Washington University in St. Louis
Office of Technology Management

THERAPY TO PREVENT ENDOTRACHEAL TUBE OR CATHETER-MEDIATED TISSUE INJURY

Gelman, Andrew, Puyo, Carlos

Richards, Jennifer

T-015918

Technology Description

Researchers at Washington University in St. Louis have developed a drug combination that can be used to prevent tissue injury resulting from placement of a variety of medical devices including, but not limited to, endotracheal tubes (ETTs) and catheters (bladder catheters). Placement of ETTs and catheters can result in an inflammatory response that causes pain and tissue injury, which can delay patient recovery.

With this technology, the inventors provide a single drug or combination of drugs that can be used to reduce inflammation. The combination can be used to coat medical devices such as ETTs or catheters. This technology provides a much-needed method to prevent or treat injuries due to catheterization or ETT placement and thereby improve patient care.

Stage of Research

Using swine models, the inventors have shown that coating endotracheal tubes or bladder catheters with the drug combination ameliorates tracheal and bladder damage.

Applications

- As a drug coating to prevent or treat tissue injury resulting from placement of medical devices such as endotracheal tubes or bladder catheters.
- Can be administered to patients as topical irrigations (bladder irrigation) for certain bladder inflammatory diseases such as non-infectious cystitis.

Key Advantages

- Provides a much-needed method to prevent ETT or catheter-induced tissue injury
- Reduces inflammation caused by insertion of a medical device into the body
- Drug combination can be embedded in or coated on a variety of medical tubes/devices
- Provides multi-level, anti-neutrophil, anti-inflammatory control at the extracellular and intracellular levels
- Can improve patient care by preventing injury and mitigating pain

Publications

- Puyo CA, Earhart A, Staten N, Prince OA, Haug C, Kollef M, Awad M. Endotracheal intubation results in acute tracheal damage induced by mtDNA/TLR9/NF-κB activity. J Leukoc Biol. 2019

Mar;105(3):577-587. doi: 10.1002/JLB.5A0718-254RR. Epub 2018 Dec 13.
- Puyo CA, Earhart A, Staten N, Huang Y, Desai A, Lai H, Venkatesh R. Mitochondrial DNA induces Foley catheter related bladder inflammation via Toll-like receptor 9 activation. Sci Rep. 2018 Apr 23;8(1):6377. doi: 10.1038/s41598-018-24818-w.
- Puyo CA, Peruzzi D, Earhart A, Roller E, Karanikolas M, Kollef MH, Krupnick AS, Kreisel D, Ibrahim M, Gelman AE. Endotracheal tube-induced sore throat pain and inflammation is coupled to the release of mitochondrial DNA. Mol Pain. 2017 Jan-Dec;13:1744806917731696. doi: 10.1177/1744806917731696.

Patents

- Published PCT patent application- ANTI-NEUTROPHIL ACTIVITY ON INNATE IMMUNE RESPONSE(WO2017127830)