

STATEMENT OF WORK (SERVICES) (SOW)

GENERAL INFORMATION

Title of Project:

Ex vivo human hippocampus mapping: correlating multidimensional MRI, histology, proteomics, and transcriptomics.

Statement of Need and Purpose:

Highly characterized (e.g., body mass index, neuropathological examination of cardiovascular conditions, circle of Willis atherosclerosis score, white matter rarefaction score, coronary atherosclerosis score, heart weight, myocardial infarct score, and clinical diagnoses) fixed human temporal lobe specimens that include the hippocampus from Alzheimer's Disease patients were obtained by Laboratory of Behavioral Neuroscience (LBN) at the National Institute on Aging (NIA) from the Banner Sun Health Research Institute Brain and Body Donation Program (BBDP). The specimens were loaned to the LBN for advanced multidimensional MRI characterization through a material transfer agreement. Upon completion of the MRI scans, the LBN will ship the specimens back to the BBDP to perform histological assessment that is vital for radiological-pathological correlation and the completion of the study.

Background Information and Objective:

Microstructural MRI techniques are unique among neuroimaging modalities because they probe tissue features at the micron scale that are invisible using other methods. This class of MRI methods promises to address the unmet needs for neuroimaging in Alzheimer's disease (AD) and related dementias: (1) early detection of subtle cellular and protein alterations and (2) delineation of comorbid pathologies. In particular, diffusion MRI is sensitive to alterations in cellularity and other microstructural changes, and relaxometry MRI is sensitive to chemical composition and macromolecular content. Combining both modalities, multidimensional MRI is an emerging modality that maximizes chemical and microstructural information by probing relaxation and diffusion mechanisms simultaneously. This approach is ideal for detecting AD pathology, namely beta-amyloid plaques and Tau tangles, as well as comorbid pathologies. In order to actualize the promise of this method, a bridge must be built between the pathologic changes that define AD and detectable multidimensional MRI signatures. Investigators in the Laboratory of Behavioral Neuroscience, Laboratory of Genetics & Genomics, and the Translational Gerontology Branch propose three research aims that apply a "bottom-up" approach, using radiologic-pathologic correspondence findings in postmortem human tissue, and perform the first study that uses this MRI technology in conjunction with histology, transcriptomics, and proteomics to deliver a clear understanding of the associations between specific cellular and macromolecular alterations in AD and the MRI responses to them.

Period of Performance:

The anticipated period of performance is 4 months after contract award.

SCOPE OF WORK

General Requirements:

Independently and not as an agent of the Government, the Contractor shall furnish all the necessary services, qualified personnel, material, equipment, and facilities, not otherwise provided by the Government as needed to perform the Statement of Work below:

Specific Requirements:

Upon receiving the samples, contractor shall serially section the entire slab of each sample, producing free-floating 80 µm thickness slices. The contractor shall then stain for amyloid beta, pTau, GFAP, Iba1, and myelin, at 4 different equally spaced levels from each sample, spanning the entire thickness of the slab. The contractor shall then send LBN the stained slides, and if possible, digitized scanned images of them. Additionally, the contractor shall take one 200 µm section from each specimen before serial-sectioning the rest of the block, put it in a tube with buffer and send back to LBN.

LEVEL OF EFFORT:

N/A

GOVERNMENT RESPONSIBILITIES

The government will send the specimens to be processed.

DELIVERY OR DELIVERABLES

The contractor shall deliver an electronic copy of the results of the analysis within three (3) months from the date of receipt of the contract.

REPORTING REQUIREMENTS

N/A

OTHER CONSIDERATIONS

Travel:

N/A

Key Personnel:

N/A

Information System Security Plan:

N/A

Data Rights:

The National Institute on Aging shall have unlimited rights to and ownership of all deliverables provided under this contract including reports, recommendations, briefings, work plans and all other deliverables. This includes the deliverables provided under the basic contract and any

optional task deliverables exercised by the contracting officer. In addition, it includes any additional deliverables required by contract change. The definition of “unlimited rights” is contained in Federal Acquisition Regulation (FAR) 27.401, “Definitions.” FAR clause 52.227-14, “Rights in Data-General, ” is hereby incorporated by reference and made a part of this contract/order.

Section 508—Electronic and Information Technology Standards:

N/A

Publications and Publicity:

The contractor will work with the National Institute on Aging on publications. Any publications are required to follow the National Institute on Aging publication procedures.

Confidentiality of Information:

N/A