

# New Preclinical Study Finds Niagen® Corrects Social Deficits in Mouse Model of Autism

7/16/2020

First-of-its-kind preclinical study shows that Niagen® (nicotinamide riboside) resolves social deficits and anxiety-like behaviors in male mice

LOS ANGELES--(BUSINESS WIRE)-- ChromaDex Corp. (NASDAQ:CDXC) today announced the results of a new preclinical study published in **NatureScientific Reports** investigating the role of Niagen® (patented nicotinamide riboside) in addressing social deficits in Autism Spectrum Disorder (ASD). This new study joins a growing body of preclinical data demonstrating that boosting NAD+ (nicotinamide adenine dinucleotide) levels may have a positive effect on cognitive health. The study was the first to evaluate Niagen® in an Autism model.

Professor Haruhiro Higashida of Kanazawa University had shown that mice missing the CD157 gene have deficits in production of oxytocin and have social deficits, particularly in males, that resemble some characteristics of ASD. Working with Dr. Charles Brenner, ChromaDex Chief Scientific Advisor, Dr. Higashida's group found that CD157 mice also have low brain NAD+ and that their oxytocin and social deficits can be corrected by oral provision of Niagen®.

"When NAD+ levels were corrected in male mice, their oxytocin and behavioral deficits were corrected. Specifically, they gained the normal ability to interact with new individuals and to move to a comfortable location in a dark/light chamber," said Dr. Brenner. "Because low oxytocin has been seen in cases of human Autism, we think we can use these insights to select human participants that may respond to Niagen® in an Autism clinical study."

The researchers set out to investigate whether supplementation with Niagen® could affect mice with phenotypes (or traits/behaviors) associated with ASD. The neurotransmitter oxytocin is essential for feelings of happiness and

attachment and is depressed in various mental health conditions. Researchers examined mice missing the gene known as CD157 that is partially responsible for production and release of oxytocin. Male CD157 mice display behavioral traits that resemble those seen in some cases of ASD in humans.

Daily Niagen® supplementation was found to correct social deficits such as fearful and anxiety-like behavior in the male CD157 mice. Following supplementation, these mice were better able to recognize and display interest in other mice.

“Drs. Higashida and Brenner’s findings open a new avenue for the investigation of Niagen® in neurodevelopmental and behavioral conditions,” says Dr. Rudolph Tanzi, Vice Chair of Neurology and Co-Director of McCance Center for Brain Health at Massachusetts General Hospital, Joseph P. and Rose F. Kennedy Professor of Neurology at Harvard Medical School, and member of the ChromaDex Scientific Advisory Board. “These latest findings suggest that supporting NAD+ levels in the brain should be clinically explored in neurodevelopmental and psychological syndromes such as ASD. Dr. Brenner’s discoveries are ushering in an exciting era in neuropsychological research that may help address the most enigmatic and challenging cognitive diseases of our time.”

More research is required to translate the health potential of Niagen® from mice to humans. Over 40 human clinical trials have been or are being conducted on Niagen® across a multitude of organ systems and chronic conditions.

Dr. Brenner first discovered the vitamin activity of nicotinamide riboside in 2004 when he was on the faculty of Dartmouth College. He has served as the Roy J. Carver Chair & Head of Biochemistry at the University of Iowa since 2009. This summer, **Dr. Brenner’s laboratory** will relocate to the City of Hope National Medical Center in California, where he will continue his research as the Alfred E. Mann Chair of the new Department of Diabetes & Cancer Metabolism. ChromaDex, the exclusive licensee of Dr. Brenner’s patented NR, has since invested over \$35 million in investigating, manufacturing and offering NR in the form of Niagen® and has secured more than 20 patents. ChromaDex has demonstrated the safety and efficacy of Niagen® in ten published human trials (and over 20 ongoing studies) and has achieved government regulatory acceptance in the United States, Canada, the European Union, and Australia.

For additional information on the science supporting Niagen visit [www.chromadex.com](http://www.chromadex.com).

About ChromaDex:

**ChromaDex Corp.** is a science-based integrated nutraceutical company devoted to improving the way people age. ChromaDex scientists partner with leading universities and research institutions worldwide to discover, develop and create solutions to deliver the full potential of NAD and its impact on human health. Its flagship ingredient,

**NIAGEN®** nicotinamide riboside, sold directly to consumers as **TRU NIAGEN®**, is backed with clinical and scientific research, as well as extensive IP protection. **TRU NIAGEN®** is helping the world AGE BETTER®. ChromaDex maintains a website at [www.chromadex.com](http://www.chromadex.com) to which ChromaDex regularly posts copies of its press releases as well as additional and financial information about the Company.

## Forward-Looking Statements:

This release contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities and Exchange Act of 1934, as amended, including statements related to whether there is a growing body of preclinical data demonstrating that boosting NAD+ levels may have a positive effect on health and whether the oxytocin and social deficits in mice can be corrected by oral provision of Niagen®. Statements that are not a description of historical facts constitute forward-looking statements and may often, but not always, be identified by the use of such words as "expects", "anticipates", "intends", "estimates", "plans", "potential", "possible", "probable", "believes", "seeks", "may", "will", "should", "could" or the negative of such terms or other similar expressions. More detailed information about ChromaDex and the risk factors that may affect the realization of forward-looking statements is set forth in ChromaDex's Annual Report on Form 10-K for the fiscal year ended December 31, 2019 as amended, ChromaDex's Quarterly Reports on Form 10-Q and other filings submitted by ChromaDex to the SEC, copies of which may be obtained from the SEC's website at [www.sec.gov](http://www.sec.gov). Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date hereof, and actual results may differ materially from those suggested by these forward-looking statements. All forward-looking statements are qualified in their entirety by this cautionary statement and ChromaDex undertakes no obligation to revise or update this release to reflect events or circumstances after the date hereof.

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Source: ChromaDex Corporation