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A Chronically Implanted, Continuous pH Monitoring System for Rats

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ABSTRACT

Many body systems operate within a strict pH range, and any deviation can cause harm. pH measurement systems are used in many biomedical research fields. Measurement systems have been able to continuously record pH for a short period of time wirelessly, or over a long period of time with wires, but no system is currently capable of long term, wireless, continuous pH recording. This paper proposes a new pH measurement system that is capable of such measurement. The system is composed of inexpensive, micro-scale, and easy to manufacture pH sensitive and reference electrodes and a data acquisition and transmission module that is wirelessly powered. The system is small enough to be chronically implanted in a rat. In vitro testing of the system showed a linear, stable pH response. The system provides a new tool to researchers who wish to study pH in vivo, chronically, and in micro scale applications.

KEYWORDS

pH monitoring, antimony electrode, silver/silver-chloride, micro pH sensor, reference electrode, chronic pH sensor, implantable pH sensor