

Advancing the translational potential of functional connectivity MRI in non-human primates

Short title: Translational functional connectivity MRI in non-human primates

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Abstract

Objective biomarkers are critically needed to improve clinical management of brain disorders that do not cause structural abnormalities. Developing biomarkers capable of accurately characterizing patients with various types of metabolic, pain, or neuropsychiatric disorders would significantly advance modern medicine.

The current proposal is part of a larger vision, which aims at advancing the potential to use resting-state functional connectivity MRI (rs-fcMRI) toward this end. The range of basic science and clinical applications of this powerful new approach is advancing rapidly, and has recently caught the collective attention of the scientific community. However, the full realization of this effort will require carefully controlled investigations in non-human primates in order to characterize the physiological mechanisms responsible for the measured signals and utilize the technique in translational research. Although some evidence exists that rs-fcMRI signals in sedated non-human primates are at least partly homologous with humans, surprisingly little work has been done to optimize the experimental conditions for nonhuman primate studies. Therefore, the current pilot has two aims.

First will be to determine the sedation procedures that optimize sensitivity in non-human primate studies. The second aim will address our ability to examine group differences, using animals that have matured under unique dietary conditions. Because of the state-of-the art animal facilities at OHSU/ONPRC, the rise in prominence of rs-cMRI in the scientific community, and the large number of investigators at OHSU/ONPRC conducting translational research that could utilize this particular approach, ONPRC is an ideal setting to systematically develop this program.