

## **A fully implantable two-channel cochlear stimulator for rats.**

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**Introduction:** Studies of the neural changes induced by cochlear implant use depend upon the availability of a flexible and low-cost animal model. We recently developed a two-channel fully implantable cochlear stimulator, small enough for a rat, to fulfill this need.

**Methods:** An omni-directional inductive link powers the implant (via coils surrounding the animals enclosure), and bi-directional communication is achieved via a separate 2.4GHz ISM radio link. A number of stimulation parameters may be varied, including pulse width, current level and rate. Amplitude-modulated pulse trains are also able to be generated, allowing examination of temporal processing. The implant is constructed with off-the-shelf components, and can be fabricated in a modestly equipped workshop.

**Results:** Preliminary data is presented on the operation of the implant and the use of the implant for chronic stimulation and evoked potential recordings.

**Conclusions:** We developed a fully-implantable stimulator able to deliver chronic intra-cochlear electrical stimulation in rats. The implant has the capacity for additional peripherals, and may prove a useful platform in other fields of biomedical research that require wireless telemetry or neurostimulation.