

Mieke A. Soens, MD

Brigham and Women's Hospital, Boston, MA

The Role of Specialized Pro-resolving Mediators in the Development of Persistent Post-Surgical Pain

Abstract

Persistent post-surgical pain (PPSP) affects millions of patients every year. Pain recovery varies greatly between patients after the same surgical procedure: some patients report fast resolution and others a much slower course. The mechanisms underlying this variability are unknown. Surgery naturally triggers an inflammatory response to promote wound healing. However, when excessive and uncontrolled, it can lead to chronic inflammation and possibly PPSP. Inflammation resolution is an important programmed response, requiring production of specialized pro-resolving mediators (SPMs). SPMs have potent analgesic actions in several murine pain models. Therefore, I hypothesize that PPSP results from failed resolution of acute inflammation via down-regulated SPM pathways and/or upregulated pro-inflammatory pathways. To address this, I have three specific aims. Firstly, to investigate whether PPSP patients have reduced SPM biosynthesis, compared to fast resolvers. Secondly, I will determine if PPSP is associated a higher ratio of pro-inflammatory to pro-resolving mediators. Thirdly, I will determine if reduced leukocyte SPM receptor expression contributes to the development of PPSP. Methods: SPM and pro-inflammatory pathways will be assessed in perioperative blood samples from patients undergoing thoracic surgery using metabolite-lipidomics. Daily pain scores will be obtained for 60 days after surgery through SMS text messaging. The effects of perioperative SPM signature on pain recovery patterns will be statistically evaluated. This will be the first translational study to rigorously test the role of SPMs in PPSP in humans. My broad long-term objective is to understand the mechanisms that drive recovery from pain after surgery.