Inositol

Inositol, or more precisely myo-inositol, is a carbocyclic sugar that is abundant in the brain and other mammalian tissues, mediates cell signal transduction in response to a variety of hormones, neurotransmitters, and growth factors, and participates in osmoregulation.

It is a sugar alcohol with half the sweetness of sucrose (table sugar). It is made naturally in humans from glucose. A human kidney will produce around two grams each day. Other tissues synthesize it too, and the highest concentration is in the brain where it plays an important role making other neurotransmitters and some steroid hormones bind to their receptors.

In the last 10 years, Myo-inositol gained importance in the management of PCOS due to its efficacy, safety profile and worldwide availability.

Deregulation of chromatin modifiers plays an essential role in the pathogenesis of medulloblastoma, the most common paediatric malignant brain tumour. Here, we identify a BMI1-dependent sensitivity to deregulation of inositol metabolism in a proportion of medulloblastoma. We demonstrate mTOR pathway activation and metabolic adaptation specifically in medulloblastoma of the molecular subgroup G4 characterised by a BMI1High;CHD7Low signature and show this can be counteracted by IP6 treatment. Finally, we demonstrate that IP6 synergises with cisplatin to enhance its cytotoxicity in vitro and extends survival in a pre-clinical BMI1High;CHD7Low xenograft model [1)].

1)

Badodi S, Pomella N, Zhang X, Rosser G, Whittingham J, Niklison-Chirou MV, Lim YM, Brandner S, Morrison G, Pollard SM, Bennett CD, Clifford SC, Peet A, Basson MA, Marino S. Inositol treatment inhibits medulloblastoma through suppression of epigenetic-driven metabolic adaptation. Nat Commun. 2021 Apr 12;12(1):2148. doi: 10.1038/s41467-021-22379-7. PMID: 33846320.