assume that the c-section is the culprit when a bitch and her puppies do not do well afterwards, ask yourself these questions:

**When was the cesarean performed?** Breeders often have an emotional (or financial) aversion to c-sections and thus wait until their bitch is long overdue, and/or weak and exhausted before finally caving in and taking her to the vet. Poor milk production can hardly be blamed on the c-section in that case.

**How long were the puppies stuck? Were they hypoxic (deprived of oxygen)**? Listless post-C section puppies are probably more often due to the stress of being stuck for too long, rather than the ill effects of anesthesia.

**Was the veterinarian a skilled surgeon?** Don't just assume your regular vet is going to be able to do a good c-section for you - ask a lot of questions. You need a vet who regularly performs c-sections, who has trained staff to assist.

**What kind of anesthesia is the vet using?** Years ago, anesthesia left mothers and puppies groggy, but newer anesthesia drugs are very different, offering almost an immediate recovery for both the bitch and her puppies. Don't assume your vet is using the latest and greatest anesthesia drugs - ask questions.

I'm not going to "take a stand" on doing c-sections, but I will take a stand on being prepared to, should it be necessary, with these three things, at minimum:

1. Form a relationship with a good repro vet/surgeon who uses the latest and best anesthesia.
2. Do ovulation timing so you know when your bitch is due.
3. Don't wait too long to intervene.

A good vet who's experienced in canine reproduction will have a lot more tools to pinpoint due dates and monitor the health of the litter while they are still in the womb – for instance, we can use x-rays and ultrasound to monitor fetal heart rates, position, maturity and often detect when a litter or puppy is stressed or needs help getting out. But at the very minimum, being prepared with the above three things forms a basic level of preparedness that every breeder should have.

**The Bottom Line**

I want breeders to re-evaluate ovulation timing as part of a compassionate pregnancy wellness protocol for the bitches that they care about, and the puppies of those bitches. Again, there are a lot of reasons for "fading puppies" and ovulation timing is not a cure-all preventative. But in the midst of a lot of things we can't control, ovulation timing and forming a relationship with a good repro vet/surgeon are things we CAN control. We all have so much emotionally and financially invested in our litters, and our bitches are counting on us to look after their interests - why not take every measure possible to improve outcomes for our girls and their puppies?