



Clinical Significance and Application of Canine Progesterone

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a. Hormones Affecting Canine Oestrus and Pregnancy

There are a variety of hormones that help regulate the female cycle and pregnancy.

These include:

- Oestrogen – Stimulate ovaries to release eggs
- Luteinising Hormone (LH) – Stimulate ovulation
- Progesterone – Maintain pregnancy

a. Hormones Affecting Canine Oestrus and Pregnancy

Understanding how hormone levels change can help determine the optimal reproduction time. When the level of oestrogen drops and the level of progesterone rises, the bitch ovulates.

Oestrogen levels can help us understand when a bitch will be in heat but it is not enough to determine when we should breed.

Vaginal cytology can also provide some basic information.

The level of progesterone (Prog) and the level of luteinising hormone (LH) are the best indicators of ovulation time and when is the best time for breeding. They can also be used to predict parturition date or caesarean section.

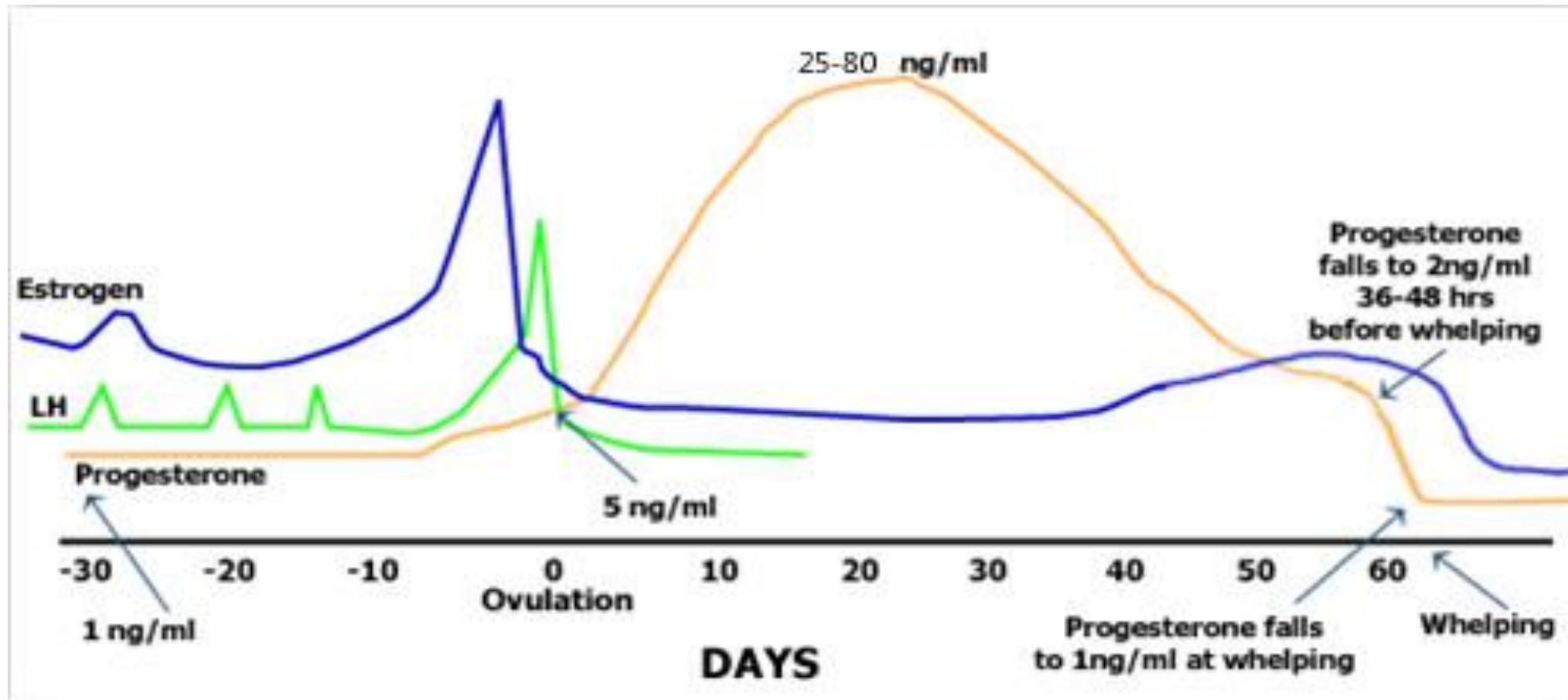
a. Hormones Affecting Canine Oestrus and Pregnancy

Luteinising Hormone Levels

LH Test

It needs to be tested every day, from the appearance of oestrus to the end of the pre-oestrus. The peak value of LH can only be maintained for 24 hours or less, so it needs to be tested every 24 hours. If the test break time is too long, the peak value may be ignored. The LH peak appears 48 hours before ovulation.

a. Hormones Affecting Canine Oestrus and Pregnancy



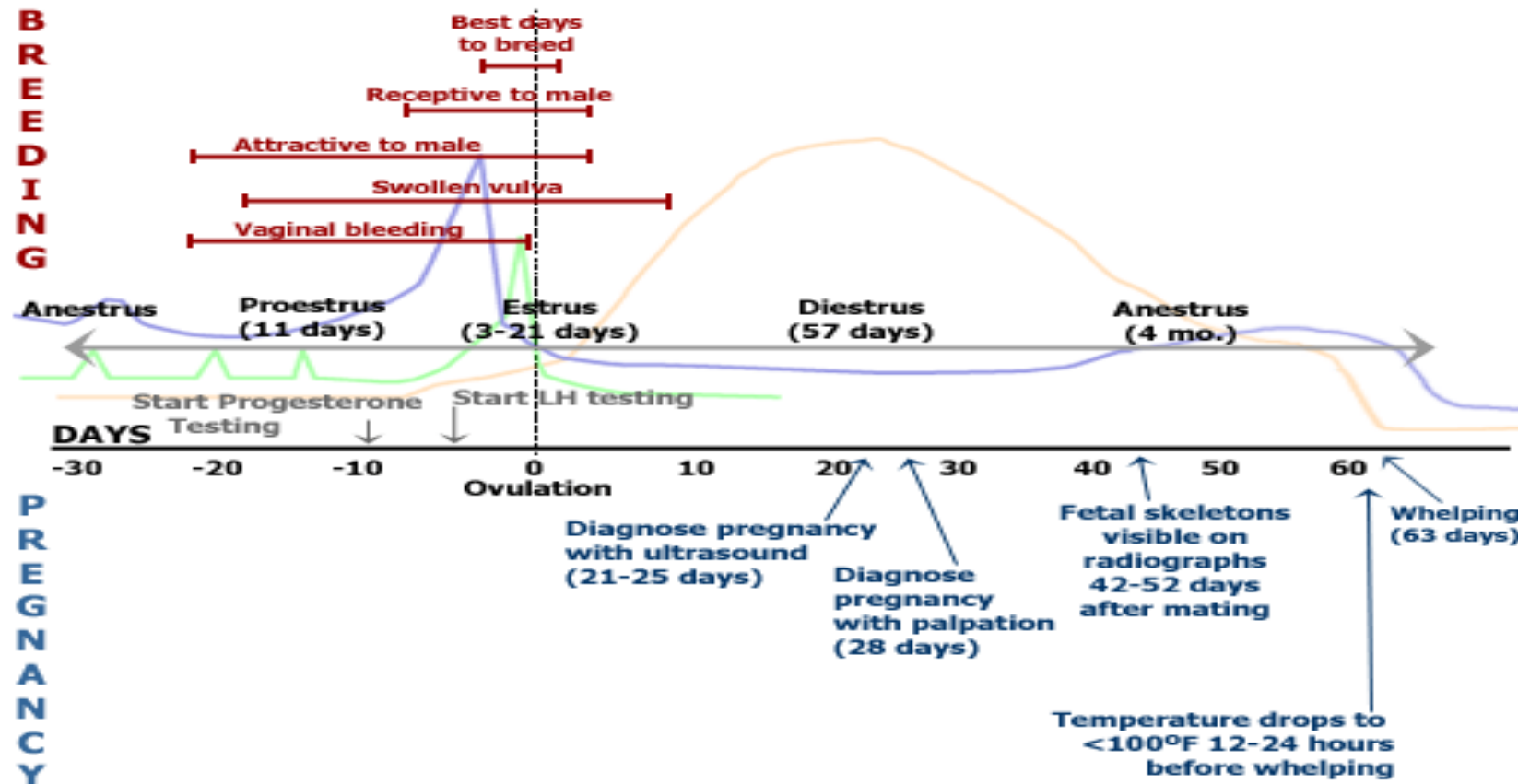
Hormone Levels During Heat and Pregnancy

b. Progesterone as the Theoretical Basis for Reproduction Regulation

Progesterone Levels

Progesterone testing should be done every 2-3 days, starting from 3-5 days in heat. The initial progesterone level is usually less than 1.0 ng/mL until the day before the LH surge. On the day of LH peak, the serum progesterone concentration was 2-3 ng/mL. One day after the peak of LH, the serum progesterone concentration is 3-4 ng/mL. Ovulation occurs at a progesterone level of 5 ng/mL.

b. Progesterone as the Theoretical Basis for Reproduction Regulation



Estimated Service Time and Production Time

b. Progesterone as the Theoretical Basis for Reproduction Regulation

Mating Time

The goal is to determine when the progesterone level reaches 2.5 ng/ml so that a mating plan can be established or a semen sample should be prepared for collection and delivery. Depending on the type of semen used, the best time for natural or artificial insemination is:

Mode of Reproduction	Time	Sperm Survival Time After Fertilization	Insemination Part
Natural Mating	Prog 2.5 ng/mL after 3 days	5-7 days	
Cold Fresh Semen	Prog 2.5 ng/mL after 4 days or Prog 5 ng/mL after 48 hours	48-72 hours	Cervix
Frozen Semen	Prog 2.5 ng/mL after 5 days or Prog 5 ng/mL after 72 hours	Less than 24 hours	Inside the uterus

b. Progesterone as the Theoretical Basis for Reproduction Regulation

Fertilisation and Implantation

It takes about 7 hours for sperm to become fertilised after ejaculation, this time is called the 'capacitation time'. Egg cells also need a certain amount of time to mature, about 48 hours after ovulation.

Fertilisation is done in the fallopian tube, regardless of the method of insemination (natural reproduction, cold fresh semen, frozen semen). The fertilised egg then moves to the uterus until it is implanted into the endometrium 17-18 days after ovulation.

If there is a problem with the endometrium, the fertilised egg will not implant or the embryo will not grow or maintain. A normal embryo implants into the endometrium. If implantation does not occur or the embryo grows abnormally, the foetus is absorbed.

b. Progesterone as the Theoretical Basis for Reproduction Regulation

Progesterone Levels During Pregnancy

After ovulation, the progesterone concentration continues to increase for 2-3 weeks, eventually reaching 10-80 ng/mL. This concentration is necessary to maintain pregnancy. The progesterone level will remain at this level for about 60 days, regardless of whether the bitch is pregnant or not.

b. Progesterone as the Theoretical Basis for Reproduction Regulation

Progesterone Levels During Pregnancy

This can help predict parturition.

The correct determination of the delivery time can prevent premature caesarean section and increase the survival rate of puppies.

	Progesterone
48 hours before delivery	~2 ng/mL
24 hours before delivery	~1 ng/mL

c. How to Use Progesterone Testing Correctly

Progesterone Value (ng/mL)	Estimated Ovulation Time (Days)	Estimated Mating Time (Days)
0-1	Basic concentration, ovulation is still early	Can't match
1-2	At least 2 days before ovulation, this concentration may last for a week or more	Expected mating time is 4-6 days later but it may take longer
2-4	Expected ovulation time is less than 1 day	The mating time is expected to be 3-5 days later but it may take longer
4-6	Ovulation is coming or just happened	Expected mating time is 2-4 days later
6-10	Ovulation does not occur more than 1 day	Expected mating time is 1-3 days later
10-20	The best time to mate	Estimated mating time is 0-2 days
20-30	The eggs are mature but aging and the fertility potential has declined	Estimated mating time is 0-1 days
>30	Too late or drastically reduced fertility potential	

c. How to Use Progesterone Testing Correctly

Sample Collection

It is reported in the literature that the concentration of progesterone in canine serum is reduced when using serum separator tubes. It is suspected that progesterone will be absorbed by the gel material. Avoid using serum separator tubes.

A plain serum tube should be used.

It is recommended to be tested after centrifugation. In addition, if the blood produces a blood clot, it should be centrifuged immediately to separate the serum from the clot.

For plasma tests, it is recommended to use a lithium heparin tube.



c. How to Use Progesterone Testing Correctly

Summary

Continuous monitoring of progesterone in female dogs has proven to be an effective diagnostic tool for managing breeding. However, the time interval from the pre-oestrus period to the first increase in progesterone and the difference in the increase rate are very different between female dogs.

In order to determine that ovulation is about to occur or has occurred, testing should be continued until a result of 5 ng/mL or more is obtained. When the serum progesterone is between 10-20 ng/mL is the best time to mate.

During pregnancy, progesterone is greater than 2 ng/mL and the progesterone level is reduced to 2 ng/mL 48 hours before delivery and 1 ng/mL in 24 hours.

c. How to Use Progesterone Testing Correctly

	P4 Analyzer		P4 Analyzer		P4 Analyzer
	<0,2		8,0		18,0
	0,5		9,0		18,0
	1,0		9,0		18,0
	1,5		9,0		18,5
→→→→	1,5	→→→→	9,5		19,0
LH Surge	2,0	First Breeding	10,0		19,0
Looking for	2,5		10,0		19,0
significant rise in	3,0		10,5		19,5
Progesterone PG Value	3,0		11,0		20,0
Should Double	3,0		11,0		20,0
	3,0	→→→→	11,6		20,5
	3,5		11,5		20,5
	3,5		12,0	→→→→	21,0
	4,0		12,0	Surgical or	21,5
	4,0		12,5	Frozen semen	21,5
	4,5		13,0		22,0
	4,5		13,5		22,0
→→→→	5,0		13,5		22,5
Ovulation	5,0		14,0		22,5
	5,5		14,5		23,0
	5,5		15,0		23,5
	6,0		15,0		23,5
	6,0		15,5		24,0
	6,5		15,5		24,0
	6,5		16,0		24,5
	7,0		16,0		24,5
	7,0		16,5		24,5
	7,5		16,5		25,0
	7,5		17,0		25,0
	8,0		17,0		25,0

Comparison Table of Progesterone Monitoring in Europe and America



Canine Progesterone (cProg) Rapid Quantitative Test

Woodley have developed a rapid, accurate and reliable, highly sensitive detection method for Canine Progesterone.

The InSight V-IA Canine Progesterone (cProg) Rapid Quantitative Test is a fluorescence immunoassay used with the InSight V-IA Veterinary Immunoassay Analyser for quantitative determination of progesterone concentration in canine serum or plasma.

The test is used as an aid to track ovulation, determine the best time for breeding or detect early pregnancy failure.

It can be stored at room temperature.



References

Hormone Levels: Determining Breeding Times and Whelping Dates – Drs. Foster & Smith Educational Staff

TIMING THE FERTILE PERIOD OF THE BITCH: BRIEF REVIEW Canine Reproduction Seminar – Dr. Scarlett Gotwals

Ovulation Timing in the Dog – Angela Hughes DVM

Interpretation of Serum Progesterone Results for Management of Breeding in Dogs – Endocrine Section, Diagnostic Center for Population and Animal Health, Michigan State University November 3, 2008

Gobello C, Hermo G, Rodriguez R, Tortora M, Gorrada T. 2005. Use of the GnRh antagonist, acyline, on estrous cycle interruption in the bitch: a preliminary report. *Theriogenology*, 64:13



Thank You