



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

January 2017

President's Message

*By Helen Richardson,
BRAINet President*

Greetings BRAINet members!
I hope you were not terribly inconvenienced by the snowy weather and perhaps had a chance to enjoy the blankets of white. I got to spend an unscheduled night in the Chicago airport between Portland's two snows.

As we come to the end of 2016, I wish you happy, safe holidays and look forward to continuing with you our exploration of the brain via the many wonderful OHSU researchers who graciously share with us their knowledge and experience.

Best regards,

*Helen Richardson,
President*



November Lecture Luncheon Summary

*By Julie Branford,
Past BRAINet President*

Neuroscience: Past, Present and Future
By Robert Hitzemann, Ph.D.

Dr. Hitzemann gave us a whirlwind overview of about 4,000 years (yes: 4,000) of neuroscience starting when our very early ancestors discovered that eating certain foods made for some strange experiences! He gave this presentation as he steps down after 16 years as the department Chair for Behavioral Neuroscience as of January 1. He said that when he began his career, neuroscience researchers were absolutely certain that there were no more than four neurotransmitters, and now researchers state that there are 30 to 100, and perhaps more.

In the 1800's, Phineas Gage had an improbable accident when a metal rod went through his brain, and yet he survived even with much of his brain's left frontal lobe being destroyed. His personality, however, has drastic changes. This caused physicians to question both why he survived

and why his personality changed with the accident.

It wasn't until about 1900 that it was determined that the brain has discrete cells: neurons. In 1921, Otto Loewi demonstrated that neurons communicate by releasing chemicals and that there are chemical synapses.

Then there was the concept of Phrenology: the mapping of the brain for which areas do which kinds of things. In 1909, Korbinian Brodmann first mapped the brain area functions, noting that the back of the head is where the primary visual cortex is and that if a person were to be hit hard there, the person could go blind.

In 1940, Wilder Penfield, a pioneering neurosurgeon, began researching electrical stimulation while treating epilepsy patients, expanding brain surgery's methods and techniques.

In 1953, H.M. (Henry Holaison) lost his memory on an operating table when his hippocampus was removed to treat his epileptic seizures. He lived until the age of 82 and maintained his intelligence, but with no short-term memory.

Now, we have tools such as fMRI to show us what areas of the brain light up when a hand is moving or when we are fearful or happy. This is a very long way to come in the last 120 years or so.

Dr. Hitzemann then moved to the areas of the brain and behavior (behavioral neuroscience), starting with Freud who proposed the first complete theory of personality and proposed the idea of a conscious, a sub-conscious, and an unconscious. Karl Jung and B.F. Skinner then followed with their own theories of areas of the brain that were tied to

emotions, such as the amygdala being tied to fear.

He then talked about some of the drugs that were used to study the brain and behaviors --- probably some experiments that would not be allowed today. He mentioned that during WWII, with a shortage of pilots, the Air Force gave pilots amphetamines to keep them awake and flying more and longer missions. The

Japanese did the same thing with their pilots.

Dr. Hitzemann shared with us the fact that the brain peaks in size at about age seven or eight, and then starts pruning and reorganizing itself in adolescence to develop the

adult brain. Starting at about age 20, we start losing dopamine at about 1-2% per year and that if we live long enough all of us will develop Parkinson's Disease due to insufficient dopamine in the brain. We have hope, however, in that if we do some other form of exercise every day for 20 minutes, we can slow the loss of dopamine by actually developing new dopamine.

As for the future, he mentioned The Human Brain Project that has a lot of potential, but is deeply underfunded. He commented that right now, there is so much data that it is hard for anyone to cope with it or understand the meaning of all of the facets.

He also talked about new technologies such as optogenetics, where light is used to control cells like neurons that have been genetically modified to express light-sensitive ion channels. Another new technology is CRISPR gene editing, which could delete mutations that are passed down through generations, thereby potentially preventing some diseases or conditions. This, of course, is controversial and laden with both promise and concerns about improper use.



January Lecture Luncheon

Our lecture luncheon will be on **Monday, January 16, at 11:30 a.m.** at



the Multnomah Athletic Club. Dr. Tarvez Tucker will speak on *“The Neurobiology of Happiness.”* Dr. Tucker is a

neurologist specializing in neurocritical care.

11:30 Registration and Lunch Served
12:00-1:00 Lecture

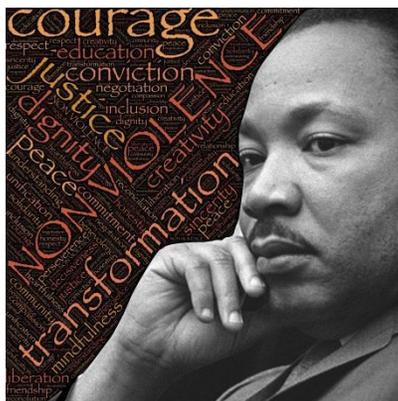
To register and pre-pay to secure your reservation (you can renew your membership at the same time!), please visit:

<http://goo.gl/llk4bn>

Registration will close at midnight on Wednesday, January 11.

This month we will be served Green Adobo Chicken Enchilada.

Please note that this date is Martin Luther King, Jr. Day.



Brain in the News

by George Ivan Smith, BRAINet member

Aphasia, a language disorder caused by damage to the brain, often by a stroke, ranges from trouble remembering words to full loss of language. Common objects are separated from their names—a very frustrating experience.

Research on aphasia (reported by Laura Ehrlich in Dec. 2016 *Brain In The News*) confirms that therapy can help the brain keep healing—even years after a stroke. Swathi Kiran, a speech-language & hearing professor leading The Sargent Project, and PhD candidate Jeffrey Johnson, have proved wrong the persisting notion that the brain reaches a recovery threshold and stops healing.

The researchers, in the Aphasia Research Lab, began in 2013, recruiting 15 people who had a stroke in the brain's left hemisphere at least 10 months prior, plus a control group of 16 healthy adults. All subjects underwent fMRI scans to determine damage and obtain a baseline for treatment.

Kiran and Johnson were surprised to find that the damaged regions for language processing (portions of the frontal, temporal and parietal cortex) were more active than the brains of healthy individuals. Language processing is usually automatic. With a stroke language becomes laborious. The goal of therapy is to train the brain to focus and approach language more efficiently.

Also surprising, the researchers found the patients' healing activity was not taking place along a right-brain, left-brain divide; it depends on which parts of the neural network are damaged, and how the rest of the network figures itself out.

The implications of this study are profound. Kiran says therapists can tell patients that their brains are actively trying to return to normal even years after a stroke.

Many details in this research will reward those who read the whole report.

Save the Dates!
2017 BRAINet Luncheon Speakers

- February 20** **Peter S. Spencer, PhD, FANA, FRCPath:** *“Mysterious Epidemics of Nods and Fits in East African Children”*
- March 20** **Vijayshree Yadav, M.D.:** *“MS and the diet buzz – an update”*
- April 17** **Annette Totten, Ph.D., and Emily Morgan, M.D.:**
“Update on geriatric medicine and dementia screening”
- May 15** **Matt Lattal, Ph.D.:** *“The science and science fiction of memory erasure”*
- June 19** **Robert Peterka, Ph.D.:** *“Engineering balance: Controlling balance in humans and robots”*



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