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Ovulation in the domestic cat: induced, spontaneous or both?

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Ovulation in the domestic cat (\textit{Felis catus}) is classically considered as being induced by vaginal stimulation. However, some authors have reported cases of spontaneous ovulation in groups of queens housed together \cite{Lawler1993, Gudermuth1997} and in wild felids, some species may show alternatively induced or spontaneous ovulations \cite{Brown2011}. The objective of our study was to determine the occurrence and frequency of spontaneous ovulations in a group of queens. This study was done in accordance with the ethical committee of the Alfort Veterinary College. Materials and methods: 11 queens aged 8 to 11 months (young queens n=5) or 3 to 7 years (adult queens n=6) and weighing 2 to 4 kg were housed together in a 20 m\textsuperscript{2} room with cat trees and scratching pads. They were put under an artificial daily lighting program with 14 hours of light (180 lux) and 10 dark hours (0.06 lux). They were fed \textit{ad libitum} with industrial food (Neutered\textsuperscript{®}, Royal Canin, France). 6/11 queens were Thai cats (an Oriental breed), 3/11 were cross-bred between Thai cats and Domestic Shorthair cats and 2/11 were Domestic Shorthair cats. During a 9 months period, they were followed daily for oestrus detection and occurrence of ovulation. No male cats were housed in the same building.

Progesterone assays were performed in 11/11 queens at the beginning of the study to ensure that there was no luteal activity (Elecsys 2010, Roche, Germany). Oestrus was detected daily by behavioral modifications (lordosis, rolling, yowls…) during a 20 minutes period of observation. At the end of oestrus, 3 to 4 days after the cessation of any oestrous behavior, one blood sample was taken in each cat to assess plasma progesterone. Except one cat that had to be sedated with isoflurane due to aggressiveness, all other queens had blood samples taken at the jugular or cephalic veins without sedation. Results: at the beginning of the study, 10/11 queens were presenting a low level of plasma progesterone (0.23 ± 0.17 ng/mL). 1/11 cat had a progesterone level of 1.29 ng/mL. During the study, 24 oestruses were detected (depending on the queen the number of oestruses clinically detected varied between 1 oestrus only to 6 successive oestruses during the 9 months study). In 6/24 cases (4 queens only) a significant increase of progesterone after oestrus was detected (26.26 ± 9.88 ng/mL), with 2 queens presenting this phenomenon twice and 2 queens presenting this phenomenon only once.

Discussion: 3/4 queens that presented a plasma progesterone increase were Thai cats. There may be an eventual breed influence or individual sensitivity on so-called ”spontaneous” ovulation. They were aged 3 to 7 years. None of the young queens presented an increase of plasma progesterone. Conclusion: In captive conditions, in which female cats are housed in groups – a social organization that doesn’t occur naturally- ovulations without vaginal stimulation occur, as already shown by others \cite{Lawler1993, Gudermuth1997}. This raises the question of how ovulation has to be physiologically defined in the domestic cat. It could be interesting to study the potential causes of its occurrence which may not be exclusively vaginal stimulation.