

# Interpreting Differences between Ear and Rectal Temperature Measurements

In comparing ear to rectal temperature measurements, [Dr. Rexroat's clinical data](#) has demonstrated that **when an animal's "core" temperature is stable**, the ear and the rectal temperature measurements will be within approximately  $\pm 0.3^{\circ}\text{C}$  ( $\pm 0.5^{\circ}\text{F}$ ) from one another. However, greater discrepancies will occur **when the animal's "core" temperature is not stable**. This is because the brain is a body "core" temperature and the rectum is not. Temperature changes of the rectum occur at a different rate than actual "core" body temperature changes. This is because the rectum is well insulated, contains fecal material with bacterial action and is distal from the "core" region of the body. The attached article entitled [Brain, Blood and Rectal Temperature During Whole Body Cooling](#), James P. Kiley stated *"Rectal temperature cannot be considered an adequate index of brain temperature."*

Recently, we have learned of several instances where the discrepancy between the ear measurement and the rectal measurement was greater than  $0.3^{\circ}\text{C}$  ( $0.5^{\circ}\text{F}$ ). All of these occurred when the animal's "core" temperature was changing rapidly in one direction or another. The following situations validate what Dr. Kiley found in his research study:

## 1. During anesthesia

- During induction, "core" temperature will drop faster than rectal temperature and, for this reason, the ear will read lower than the rectum (typically  $0.5\text{-}1.0^{\circ}\text{C}$  or  $0.9\text{-}1.8^{\circ}\text{F}$ ).
- On a heated surgery table, the rectum will be considerably warmer ( $1\text{-}2^{\circ}\text{C}$  or  $1.8\text{-}3.6^{\circ}\text{F}$ ) than the ear. This is due to the fact that the anesthetic keeps the "core" body temperature cool while the heated table warms the extremities.

## 2. Post anesthesia

- "Core" temperature (ear temperature) will change faster than rectal. As the animal becomes ambulatory, ear temperature may read  $1\text{-}2^{\circ}\text{C}$  ( $1.8\text{-}3.6^{\circ}\text{F}$ ) warmer than the rectum. For example, the ear will read  $36.5\text{-}37.5^{\circ}\text{C}$  ( $97.7\text{-}99.5^{\circ}\text{F}$ ), whereas the rectum may still be  $35\text{-}36^{\circ}\text{C}$  ( $95\text{-}96.8^{\circ}\text{F}$ ). Dr. Gonzalez at the University of Missouri believes the ear is a better indicator of the actual "core" body temperature because of the ambulatory nature of the animals. She thinks that if the actual "core" temperatures of these animals were still  $35\text{-}36^{\circ}\text{C}$  ( $95\text{-}96.8^{\circ}\text{F}$ ), these animals would not be walking around.

## 3. When excited

- Dogs and cats do not dissipate heat as readily as humans. Their fur coats insulate their bodies well, and for this reason, excitement and stress can rapidly increase the "core" body temperature. However, because of the rectal temperature lag time discussed above, their rectum will not register this body temperature change immediately. When an animal becomes excited and/or stressed, as can happen in a busy veterinary office, its "core" body temperature can rise rapidly and this will be identified immediately by the ear thermometer. The rectal measurement will not

show this rapid increase and will be 0.5-1.0° C (0.9-1.8° F) lower than the ear. After 30-60 minutes of continued excitement, the rectum will eventually catch up with the ear.

#### 4. **When crashing**

- We know of at least one instance where ear and rectal temperatures disagreed in a poisoned dog that was physiologically "crashing." We believe the ear was more correct. The dog's ear temperature was quite low 35° C (95° F), while the rectum measured nearly 37° C (98.6° F). Unfortunately, even with attempted resuscitation, the dog expired. The ear was a better indicator of the animal's "core" temperature, which was dropping rapidly. Because of the rectal lag time, the conventional rectal measurement actually gave the clinician misinformation and this may have had an adverse affect on the chosen treatment.

As can be concluded from the above situations, temperature measurements in the ear and the rectum will not always be the same. We believe the ear is a much better site for "core" temperature measurement, especially when the animal is experiencing rapid temperature changes - a common situation in a typical veterinary practice. At this time, Advanced Monitors Corporation is collecting clinical data with the Vet-Temp® to confirm that the ear more closely approximates "core" temperature than the rectum.

## **Animal Fever Facts**

- ★ All warm-blooded animals, including humans, may develop a fever (an elevated temperature of the body interior), as a reaction to infection, brain tumor, environmental factors or physical and emotional activity.
- ★ There is no such thing as a normal temperature, only a normal temperature range.
- ★ The longer the lifespan of the animal, the lower its normal temperature range.
- ★ The normal temperature range relates to the metabolic rate of the animal. The higher the metabolism, the higher the normal temperature range.
- ★ The ear canal temperature is the most accurate noninvasive indicator of core temperature because it is measured from a site located near the brain.
- ★ The Vet-Temp® Instant Thermometer readings from the ear will be in the same range as those measured with traditional glass mercury or electronic contact thermometers.
- ★ No warm-blooded animal can survive if temperature of its brain (or core) is elevated over 42.2 degrees Celsius (108 degrees F). Other parts of the body may experience a greater variation in temperature without an adverse physiological response.
- ★ Typical fever reducing medication, such as aspirin, can be harmful to many animals. Please consult with your veterinary professional with regards to the best method of treating

an animal fever.