

AbstractID: 1241 Title: A new technique in pharmacological fMRI to investigate the effects of isoflurane and equithesin on rat brain stimulation

Functional magnetic resonance imaging (fMRI) was used to investigate neural activations in rat brains. Recent fMRI studies have focused on utilizing simple stimulation paradigms to study different brain regions. The goal of this work was to design a simple stimulation paradigm that provides consistent and reproducible neuronal activations in rats' cerebral cortex, and then test the effects of two commonly used anaesthetics on these robust activations. This was achieved using a simple air puff technique whilst the rats were anaesthetised with two different anaesthetics (Isoflurane and Equithesin). Eight male Sprague-Dawley rats (358±24g) were scanned over four weeks using a Bruker BIOSPEC 47/30 animal magnet. Gradient echo echo-planar-imaging (EPI) acquisitions, using axial and sagittal slice orientations, were used for the functional scanning. Imaging parameters were very crucial to eliminate motion and ghosting artefacts as well as minimising image distortion. This was done by using the following parameters: FOV=6cm, slice thickness/ gap=1/1mm, TR=3745msec, TE=9.8msec, MTX=64x64, number of echo train segments= 1 (axial) and 2 (sagittal), and EPI trim=63µsec (axial) and 64µsec (sagittal). The SPM99 results of fMRI scans showed reproducible and consistent neural activations in the cerebral cortex, with the highest activations observed in the left barrel field region (Z score = 7.9) when Isoflurane was used, whereas Equithesin showed no neural activation in 15 of 16 experiments (n=8). This indicates a suppressive effect of Equithesin on rat brain activity in response to sensory stimulation. This novel technique could also be used for consistent whisker stimulations, producing more focused activations.