Abstract

N6-methyladenosine (m6A) is the most ubiquitous post-transcriptional RNA modification and has an important role in determining the fate of mRNA transcripts. Among the key proteins of the m6A pathway are methyltransferases (METTL family enzymes), demethylases (FTO, ALKBH family enzymes), and m6A binding proteins (e.g., YTHDF family) which recognize RNA sequences depending on the amount and localization of m6A in target transcripts and subsequently influence the fate of mRNA transcripts. The role of methyltransferases and demethylases is to provide a dynamic balance of m6A levels and possibly to convey mechanisms of specificity for these so-called epitranscriptomic marks, which are not yet fully understood.

The main objective of this work was to determine the relative changes in the expression of key m6A pathway proteins during early postnatal development and adulthood in the rat brain. We found that the level of expression of key m6A pathway proteins decreases from birth to adulthood, with the exception of a transient increase between postnatal days 10 and 18. During this period, we also found significant changes in the expression of respiratory chain complexes. However, further research is needed to provide evidence of a mechanistic link between the m6A pathway and brain energy homeostasis during early development. Determining the role of the m6A pathway in the regulation of brain ontogeny and energy homeostasis could bring advancement in the understanding and treatment of neurological disorders.

Key words:

N6-methyladenosine, FTO, postnatal development, energy metabolism, brain