A Symposium Note by Christopher J. Patton, MA, MBA

Quantitative Proteomic Analysis for the Effects of Elderberry on Global Cerebral Ischemia in Mice

Hui Zhou, Zhe Qu, Jiankun Cui, Agnes Simonyl, Victoria A. Engel, Shanyan Chen, Shuwei Li, Jilong Li, Jianlin Cheng, Michael Greenlief, Andrew L. Thomas, Kevin L. Fritsche, William R. Folk, Dennis B. Lubahn, Grace Y. Sun, Zezong Gu. Center for Translational Neuroscience, Center for Botanical Interaction Studies, Departments of Pathology and Anatomical Sciences, Biochemistry, School of Medicine, Departments of Computer Science, Informatics Institute, Chemistry, Southwest Research Center, Division of Animal Sciences, College of Agriculture, Food and Natural Resources, University of Missouri, Columbia, MO, USA. Department of Chemistry, University of Maryland, College Park, MD, USA.

Stroke is the third leading cause of death and disability in aging adults. It is commonly caused by interference in blood flow to the brain that results in considerable brain damage. Elderberry has been found to exhibit benefits in human health through its antioxidant properties, which are assumed to offer beneficial effects on antagonizing inflammatory responses and preventing neurodegenerative diseases. Although interest in neuronal-related actions of elderberry is increasing, the molecular and cellular mechanisms underlying their mode of action have not been elucidated. In the present study, we selected a global cerebral ischemia mouse model. Mice were fed a semi-purified control diet (AIN-93G) for one of two experimental diets that contained elderberry (2% freeze-dried whole fruit) for 2 months prior to 30-min bilateral common carotid artery (BCCA) occlusion followed by 3-day reperfusion. We then conducted a comprehensive proteomic analysis to investigate the overall changes in protein levels in various regions of ischemic injury mice brain…

…In addition, with the proteins exhibiting significant protein level changes, Ingenuity Pathway Analysis (IPA) was used to identify multiple molecular targets and predict signal transduction pathways affected by elderberry. Our study may provide important insights into the molecular events underlying the treatment of elderberry and allow the identification of novel therapeutic targets.

This research took a deeper, more granular look at the positive effects of elderberry against stroke damage at the molecular level with emphasis on the protein changes and the molecular pathways used in effecting those changes. Key learnings here at this point are further support of the principle of using elderberry as a regular part of one's diet to reduce or prevent various disease symptoms or injury, elderberry impacts brain and central nervous system function at the protein level, and the evidenced potential to develop elderberry-based agents or drugs for specific, targeted medical treatment is enough to justify further research.

© Minnesota Elderberry Cooperative 2013