Non-Technical Summary

Term and preterm newborns undergo a significant number of painful procedures during mechanical ventilation and intensive care. Exposures to repetitive pain are associated with short-term and long-term sequelae in brain development. Despite potential neurotoxicity, opiates and benzodiazepines are most commonly used for analgesia/sedation. Researchers have raised important issues about the long-term neurodevelopmental sequelae following such therapies. Our primary objective is to evaluate the combination of dexmedetomidine and low-dose ketamine as a neuroprotective sedation/analgesia strategy in preterm and term ventilated neonates leading to improved neurodevelopment.

Assessment of neonatal pain is also an unresolved problem in this non-verbal population. To date, no gold standard has been identified for accurately quantifying pain in neonates. The second objective will be to assess the feasibility and reliability of an innovative, non-invasive, continuous pain monitor developed at Stanford. This could be a fundamental step toward improving the accuracy of neonatal pain assessments, which is the necessary condition for evaluating novel agents given for analgesia/sedation to ventilated newborns.

To this aims, we have started an active collaboration with Prof. KJS Anand, director of the Pain/Stress Neurobiology Laboratory at Stanford University School of Medicine and the Neonatal Neuro-Intensive Care Unit at Lucile Packard Children’s Hospital at Stanford.