

## Preventing cognitive decline in children with Down Syndrome using Targeted Nutritional Intervention (TNI)

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### Abstract:

Down Syndrome (DS) is the most common genetic disorder and has been characterized as a neurodegenerative disease, leading to early aging and Alzheimer's development in over 97 % of affected individuals.

Numerous mechanistical studies have determined the biochemical changes that the additional chromosome 21 causes, but only very few clinical studies on treating trisomy 21 with

TNI exist. Individuals with DS show systemic oxidative stress, due to SOD1 overexpression, which

contributes to early aging and loss of neurons. Due to alterations in the blood-brain barrier, certain

minerals can be deposited in the brain, leading to local inflammation processes. Since DS can also

be characterized as an immune disorder, with chronically elevated levels of proinflammatory cytokines such as IL-6, brain inflammation can be sustained. Furthermore, changes in neurotransmitter levels in the brain of individuals with DS involve overactivity of acetylcholinesterase, leading to lower levels of acetylcholine in the brain, further adding to the

development of early Alzheimer's disease.

TNI attempts to counterbalance many of the prominent genes involved in neurodegeneration and cognitive development, such as SOD1, CBS, DYRK1A, MECP2, miRNA-155 and others.

Normalization of systemic oxidative stress, one-carbon metabolism, methylation, mitochondrial

dysfunction, as well as neurotransmitter levels of histamine and acetylcholine in the brain can lead

to improvements in speech, memory, learning, neurogenesis as well as fine motor abilities and may

prevent early development of Alzheimer's.

Treating trisomy 21 early and comprehensively can improve quality of life of people with

DS and should be part of their medical care.

**Biography:**

Petra Buchanan has completed her PhD from the Friedrich-Alexander-University in Erlangen, Germany and continued her postdoctoral studies in translational cancer research at the University of California, San Francisco and the University of Minnesota, Minneapolis, USA. She finished her naturopathic training in 2019 and has a successful practice in Freiburg, Germany since May 2019, where she is specializing in Functional Medicine for children with Down Syndrome and other neurodevelopmental diseases and chromosomal disorders. She develops individual treatment plans based on the individual genetic and biochemical makeup.