Abstract
Pain and the relief of pain are strongly affected by learning. Classical conditioning techniques have been used in experimental settings to manipulate pain relief, i.e. conditioned analgesia. Through multiple neurotransmitter systems, including endogenous opioids, these manipulations engage neural circuits in pain, pain modulating, and reward pathways which in turn lead to changes in spinal cord activity. Despite these discoveries, optimal features of behavioral protocols to condition analgesia remain unknown. Whether conditioned analgesia could occur in sensitized tissues, e.g. post-operative pain, is also unknown. The objective of the current proposal is to extend our understanding of conditioned analgesia, optimize its effectiveness, and systematically apply our current state of knowledge to post-operative pain management. Healthy human subjects will be used to determine optimal type, timing, and duration of conditioning cues used to achieve conditioned analgesia. Multiple paradigms of experimental pain relief will be used including offset analgesia and cooling heat pain in capsaicin sensitized skin. Importantly, a pilot study will be performed in patients recovering from surgery to determine the feasibility of pairing conditioning cues with analgesia from intravenous opioids delivered by a patient-controlled analgesia (PCA) pump. The current proposal relates to anesthesia practice by investigating mechanisms of pain relief and novel methods of pain management in the post-operative setting.