



# LONG NON CODING RNAs (lncRNAs )IN NEURODEGENERATIVE DISEASES- DIAGNOSIS AND THERAPEUTICS

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## ABSTRACT:

RNA molecules longer than 200 nucleotides, known as long-non-coding rnas (lncrnas), are involved in a multitude of biological processes and an increasing number of diseases. They regulate gene transcription, pre-mrna processing, the transport of mature mrnas to distinct cellular compartments, mrna stability, and protein translation and turnover. Neurodegenerative diseases (nnds) are progressive and eventually lethal conditions that include Alzheimer's disease (AD), Parkinson's disease (PD), and Huntington's disease (HD). Environmental signals and heredity are two elements that affect the start of NDD. New research reveals the critical roles lncrnas play in the development of neurological disorders, such as nnds. In the future, an enhanced comprehension of the diagnosis methods for diseases.

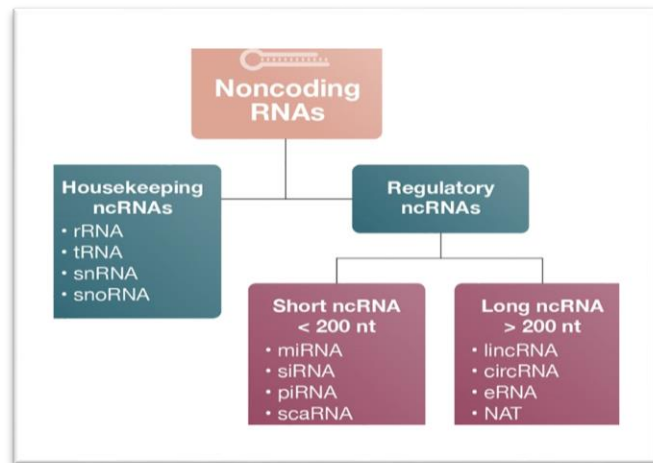
**KEYWORDS:** Non coding RNA, Mrna stability, Parkinson disease,neurological disorder,alzheimer's diseases,hungtington's diseases

## INTRODUCTION:

The lack of precise and potent therapeutic targets as well as highly sensitive biomarkers of disease activity and progression is impeding the development of disease-modifying treatments for neurodegenerative diseases like Alzheimer's, Parkinson's, and amyotrophic lateral sclerosis. Over time, as these disorders worsen, protein aggregates frequently accumulate. Examples of amyloid plaques include those found in Alzheimer's disease, Parkinson's disease, and Huntington's disease[1]. They are generated by the buildup of amyloid  $\beta$ -protein ( $A\beta$ ),  $\alpha$ -synuclein, and mutant huntingtin protein. Additionally, neuroinflammation is crucial to the development of degenerative illnesses. Therefore, the goal of therapeutic research is to figure out how to get rid of neurotoxic aggregates and lessen the neuroinflammatory response. Unfortunately, there are no trustworthy markers for neurodegenerative disease diagnosis or tracking the course and activity of the illness[3].

## NON CODING RNA AND TYPES

genomic regions and RNA processing. Genes that code for proteins, enhancer regions, and transposon elements are among DNA segments that can be translated into non-coding RNAs. ncRNA can be categorized into two groups. Housekeeping ncRNAs and Regulatory ncRNAs[2].



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## BIOLOGICAL ROLE OF NC RNA:

Noncoding RNAs belong to several groups and are involved in many cellular processes. These range from ncRNAs of central importance that are conserved across all or most cellular life through to more transient ncRNAs specific to one or a few closely related species. They are RNA splicing, DNA replication and gene regulation. In gene regulation its involved in trans-acting, cis-acting and also involved in genome defense, chromosome structure, bifunctional RNA, and act as a hormone[4-5].

## NON CODING RNA ROLE IN ALZHEIMER'S DISEASE:

A neurodegenerative condition that progresses over time is Alzheimer's disease (AD)[13]. Subsequently, there is neuroinflammation, synaptic dysfunction, autophagy, and oxidative stress. Because non-coding RNAs (ncRNAs) play critical regulatory functions in a variety of biological processes involved in the development of disease, they may be employed as prospective therapeutic targets and biomarkers. It is becoming more widely acknowledged that ncRNAs play a role in the pathophysiology of AD[15].

## DIAGNOSIS AND THERAPEUTICS:

Identifying Possible Targets in AD Patients' Brains Potential therapeutic targets and properties of non-coding RNAs (ncRNAs) were also disclosed by analyzing the expression profile of these molecules in the brain tissue of AD patients throughout various clinical processes[17]. individuals with Braak stages IV to VI AD had higher levels of miR-455-3p in their frontal cortex, while individuals with Braak stage V AD had considerably higher levels of this gene's expression[16]. decreased the expression of miR-107 in the temporal cortex of MCI participants, while patients with late-onset AD (Braak VI stage) continued to show this decrease. Moreover, it was noted that patients with early-stage AD had lower levels of miR-107 in their hippocampi, whereas patients with Braak stages III/IV AD showed no alterations. it can be easily cured by some identified methods[15].

## NON CODING RNA ROLE IN PARKINSON DISEASE:

Parkinson's disease (PD) is a neurodegenerative condition marked by tremor, rigidity, and bradykinesia. The primary risk factor is age. They might have an impact on the control of numerous PD pathological processes. Numerous pathophysiological mechanisms have been linked to Parkinson's disease (PD)[6],

including axonal transport, calcium homeostasis, oxidative stress, alpha-synuclein aggregate, and neuroinflammation. Potential biomarkers and therapeutic targets for the early detection of Parkinson's disease (PD) could be lncRNAs[7-8].

### **DIAGNOSIS AND THERAPEUTICS:**

A growing body of research indicates that the brains of Parkinson's disease patients have different long-term changes in certain lncRNAs. Parkinson's disease symptoms improve along with changes in lncRNA and microRNA levels[18]. Simultaneously, a recent study demonstrated a positive correlation between the MDS-UPDRS III score and lnc-MKRN2-42: 1 in PD patients. The primary location of PD pathology is quite close to CSF[20]. The CSF is a prime source of PD biomarkers because the molecular changes occurring in the brains of PD patients are reflected in the composition of the fluid[19].

### **NON CODING RNA ROLE IN HUNTINGTON DISEASE:**

Gene regulatory networks undergo extensive alterations in conjunction with neurodegeneration in the brains of individuals suffering from Huntington's disease. According to recent research, these alterations also affect non-coding RNAs (ncRNAs), not just protein-coding genes. Long noncoding RNAs (lncRNAs) are highly expressed in the mammalian nervous system, and many of them probably have important functions in neuronal development[6-8].

### **DIAGNOSIS AND THERAPEUTICS:**

They may be useful in the development of novel therapeutic strategies in addition to tracking the course of the illness and evaluating the effectiveness of treatments in clinical settings. This is crucial for neurological and genetic disorders in particular, as treating these conditions at the prodromal stage can greatly slow down, if not completely stop, the progression of the illness[11]. The current state of biomarkers for Huntington's disease (HD), a deadly hereditary degenerative illness. The three main categories of HD symptomology are progressive motor, cognitive, and psychiatric/behavioral abnormalities[9]. Involuntary movements (such as chorea, rigidity, and dystonia) and a reduction in voluntary movements (such as difficulty preparing and executing tasks, dysarthria, dysphagia, and akinesia) are characteristics of motor dysfunction[10]. Declines in executive decision-making processes are a sign of cognitive defects, especially when it comes to goal-oriented behaviors[12].

### **CONCLUSION:**

While the role of lncRNAs in the pathogenesis of diseases has been thoroughly investigated, the functions of many lncRNAs remain unknown. For example, we only know that their expression increases under specific pathological conditions, such as the abnormal expression of BDNF-AS in Huntington's disease. Further investigation is required to fully understand the mechanism of action of the lncRNAs implicated in the pathogenesis of neurodegenerative diseases. In this review we can conclude that

neurodegenerative diseases can be involved in non coding rna is very important techniques in human life.the diagnosis and therapeutics are consider as evaluation of non coding techniques.

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