

AUTHENTICATION OF KEY RESOURCES – PROJECT 3 – BIOMARKERS OF HUMAN EPILEPTOGENESIS AFTER TRAUMATIC BRAIN INJURY

For Project 3, the entirety of the research effort takes place in Neurocritical Intensive Care Units at the collaborating institutions. At each facility, the modern NICU is a highly instrumented setting with up to 28 specialty care beds each independently equipped with multiple dedicated automated real-time physiologic monitoring. At minimum, under National Neurotrauma guidelines, standard NICU practice has long included multiple cardiac-, pulmonary-, blood- and brain-specific devices, all of which generate electronic signals in standard computer-readable formats and all of which are capable of 24/7 information feeds. NICU physician and nursing staffs at every institution are constantly undergoing training and certification in the use of these monitors and electronics, and their applicability to the full range of patient conditions. Special to this Project will be only continuous and depth EEG, which is performed in selected settings at this time. Continuous and depth EEG device placement, signal capture, verification and clinical integration will be the subject of directed training by Dr. Vespa and colleagues over the course of the study for those facilities not yet performing cEEG regularly.

Each collaborating facility incorporates a modern magnetic resonance imaging device (either Siemens or General Electric, 3 tesla). The device is staffed with radiology specialists and overseen by dedicated physicians. For purposes of signal conformance each device will be tested in Years 1 and 2 using a purpose-built MRI phantom, shipped sequentially twice to each facility. The oversight for phantom testing and signal interpretation rests with Drs Ellingson and Monti at UCLA and does not require any additional on-site training or staffing in the collaborating settings.

Each NICU is also equipped with high-speed standalone and networked computing capabilities. With the universality of internet connections and the IAC's standing web-enabled interfaces, no special software, algorithms, or intermediate storage devices will be needed to engage such capacities remotely to and from the central IAC data repository.