

Breakthrough on physical cause of vegetative state, other 'disorders of consciousness'

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(Medical Xpress)—By exploring parts of the brain that trigger during periods of daydreaming and mind-wandering, neuroscientists from Western University have made a significant breakthrough in understanding what physically happens in the brain to cause vegetative state and other so-called "disorders of consciousness."

Vegetative state and related disorders such as the minimally conscious state are amongst the least understood conditions in modern medicine because there is no particular type of brain damage that is known to cause them. This lack of knowledge leads to an alarmingly high level of misdiagnosis.

In support of the study titled, "A role for the default mode network in the bases of disorders of consciousness," Davinia Fernandez-Espejo, a post doctoral fellow at Western's Brain and Mind Institute, utilized a technique called [diffusion tensor imaging](#) tractography to investigate more than 50 patients suffering from varying degrees of brain injury.

This state-of-the-art [magnetic resonance imaging](#) (MRI) technique allows researchers to virtually reconstruct the pathways that connect different parts of the brain in the patients while detecting subtle differences in their brain damage.

Specifically, Fernandez-Espejo was able to show that in vegetative state patients, a group of [brain regions](#) known as the default mode network that are known to activate during periods of daydreaming and mind-

wandering were significantly disconnected, relative to healthy individuals.

"These findings are a first step towards identifying biomarkers that will help us to improve diagnosis and to find possible therapies for these patients" says Fernandez-Espejo. "But they also give us new information about how the healthy brain generates consciousness."

The findings were released today in *Annals of Neurology*, the official journal of the [American Neurological Association](#) and the Child Neurology Society.

Provided by University of Western Ontario

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