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Early-life NMDA receptor antagonism may normalize Aspartame-impaired insulin tolerance and weight gain

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Non-nutritive sweeteners (NNS) are widely consumed as an alternative to dietary sugar, however physicians and diabetes educators are often asked if NNS are recommended for diabetic patients. Aspartame is one of the most widely available NNS, used in more than 6000 dietary products consumed by the general public including pregnant and lactating women, children and adults. Nevertheless, recent epidemiological studies have linked consumption of NNS with a counter-intuitive positive association with weight gain, Metabolic Syndrome and Type 2 diabetes. Additionally, a recent prospective study reported a doubling of the risk of being overweight amongst 1-year olds whose mothers consumed NNS-sweetened beverages daily during pregnancy. Therefore there is mounting evidence that exposure to NNS either prenatally or at a later stage of life is associated with an increased risk of being overweight. However the mechanism by which artificial sweeteners consumption may increase the risk of diabetes is still under investigation. Using an animal model which was designed to mimic patterns of human aspartame consumption, we have previously shown that chronic aspartame consumption by C57Bl/6J mice commencing in utero via the mother's diet, increased adult offspring body weight and impaired insulin tolerance. In the present study, we demonstrate that the detrimental effects of aspartame exposure on insulin tolerance can be normalized by maternal treatment with the competitive N-Methyl D-aspartate (NMDA) receptor antagonist CGP 39551. Our data supports findings from other researchers that NMDA receptors may be involved in insulin signaling, and could be potential drug targets for diabetes treatment in the future.

Biography

Kate S Collison, PhD is the corresponding author of 15 peer-reviewed papers on diabetes-related research in prestigious International journals, and is a co-author & collaborator in 32 additional research publications. She is a Fellow of the Royal Society of Chemistry and of the Royal Society of Biology UK, and an Associate and Academic Editor for several International Journals.

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