



The BRAINet SYNAPSE

BRAINet is a friends group of the OHSU Brain Institute (OBI) that helps build community awareness, interest, and support for neuroscience research at OHSU.

BRAINet Synapse Newsletter

June 2017

President's Message

*By Helen Richardson,
BRAINet President*

Greeting BRAINet Members and Friends,
This month, in addition to our luncheon, we have an opportunity to view the screening of a documentary detailing a most interesting phenomenon. For complex sociological and psychological reasons, there are Japanese people who withdraw from society. Dr. Alan Teo, assistant professor of psychiatry, has investigated and become an expert on this phenomenon, known as Hikikomori. On Thursday, June 29 at noon, a short documentary film made for Fusion TV will be screened at OHSU Hospital, 8B60 Auditorium. This is a new concept to me and I'm interested in learning about it. In our current uncertain times, there may be information we might find applicable ourselves.

Otherwise, enjoy the beginning of summer and don't forget the sunscreen!

Best regards,

Helen Richardson, President

For more information about this event, please visit:
<https://goo.gl/3n1UAY>

June Lecture Luncheon

June's lecture luncheon will be on **Monday, June 19, at 11:30 a.m.** at the Multnomah Athletic Club. Robert Peterka, Ph.D., will present "*Engineering Balance: Controlling balance in humans and robots.*"

Dr. Peterka is an associate professor of biomedical engineering at OHSU and a research investigator at the National Center for Rehabilitative Auditory Research at the VA. His research is focused on how the brain uses various sources of sensory information to provide an accurate sense of orientation.

11:30 Registration and Lunch Served

12:00-1:00 Lecture

To register and pre-pay to secure your reservation please visit:

<https://goo.gl/Qokm67>

Registration will close at midnight on Wednesday, June 14.

This month we will be served Nicoise Salad with Oregon Bay Shrimp.

We were lucky enough to hear from Dr. Jeffrey Pollock at May's lecture luncheon regarding the past, present, and future of functional MRI. Not coincidentally, he also penned a blog in April in conjunction with Neurodiagnostic Week, a time to honor and celebrate the contributions of our neurodiagnostic professionals.

From On the Brain Blog:

April Spotlight: Neuroradiology and the fMRI exam

By Jeffrey Pollock, M.D.

Our [Neuroradiology department](#) is an integral part of the diagnostic evaluation process and collaborates with all OHSU clinical and medical teams including but not limited to neurosurgery, interventional neuroradiology, ENT surgery, orthopedic surgery, and vascular surgery.

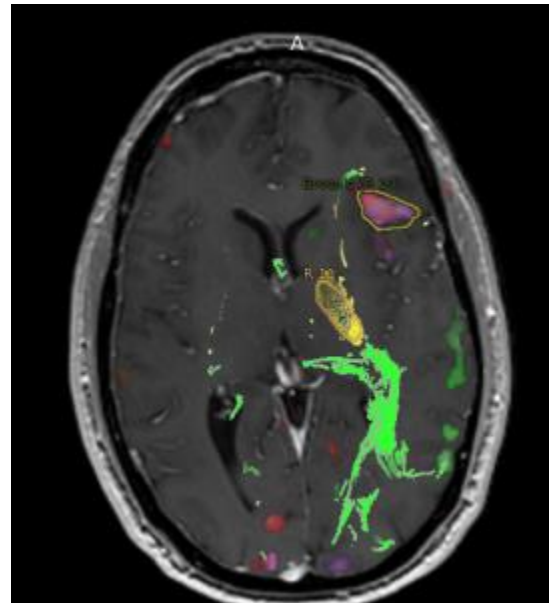
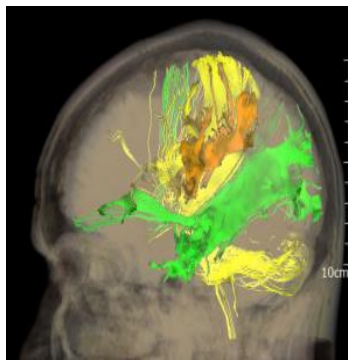
One of the most advanced techniques we use is a [functional magnetic resonance imaging \(fMRI\) exam](#). This exam is tailored to the location of the brain lesion, regions of clinical concern, and the normal brain adjacent to it.

The goal is to allow the neurosurgeon or clinician to plan the optimal, least invasive approach, and to allow the surgeon to more completely excise a mass or portion of the brain while preserving as much normal function as possible.

How it works:

Functional MRI is based on changes in blood flow to regions of the brain associated with an activity.

For example, when you move your fingers, the neurons in your brain that tell your finger to move need more oxygenated blood and the body delivers more blood to these cells.



The MRI scanner can measure these very small changes in blood flow and display them on an image. The test is designed to evaluate different tasks such as tapping your fingers or reading/thinking of words.

These tasks allow the MRI to identify these critical areas of the brain cortex before surgery. To identify the “wiring of the brain” or the connections between the cortex and your extremities, we use a technique called diffusion tensor imaging (DTI).

This complex MRI sequence allows visualization of the white matter of the brain and shows where regions of the brain are connected.

The fMRI and DTI images are then incorporated together into the operating room so the neurosurgeon can navigate around these critical areas and perform the surgery without damaging these areas.

An fMRI is often indicated for presurgical planning for many conditions including but not limited to epilepsy and brain tumors.

fMRI allows a patient to better understand the potential risks of having surgery. [Many studies have shown reduced morbidity and increased](#)

[survival rates in patients who have had preoperative fMRI.](#)

I started the current fMRI program in 2008 when I arrived at OHSU from Wake Forest University. In the beginning of the program, all the fMRI exams were audio based. Patients would have to listen to words being read to them while in the scanner.

While the fMRI was often successful, the MRI environment is quite loud so some patients had difficulty hearing the words. The potential of the technology was still demonstrated and many patients had great results.

OHSU realized the potential and made significant investments in hardware and software which allowed patients to see the fMRI data with a large MRI compatible LCD monitor.

Now patients will silently read words or follow instructions on the screen to move their fingers. The visual based fMRI system has allowed many more patients to benefit from the technology. In addition to the hardware upgrade, the new software allowed for seamless integration of the fMRI and DTI data into the surgical environment.

Over 300 patients have since been successfully scanned making OHSU one of the most active fMRI programs on the west coast.

Brain in the News:

by George Ivan Smith, BRAINet member

Gut and brain is a new frontier in neuroscience that gets extensive consideration in *Cerebrum*, May 1, 2017. Microbiota is the collective fungi, viruses, bacteria and other microorganisms that live in the digestive tract, and have been linked to disorders such as schizophrenia, autism, Alzheimer's and Parkinson's.

For many decades we saw the gut microbiota as bacteria that did us no harm and little benefit. But now we believe the gut microbiota is, in effect, a virtual organ of immense importance.

“The brain-gut-microbiota axis” enables two-way communication between gut and brain. The gut microbes collectively weigh about three pounds, and contain ten times the number of cells in our bodies, and over 200 times as many genes as our genome.

Many of the genes in our microbiota are important for brain development and function; they enable gut bacteria to synthesize neurotransmitters and neuromodulators such as GABA, serotonin, dopamine, and short-chain fatty acids. Many products of microbiota are transported widely and are needed for proper functioning of diverse organs. Gut microbes depend on us for nourishment; anything that reduces or increases food intake affects them.

Communication between gut and brain likely includes neural, endocrine, immune, and meta-bolic paths. The long vagus nerve is thought to be a key bidirectional pathway.

Chemicals such as tryptophan, leptin, and ghrelin are produced or have their production controlled by gut microbes, and regulate mood and appetite. Cytokines—key immune molecules—produced in the gut travel through the blood stream, and influence brain function in certain regions, such as the hypothalamus, where there is a deficient blood brain barrier.

The article includes extensive details on recent Parkinson's research.

This extensive article is the work of Ted Dinan, MD, PhD, of University College, Cork, Ireland, and his colleague John F. Cryan, PhD.

Upcoming BRAINet Lecture Luncheons

July 17 “An update in pediatric neurology”

Yoon-Jae Cho, M.D.

*Chief, Division of Pediatric Neurology
Doernbecher Children’s Hospital*

August 21 “Brain and behavior perspectives on the complaint ‘I hear you but can’t understand you’”

Curtis Billings, Ph.D.

*Research Investigator and Audiologist, National Center for Rehabilitative Auditory Research
VA Portland Healthcare System*

September 18 “Interactive Effects of Context and Race on Facial Profiling”

Binyam Nardos, Ph.D.

*Post Doctoral Researcher
Fair Neuroimaging Lab*

October 16 “The science and science fiction of memory erasure”

Matt Lattel, Ph.D.

Professor, Department of Behavioral Neuroscience

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