

SULFORAPHANE TREATMENT OF CHILDREN WITH AUTISM SPECTRUM DISORDER – A PROGRESS REPORT

Eileen Diggins, BA, Andrew Zimmerman, MD, Kanwaljit Singh, MD, Susan Connors, MD
Division of Neurology, Department of Pediatrics, University of Massachusetts Medical School

This ongoing clinical trial in autism spectrum disorder (ASD) tests a nontoxic approach to therapy of ASD.

Background: Direct treatment of underlying mechanisms in ASD is limited. Cellular dysfunction in ASD may involve a number of related metabolic pathways. The “fever effect” in ASD, in which febrile illness dramatically but temporarily ameliorates disordered behavior, offers a clinical clue. Fever stimulates heat shock proteins (HSP) and cellular stress responses that may ultimately lead to improved synaptic function and increased long-range connectivity. The expression of gene transcription by NFE2L2 (Nrf2), which is reduced in ASD, may also increase during fever. **Sulforaphane (SF)**, an isothiocyanate obtained from 3-day-old broccoli sprouts, induces HSP and Nrf2 as well as “cell-protective” responses. SF has several possible modes of action that may benefit ASD through common cellular mechanisms underlying heterogeneous phenotypes. SF crosses the blood-brain barrier and is bioavailable orally.

Preliminary data: In a randomized, double-blind, placebo-controlled pilot trial in 44 male adolescents and adults (13-30 years), results showed SF was well tolerated without significant side effects. On average, participants on SF (particularly those with a history of fever effect) showed significantly more improvements in ASD symptoms – including social interaction, aberrant/abnormal behavior, repetitive/stereotypical behavior, and verbal communication – than placebo participants.

Current study: Our randomized, double-blind, placebo-controlled phase-2 clinical trial at UMass has three aims: To determine: (1) if orally administered SF has measurable effects in children (ages 3-12 years) with ASD; (2) if treatment with sulforaphane is safe and well tolerated; (3) To elucidate cellular biomarkers that support the mechanisms of action of SF in ASD. We hypothesize that positive effects of SF will be more marked and lasting in the developing brain. To date, 7 participants have completed the trial, and 22 are actively enrolled. Recruitment is ongoing, with a target sample size of 50.

Contact:

Eileen Diggins
University of Massachusetts Medical School
Eileen.Diggins@umassmed.edu