

Central nervous system complications: the function of long non-coding RNAs

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Introduction: More than 80% of the human genome is transcribed to RNA, whereas less than 3% of the genome encodes proteins. Noncoding RNAs (ncRNAs) have been recently shown to be involved in diverse biological processes. Long non-coding RNAs (lncRNAs) are a novel heterogeneous class of non-coding RNAs that includes thousands of different species and have many roles in regulating various stages of gene expression. A major function of lncRNAs appears to be to modulate the epigenetic status of proximal and distal protein-coding genes through cis- and trans-acting mechanisms that include the recruitment of chromatin remodeling complexes to specific genomic loci. The precise temporal and spatial expression of lncRNAs appears to be exceptionally important for mediating CNS form and function. So, dysregulation of lncRNAs expression may be a key factor to CNS complications such as multiple sclerosis. Literature review: Combinations of the following keywords were used to search articles: Central nervous system, Multiple sclerosis, long non-coding RNA and lncRNA. Literature review was performed using different databases including PubMed, MEDLINE, and Google Scholar.

Conclusion: Several lncRNAs that are associated with CNS formation and function have been identified. Some of these lncRNAs are induced upon cell differentiation, including neuronal differentiation. For example, the lncRNA Gomafu is expressed in a subset of differentiating neural progenitor cells and post-mitotic neurons, and is localized in a novel nuclear microdomain. Several studies have shown that in autoimmune central nervous system disorders such as multiple sclerosis, expression profiles of lncRNAs in immune cells is dysregulated. These lncRNAs may function by guiding chromatin modifiers to specific genomic loci. THRIL is an lncRNA that is upregulated in stimulated human THP1 macrophage cells and can change the expression of TNF α . So lncRNAs may be one of the main key factors in dysregulation of the function of immune system in multiple sclerosis.

Keywords: long non-coding RNA, Central nervous system, multiple sclerosis, immune system