



# Pulse Oximetry for Rodents

By Dr. George A. Vogler, DVM

The value of monitoring oxygen saturation and pulse rate is well established for large and companion animals. The same advantages apply to rodents, but their small size and high pulse rates present unique challenges for pulse oximetry monitoring. For example, while the tongue is often used as a monitoring site in larger species, it is rarely an option with rodents.

## Pulse Oximetry in Laboratory Rats

Pulse oximeters designed for use on humans have been successfully used on some larger animals, but are not satisfactory for rodents. *A veterinary pulse oximeter with probes designed for animals and the ability to track high pulse rates is essential.* Rodents generally have fewer available sites for secure sensor application and the smaller species, such as mice, present formidable difficulties in obtaining a satisfactory signal even for clinical veterinary monitors. For these reasons, there is probably more experience with pulse oximetry in the laboratory rat than any other small rodent. The following suggestions are based on experience with pulse oximetry in the rat.

## Basic Requirements for Successful Use of Pulse Oximetry in Any Species

- The monitoring site must have a good peripheral pulse.
- The sensor should be securely attached, but should not inhibit perfusion.
- The sensor should be protected from extraneous light.
- The monitoring site should be protected from excessive motion.
- Fur should be removed when necessary and highly pigmented areas avoided.

Some common drugs, including alpha-2 agonists, cause peripheral vasoconstriction and can interfere with signal acquisition. Hypothermia can exacerbate the problem.

Eliminating or reducing the dose of these drugs and ensuring effective thermal support will increase the chances of locating and maintaining a reliable signal.

## Why Nonin Pulse Oximeters and Sensors?

In the author's experience, Nonin's veterinary pulse oximeters and probes have proven to be reliable and simple to use in a wide range of species. With the precautions described in the *basic requirements* above, Nonin veterinary pulse oximeters and sensors provide convenient and reliable monitoring in a variety of small rodents. The following are guidelines for the appropriate use and placement of Nonin's sensors with laboratory rats.

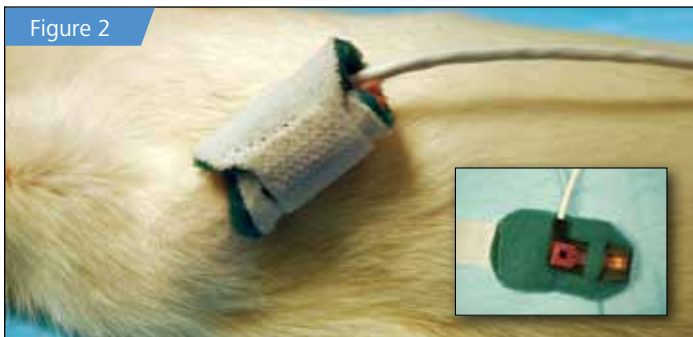


### • Nonin Lingual Clip Sensor (Model 2000SL)

The 2000SL clip-on sensor (*Figure 1*) is convenient for spot-checks and for monitoring during recovery while the patient is immobile. However, to minimize vascular compression, the 2000SL sensor is held in place by light spring pressure that could allow it to become dislodged with movement — making it less suitable for surgical procedures. Further, over time even light spring compression may interfere with blood flow resulting in signal loss and the need to reposition the sensor. The 2000SL is most easily applied to the rear foot, but the front foot and tail can also be used.

- **Nonin Small Animal Wrap Sensor (Model 2000SA)**

The 2000SA sensor (*Figure 2*) is easily secured and less prone to accidental displacement, making it an ideal option for continuous monitoring during long surgical or other procedures. Adhesive tape or a cohesive bandage can be used, but care must be taken to assure that the sensor diodes are aligned directly opposite each other and that excessive pressure is avoided. A convenient alternative is a suitably shortened Posey™ wrap with two small slits added to hold the sensor (*Figure 2 inset*). The 2000SA should not be applied to hair-covered or highly pigmented areas.



- **Nonin Transflectance Sensor (Model 2000T)**

Also suitable for continuous monitoring, the 2000T transflectance sensor is the smallest probe and can be applied to the rear or front feet, or to the ventral surface of the tail of the rat. To secure the sensor, adhesive tape can be used (*Figure 3*), or it can be adhered to a Posey wrap with a small dab of poster putty. Alternatively, the 2000T sensor can be attached to the surface of an operating or imaging table and the foot simply taped in position over it (*Figure 4*). This approach works best on a hard table or cradle with the animal in a prone position.



### Pulse Oximetry in Other Rodents

There is less information available concerning guinea pigs, hamsters, gerbils, etc. For the larger species, the feet may be used with the 2000SA wrap sensor as described for the rat. For the smaller species, the 2000T transflectance sensor may be appropriate.

*Note:* The sensor recommendations in this article are not applicable for use during MRI procedures with rodents. Contact Nonin Medical for more information regarding specialized pulse oximeters with fiber optic sensors designed for use in MR environments.

---

Dr. George A. Vogler, DVM, DACLAM, received his veterinary degree from Purdue University in 1974, and following a residency in laboratory animal medicine at the University of Missouri, he received board certification in 1980. He is Professor Emeritus in the Department of Comparative Medicine at Saint Louis University School of Medicine. As a recognized expert in anesthesia and monitoring equipment for laboratory animals, he is a contributing author to the ACLAM series of texts including *Anesthesia and Analgesia in Laboratory Animals*, *The Laboratory Rat*, and *Laboratory Animal Medicine*.



**Nonin Medical, Inc.**

13700 1st Avenue North, Plymouth, MN 55441-5443, USA  
 Phone: +1 763.553.9968 | Toll Free: 800.356.8874 | Fax: +1.763.553.7807 | Email: info@nonin.com



[www.nonin.com](http://www.nonin.com)