

Eating blueberries could regulate genetic and biochemical drivers of depression and suicide

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A maturing 'Polaris' blueberry (*Vaccinium corymbosum*) Credit: Public Domain

For many people suffering from post-traumatic stress disorder (PTSD),

available medical treatments offer only limited relief. In a series of studies conducted in rats, researchers have found that eating blueberries could help to reduce the genetic and biochemical drivers behind depression and suicidal tendencies associated with the disorder.

"We need to conduct a clinical trial in people to be certain that this works, but based on our studies in animal models, there is evidence that [blueberries](#) may help to mitigate some of the problems associated with PTSD," said Joseph Francis, Ph.D., the Everett D. Besch Professor of Veterinary Medicine at Louisiana State University's School of Veterinary Medicine and the study's senior author. "And in the meantime, it seems safe to say that eating blueberries can't hurt—and may help—in people with PTSD."

Philip Ebenezer, Ph.D., a postdoctoral researcher in Francis's laboratory at Louisiana State University, will present this research at the American Society for Pharmacology and Experimental Therapeutics Annual Meeting during Experimental Biology 2016.

PTSD, an anxiety disorder that can develop after someone experiences a traumatic event, affects an estimated 6.8 percent of Americans at some point in their lifetimes. PTSD diagnoses have risen sharply in recent years and the disorder is particularly common among combat veterans. It is associated with a wide range of psychological, behavioral and social problems such as depression, substance abuse, relationship problems and an increased risk of suicide.

To investigate the biological factors that might contribute to PTSD and its effects, the research team developed a process that induces effects analogous to PTSD in rats, such as exhibiting fear instead of curiosity when presented with an unfamiliar object. They then assessed how eating a diet rich in blueberries affects those factors.

In the new study, the team focused on the role of a gene called SKA2, a gene that other researchers have found is expressed at abnormally low levels in people who have committed suicide. Although it is impossible to know whether a rat is experiencing suicidal thoughts, Francis and Ebenezer found that rats with PTSD-like effects express SKA2 at low levels compared with normal laboratory rats, bolstering the evidence for the role of SKA2 in psychological problems and suggesting the team's PTSD-like rats can be a useful model for studying the biochemistry behind suicidal tendencies.

The researchers then fed some of the PTSD-like rats a diet rich in blueberries—the equivalent of about two cups per day for a person—and found that SKA2 levels increased compared with rats fed a normal diet, suggesting the blueberries had a beneficial effect.

"In the PTSD animals, there was a decrease in the SKA2 levels in the blood, as well as in the brain's prefrontal cortex and hippocampus, compared to non-PTSD rats," said Francis. "Since these levels increased when we fed them blueberries, the findings suggest that a nonpharmacological agent like blueberries can have an effect on the expression of this important gene."

The work builds on a study released last year, in which Francis and Ebenezer found that [rats](#) with the PTSD-like experience fed a blueberry-enriched diet showed increased levels of the signaling chemical serotonin in the brain. Since serotonin is associated with feelings of happiness and well-being, that study suggested blueberries might help to alleviate depression in patients with PTSD.

The team is now pursuing research into the links between SKA2 and serotonin levels to find out whether blueberries may simultaneously help relieve feelings of depression and reduce suicidal tendencies through a single biological pathway.

There are a number of medications that increase [serotonin levels](#) and are used to treat depression. However, these agents, called selective serotonin reuptake inhibitors, or SSRIs, have shown limited success in treating patients with PTSD, and have even been linked with increased [suicidal tendencies](#) in some patients, particularly children and adolescents. Francis said the team's research aims to fill the treatment gap for PTSD sufferers who do not benefit from existing medications.

"There is an urgent need to identify novel targets for treating PTSD. Based on our findings, blueberries can not only increase serotonin, but also increase SKA2 levels, thereby potentially protecting against untoward behavior," said Francis.

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