New research increases understanding of drug effects in treatment of Alzheimer's Disease

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Just like one size doesn't fit all, it appears that some pharmaceuticals designed to improve mental ability may do the opposite when given to people with normal mental function. Scientists from Trinity College Dublin, in a collaboration between the Trinity College Institute of Neuroscience, the pharmaceutical company GlaxoSmithKline and St. James's Hospital Dublin, have used a novel combination of technologies to better understand the mechanics of a commonly prescribed medication for Alzheimer's Disease. The collaboration is supported by the Irish Development Agency (IDA).

Human brain scanning studies typically use one of two technologies; electroencephalography (EEG), which is great at telling you when something happens but poor at telling you where it happened, or functional magnetic resonance imaging (fMRI), which is great at telling you where something happened but poor for telling you when it happened. A handful of institutions worldwide have developed the ability to successfully combine these techniques, and Trinity College Institute of Neuroscience – Ireland's centre of excellence for neuroscience research – is one of the first to apply simultaneous EEG/fMRI to the understanding drug effects in healthy individuals.

A study published this month in *PLoS ONE* (dx.plos.org/10.1371/journal.pone.0024126), combines a short (six hour) and long-term (four week) assessment of healthy older individuals taking an Alzheimer's medication (Donepezil) or a placebo. The results showed that healthy individuals who took the medication performed worse on a memory task compared to their individual pre-drug baseline, and to the placebo group. This poorer performance was coupled with reduced neural oscillations as measured by the EEG. By simultaneously acquiring fMRI it was possible to source these changes to specific anatomical regions, which will help in the development of more effective medication in the treatment of Alzheimer's Disease.

Dr. Joshua Balsters, from Trinity College Institute of Neuroscience, Dublin, said: "Drugs are often tested on their target audience, but it's clear that we should also be testing them on healthy individuals as well. This study highlights two simple tests that can be administered as early as six hours after the first dose to check if the person is responding well to the drug".

Professor Ian Robertson of the Trinity Institute of Neuroscience said: "These groundbreaking methods of assessing the effects of pharmaceuticals in human volunteers offer a powerful way of speeding

up the development of novel treatments for conditions such as Alzheimer's Disease: Trinity College Institute of Neuroscience is optimally-placed to help Ireland establish an international lead in this novel approach to the fight against diseases of the brain."

Provided by Trinity College Dublin