**Colleague Vanessa R post to week 4 discussion 1**

**PSY625, Week 4: Disorders of Memory and Language Alzheimer’s Disease (Group 2)**

Alzheimer ’s disease (AD) is a degenerative cognitive disease that stems from hereditary and environmental factors.  The ApoE4 genotype has been linked as a risk factor for AD. Results from a study by Striepens et.al indicated that ApoE4 carriers performed worse on episodic memory than non-carriers and smaller left hippocampal volumes; while non-carriers had larger right hippocampal volumes (2011). However, the presence of this genotype does not guarantee that the disease will express itself.  As with most complex neurological phenomenon, multiple mechanisms contribute to this disease.  In the same study of ApoE4 carriers, individuals who did not suffer from subject memory decline had the opposite effect: better memory performance and a larger hippocampus (Striepens et.al, 2011). Clearly another mechanism is at play that produces this effect in AD resistant pathology. Multiple studies point to the hippocampus for episodic memory recall, and MRI imaging of patients with AD illustrate the hippocampus volume reduction.  Impairment in this region results in the progressive memory loss characterized by AD.  A 2018 study identified a synaptic pathway in the CA1 hippocampus that controls spatial learning and memory prevalent to AD (Yang, 2018).

Interestingly, a recent study by Shakerin et al. demonstrated neurogenesis in the hippocampus in rats which had been previously injected with amyloid-beta (Aβ1-42) – simulating AD (2020).  “Aggregation and deposition of Aβ in the brain lead increase in acetylcholinesterase activity, induction of oxidative stress, inflammation, and impairment of learning and memory” (Shakerin et al., 2020, pg. 4).  These conditions suppress neurogenesis in the hippocampus.  This study found that treatment with Cyperusrotundus extract could repair spatial memory. Cyperusrotundus extract is a medicinal herb found in Islamic traditional medicine that contain flavonoids; a compound found to help regulate cellular activity. It was specifically observed to improve memory impairment and increase the mitochondrial mass in CA1. Therefore, it is assessed that the flavonoids’ ability to regulate cellular activity produced the improvement of hippocampus functioning in the Aβ rat model (Shakerin et al., 2020).  I personally believe this is an exciting discovery, and would like to see its effect in human trials.

Resources:

Striepens, N., Scheef, L., Wind, A., Meiberth, D., Popp, J., Spottke, A., . . . Jessen, F. (2011). Interaction effects of subjective memory impairment and ApoE4 genotype on episodic memory and hippocampal volume. Psychological Medicine, 41(9), 1997-2006. doi:http://dx.doi.org.proxy-library.ashford.edu/10.1017/S0033291711000067

Shakerin, Z., Esfandiari, E., Razavi, S., Alaei, H., Ghanadian, M., &Dashti, G. (2020). Effects of cyperusrotundus extract on spatial memory impairment and neuronal differentiation in rat model of alzheimer's disease. Advanced Biomedical Research, 9(1), 17. doi:http://dx.doi.org.proxy-library.ashford.edu/10.4103/abr.abr\_173\_19

Yang, X., Yao, C., Tian, T., Li, X., Yan, H., Wu, J., . . . Lu, Y. (2018). Synaptic mechanism in alzheimer's disease: A selective degeneration of an excitatory synaptic pathway in the CA1 hippocampus that controls spatial learning and memory in alzheimer's disease. Molecular Psychiatry, 23(2), 167. doi:http://dx.doi.org.proxy-library.ashford.edu/10.1038/mp.2018.1