New hybrid drug, derived from common spice, may protect, rebuild brain cells after stroke

February 10 2011

Whether or not you're fond of Indian, Southeast Asian and Middle Eastern food, stroke researchers at Cedars-Sinai Medical Center think you may become a fan of one of their key spices.

The scientists created a new molecule from curcumin, a chemical component of the golden-colored spice turmeric, and found in laboratory experiments that it affects mechanisms that protect and help regenerate brain cells after stroke. Research scientist Paul A. Lapchak, Ph.D., director of Translational Research in the Department of Neurology at Cedars-Sinai Medical Center, presented these findings at the American Heart Association International Stroke Conference in Los Angeles on Wednesday, Feb. 9.

Only one drug is now approved for ischemic stroke, which occurs when a clot blocks blood flow to the brain. Commonly called a "clot-busting drug," tissue plasminogen activator (tPA) is injected intravenously to dissolve clots and reinstate blood flow. If blood and oxygen are restored in time, consequences of the stroke, such as speech, memory, movement and other impairments, may be reduced.

The new curcumin-hybrid compound—CNB-001—does not attack clots but instead repairs stroke damage at the molecular level that feed and support the all-important brain cells, neurons.

Curcumin has been studied for its potential to treat brain injury and disease, and while the substance itself looks promising, it has several drawbacks, especially as an emergency stroke treatment, which must be quick to be effective: It is not well absorbed in the body, fails to reach its target in high concentrations, becomes depleted quickly, and is blocked from entering the brain by a natural protective mechanism called the blood-brain barrier.

"CNB-001 has many of the same benefits of curcumin but appears to be a better choice of compound for acute stroke because it crosses the blood-brain barrier, is quickly distributed in the brain, and moderates several critical mechanisms involved in neuronal survival," Lapchak says, adding that he and his colleagues expect the new drug to move to human clinical trials soon.

When brain tissue is deprived of blood and oxygen, a cascading series of interrelated events triggers at the molecular level, breaking down the normal electrical and chemical "signaling pathways" responsible for nourishing and supporting neurons. The environment quickly becomes toxic, killing brain cells and destroying their support structures.

Theoretically, interrupting these harmful events and restoring normal pathway function could prevent cell death and the memory and behavioral deficits that result, but it will take a cocktail of drugs or a drug capable of targeting many mechanisms to correct the many pathways damaged by stroke, Lapchak says. CNB-001protects brain cells from damage by repairing four major pathways. One mechanism also plays a major role in the growth and survival of neurons.

The drug reduced stroke-caused "motor deficits"—problems of muscle and movement control—in this laboratory study. It was effective when administered up to an hour after stroke, which correlates with about three hours in humans, the same time frame for which tPA is currently

approved.

Lapchak and colleagues at the Salk Institute for Biological Studies used the same laboratory rabbit model to mimic human stroke that earlier researchers had employed before the clot-busting drug tPA entered clinical trials. Patrick D. Lyden, M.D., chairman of Cedars-Sinai's Department of Neurology, helped lead a major trial that resulted in the Food and Drug Administration's 1996 approval of tPA, still considered the stroke treatment gold standard.

Those who cook Indian, Thai, Malay and Persian dishes know turmeric well for its zesty flavor, use in curries and for the rich color it imparts to food. Turmeric also has a long history of use in Ayurvedic and Chinese traditional medicine.

Provided by Cedars-Sinai Medical Center

Citation: New hybrid drug, derived from common spice, may protect, rebuild brain cells after stroke (2011, February 10) retrieved 1 May 2024 from https://medicalxpress.com/news/2011-02-hybrid-drug-derived-common-spice.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.