

A new implantable transmitter for simultaneous recording of sympathetic nerve activity and blood pressure

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Introduction

- Over activity of the sympathetic nervous system has been implicated in a number of cardiovascular diseases.
- The direct recordings of sympathetic nerve activity (SNA) in conscious animals in combination with blood pressure provides ideal platform for exploring the role of SNA in the disease process.
- While a telemetry system has been developed to enable recording of SNA it has required the implantation of a separate transmitter to record blood pressure.
- We have now developed wireless implantable transmitters capable of simultaneously recording arterial blood pressure and sympathetic nerve activity.

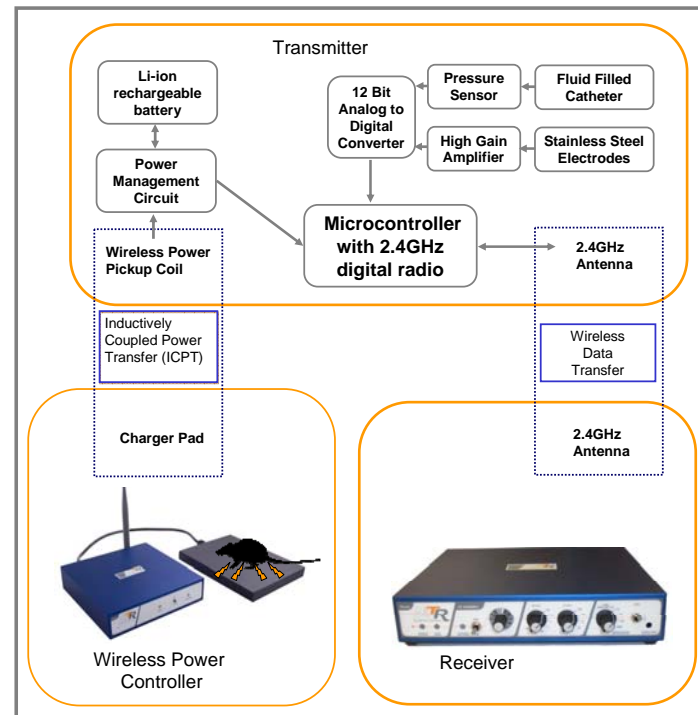
Signal characteristics

Sympathetic nerve activity:

- Contains frequencies up to 8000 Hz
- Very low amplitude signals (+/- 10 μ V)

Blood pressure:

- Range 0-250 mmHg
- Low frequency (DC to 200 Hz)
- Must provide stable/accurate recordings not sensitive to changes in temperature and atmospheric pressure



System Overview

- A fluid filled catheter with a biocompatible gel interface to the blood.
- Stainless steel electrodes for placement on the nerve
- Overall Dimensions 35x25x10mm
- Weight 14gm
- Transmission Range up to 5m
- Digital transmission
- Remote switching of the transmitter off and on
- Co-housing of animals permitted through multiple channels of transmission
- Inductive power recharging of the battery means the completely sealed unit does not need battery refurbishment.



Results

Devices were tested in rats weighing +200 gm. Recordings were made intermittently up to 2 months post implantation. Animals were subjected to physiological stimuli (baroreflex, nasopharyngeal) and renal SNA and BP responses recorded.

