Telemetry of Blood Pressure and Sympathetic Activity.

Dr. Van Vliet began using commercial telemetry devices to monitor blood pressure and heart rate in conscious, freely behaving animals in 1994. Telemeters (Figure 1) allow blood pressure and related data to be sent by radio transmission from an animal to a nearby receiver (reviewed in Van Vliet et al, 2000). Data can be collected 24-h per day, allowing a comprehensive analysis of blood pressure and its variations over the course of a day (Van Vliet et al, 2006). Dr. Van Vliet’s laboratory has made use of this method in a number of studies involving mice, rats, rabbits, and pigs. Most recently, Dr. Van Vliet has worked in collaboration with Telemetry Research Inc to establish a method for recording sympathetic nerve activity from the renal nerves in rats.

**Mouse BP Implant Construction**

![Diagram of Blood Pressure Telemeter](image)

*Fig 1:* Schematic illustration of the design of a Blood Pressure Telemeter (Data Sciences model #Ta11Pa-c10) used in Dr. Van Vliet’s research.

![Blood Pressure Signal Graph](image)

**Fig 2:** Illustration of the high fidelity recording provided by the C10 telemeter, which allows for the accurate measurement of pulse pressures in mice despite their high heart rate (10 per second!).
In addition to using the telemetry method to answer his own research questions (e.g. see above), Dr. Van Vliet is also interested in promoting telemetry methods and protocols that will facilitate the accurate and comprehensive assessment of physiological variables.

- He has reviewed the use of telemetry in experimental animals (Van Vliet et al, 2000) including its use to comprehensively phenotype the blood pressure level in mice (Van Vliet et al, 2006).

- The software routines used in his lab for the routine inspection and analysis of 24h sets of blood pressure data are based on a Microsoft Excel 2003 spreadsheet (do not use with Excel2007 !), and are available (including instructions and sample data) for download.

- During a recent research sabbatical (hosted by Simon Malpas, Department of Physiology, University of Auckland, and Telemetry Research Ltd, Auckland), Dr. Van Vliet established a method for recording sympathetic activity from the renal nerves of conscious, freely behaving rats. This made use of TR46 telemeters (Telemetry Research Ltd, **Figure 3**) which are uniquely appropriate for this task because of their high sensitivity and bandwidth. Recordings could be routinely maintained for several weeks, and as long as 3 months in one case (**Figure 4**). Dr. Van Vliet instructed at a Masters class on long term recording of sympathetic activity held by Telemetry Research Inc (St. Louis University, October 2007).

**Fig 3**: The TR46 telemeter (Telemetry Research Ltd), with sensitivity and bandwidth appropriate for recording sympathetic nerve activity. The devices can be recharged by induction while implanted.
**Fig 4:** Bursts of renal sympathetic nerve activity made in a conscious, freely behaving rat 64 days following telemeter implantation.

**Literature Cited:**

