USF Available Technologies

Technology Transfer Office

Anesthesiology Measurement and Control System

Researchers at the University of South Florida have developed a novel device and system that will ensure the proper delivery of anesthesia to a patient prior to and during a procedure.

Anesthesiology involves the administration of anesthetic agents to a patient prior to or during a procedure. If the proper dose of anesthesia is administered, the patient will be relieved of pain and sensory burden of the procedure with minimal side effects. However, complications in anesthesia commonly occur due to an improper dose administration. If a supra-optimal amount of anesthesia is delivered to the point of toxicity, morbidity or mortality can ensue and if a suboptimal amount is delivered, the patient may awake, sense pain, or develop anesthesia awareness. Current neurological monitors measure neurological function but does not work well under many general anesthesia cases nor are they adequate for local anesthesia.

Our inventors have developed a device consisting of a sensor, detection and control system, to measure, analyze, and control the effects of anesthesia or analgesics in humans and animals. The invention utilizes contact or non-contact electrodes to probe a tissue or body part of the patient under anesthesia. The electrodes transmit an electromagnetic signal at a single, multiple or domain of frequencies that can be transmitted through or reflected by a single tissue or multiple tissues to and from the electrodes. The tissue response to the signal is then processed and the resulting data and derivatives are analyzed to yield dielectric, or electromagnetic characteristics of the tissue that reflect the level of sedation of the tissue and patient in general.

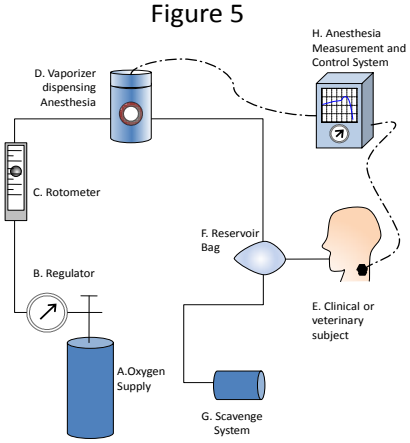
The electrodes can be implanted, superficial, invasive as part of a drug delivery system, or part of an invasive or non-invasive instrument. The electrodes and system can be contained within a single chip device or packaged as a small circuit device, that can be used as a stand alone instrument or in conjunction with electroencephalogram, thermometers, pulse oximeters, capnographs, and peak flow meters.

ADVANTAGES:

- **Accurately determines the depth of anesthesia or sedation level of a patient**
- **Applicable to both local and systemic modes of anesthesia administration**
- **Can be used on all organs and tissues, both invasively and non-invasively**

Accurate Measurement of the Depth of Anesthesia in a Patient

Figure 5



Tech ID # 09A011 **Patent #: 8,914,102**

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