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Gut microbiome marks Alzheimer's disease

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We reported the induction of neurotoxicity and neurodegeneration by tryptophan metabolites that link the metabolic alterations to Alzheimer's disease (AD). Tryptophan is a product of Shikimate pathway (SP). Human cells lack SP, which is found in human gut bacteria using exclusively SP to produce aromatic amino acids (AAA). The presented study is a first attempt toward gene targeted analysis of human gut microbiota in AD fecal samples. The oligonucleotide primers newly-designed for this work target SP-AAA in environmental bacteria associated with human activity. Using polymerase chain reaction (PCR) we found unique gut bacterial sequence in most AD patients (18 of 20) albeit rarely in controls (1 of 13). Cloning and sequencing AD-associated PCR products (ADPP) enable the identification of Na (+)-transporting NADH: ubiquinone reductase (NQR) in *Clostridium* sp. The ADPP of unrelated AD patients possess near identical sequences. NQR substrate, ubiquinone is a SP product and a human neuroprotectant. A deficit in ubiquinone has been determined in a number of neuromuscular and neurodegenerative disorders. The antibacterial therapy prompted the ADPP reduction in ADPP-positive control person who has been later diagnosed with AD-dementia. We explored the gut microbiome databases and uncovered a sequence similarity (up to 97%) between ADPP and some healthy individuals from different geographical locations. The difference in gut microbial genotypes between AD and controls revealed in this study is the breakthrough finding. The test is suggested for a non-invasive laboratory monitoring of AD and related/associated disorders.

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