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Abstract: First phase of telemetry project is completed. Four cheetah females were fitted with activity-monitoring collars and implanted with body-temperature transmitters. Results of initial data analysis revealed an absence of a clear circadian rhythm in either of the telemetered parameters. Results of the activity monitoring transmitters also are preliminary. Initial analysis revealed no clear circadian rhythm, although a tendency to be diurnal is apparent.

TELEMETRIC MONITORING OF OVULATORY CYCLES OF CHEETAHS AND ORANGUTANS BY CHANGES IN BASAL BODY TEMPERATURE AND ACTIVITY LEVEL

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We have completed the first phase of the telemetry project with our cheetahs. Four females were fitted with activity-monitoring collars and implanted with body-temperature transmitters. Data have been collected continuously by programmed receivers. On 14 December 1989 immobilization and blood drawing were initiated with two of the four females. Samples were collected twice weekly through 15 February 1990 for one, but only through 2 January for the other, which had to be removed from the project due to illness. The remaining two females will be blood-sampled for two months during the summer.

Results of initial data analysis revealed an absence of a clear circadian rhythm in either of the telemetered parameters. Although this made determination of ovarian cycle effects on body temperature problematic, such data are in striking contrast to the patterns seen in most mammals. Rather than having an activity rhythm driven by an intrinsic metabolic cycle, it appears that the cheetah (and perhaps other felids) may be free to respond to environmental variation by adjusting activity patterns to local conditions. Although such an investigation was not part of the original hypothesis, its fortuitous discovery could prove to be important to understanding the interaction of physiology and behavior.

The absence of a clear circadian rhythm in body temperature prevented simple examination of daily, basal-body temperature at a regular time of the day, as is practiced by women taking their temperatures each morning on awakening to track ovulatory changes. Instead, we have compared mean temperatures across days.

Body temperature is expected to detect ovulation by increasing in response to the post-ovulatory progesterone rise. During the

initial two-month period of blood sampling, assay revealed no rise in progesterone that would indicate ovulation. However, a third cheetah became pregnant in early January according to vaginal cytology. The ovulation which accompanied mating and conception afforded us an opportunity to test the hypothesis. This inferred ovulation, estimated by cytology to have occurred around 2 January 1990, was indeed followed by a sustained rise in mean daily body temperature (Figure 1).

This conclusion must be confirmed after parturition by re-calculating the expected time of ovulation by gestation length. We also hope that during the next period of blood sampling of the other two females during the summer that an ovulation will occur which can be confirmed by hormone assay. If not, we anticipate inducing ovulation by exogenous hormone administration.

Results of the activity monitoring transmitters also are preliminary. Initial analysis revealed, as with body temperature, no clear circadian rhythm, although a tendency to be diurnal is apparent. However, because results from the estradiol assay of the December through February blood samples are not yet available, we have not been able to evaluate the possible stimulatory effect of estradiol on activity.

We originally anticipated shifting the telemetry system from the cheetahs to the orangutans after four to six months. For several reason we are reluctant to stop collecting data from the cheetahs so soon. Our pregnant cheetah was not included in the immobilization and blood-sampling regime due to our concern about possibly jeopardizing the pregnancy. We decided to sample two females at that time and the remaining two at a later date. We will schedule that procedure once vaginal cytology indicates that cycling has resumed post-partum.

Meanwhile we are attempting to acquire a second telemetry receiver system so that orangutan monitoring may begin without halting data collection from the cheetahs. Barring that, the orangutan project will start in the fall.

FIGURE 1. Increased mean daily body temperature in a female cheetah at the time of inferred ovulation.