

First human clinical study of ChromaDex's NIAGEN nicotinamide riboside meets primary endpoint

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ChromaDex Corp. (OTCQX: CDXC) announced today that the initial results of the first human clinical study for the company's NIAGEN® nicotinamide riboside (NR) has met its primary endpoint. **The results demonstrated that a single dose of NR resulted in statistically significant increases in the co-enzyme nicotinamide adenine dinucleotide (NAD+) in healthy human volunteers.** The study shows for the first time a similar conversion of NR into NAD+ as has been shown in prior animal studies.

Maintenance of sufficient levels of NAD+ is key to cellular energy metabolism and mitochondrial function. If NAD+ levels go down or are redirected (as in cancer cells), mitochondrial function erodes, creating numerous adverse effects. For example, results of a mouse study conducted by the National Institutes of Health (NIH) in collaboration with ChromaDex published in November 2014 indicated that **NR was effective at restoring NAD+ levels in mitochondria and rescuing phenotypes associated with a devastating accelerated aging disease known as Cockayne Syndrome (CS).** The researchers concluded that NR showed promise as a potential therapy for the disease, as well as for other age-related neurodegenerative conditions.

In the first human clinical study of NIAGEN®, NAD+ metabolomic analyses were completed in blood for various time points over a 24-hour period. For the first time, the study also established an effective dose range for NR in humans.

A preliminary analysis of the results did not reveal any safety issues with NR, which is consistent with previous safety results demonstrated in numerous cell and animal studies.

The full results of the study will be submitted for peer review in the scientific literature.

The NAD+ metabolomics analyses were performed in the laboratory of Dr. Charles Brenner, the Roy J. Carver Chair of Biochemistry and Professor of Internal Medicine at the University of Iowa. In 2004, Brenner, who was then a faculty member at Dartmouth College, discovered NR to be a vital precursor of NAD+, which is made available by nicotinamide riboside kinases (Nrks) that are conserved between yeast and humans. In 2007, Dr. Brenner's lab discovered a second pathway by which NR is converted to NAD+ and showed that NR can extend the lifespan of yeast cells by virtue of elevating NAD+ levels and increasing the activity of the NAD+-dependent Sir2 enzyme.

Dr. Brenner commented, "The results of this study constitute a significant milestone in the translation of NR technologies as it is the first time an increase in NAD+ in humans has been demonstrated through NR supplementation. As noted in numerous scientific studies, the potential health and therapeutic benefits of NR as a precursor to NAD+ are significant. The results of this clinical study should encourage more studies and research regarding the possible health benefits of NR in humans."

Nobel Laureate Dr. Roger Kornberg, who chairs ChromaDex's Scientific Advisory Board, commented, "Demonstrating that NR is an effective precursor to increase NAD+ in humans has significant positive implications and may be a cornerstone to developing solutions to delay or reverse the effects of aging, obesity and disease."

Frank Jaksch Jr., founder and CEO of ChromaDex, commented, **"We believe the confirmation that a single dose of NR increases NAD+ in humans is a landmark result and a significant bridge between the numerous animal studies previously conducted that have demonstrated not only an increase in NAD+, but also a broad range of therapeutic benefits."**

Jaksch continued, "Dysfunctional cellular energy metabolism in mitochondria is increasingly implicated in diseases of aging, autoimmune diseases, muscle wasting, neuropathies and other conditions, and this study opens the door to the development of both consumer products and pharmaceuticals addressing these conditions."

ChromaDex's NIAGEN® is the only commercially available form of NR and is supported by five patents issued and several pending, with patents rights acquired from Dartmouth College, Cornell University and Washington University.

Published research has shown that NR is perhaps the most effective precursor to boost the co-enzyme NAD+ in the

cell. NAD⁺ is arguably the most important cellular co-factor for improvement of mitochondrial performance and energy. In recent years, NAD⁺ has also been shown to participate as an extracellular signaling molecule in cell-to-cell communication. NAD⁺ is essential in supporting healthy cellular metabolism, including the efficient conversion of blood glucose into energy.

As organisms age, NAD⁺ levels drop, which leads to a decrease in mitochondrial health; this in turn leads to age-related health issues. Low NAD⁺ levels limit the activity of a group of enzymes called sirtuins, which are believed to play key roles in longevity. NAD⁺ levels can be depleted by many of the stresses of life. By boosting NAD⁺, NR can increase mitochondrial health and induce creation of new mitochondria.

Source:

ChromaDex Corp.
