Indian Journal of Experimental Biology
Vol. 64, April 2026, pp. 289-300
DOI: 10.56042/ijeb.v64i04.21345

Mini-Review

From transcriptional noise to tumor regulators: The role of long non-coding RNAs in thyroid cancer

Ritika Sharma, Shreya Mangotra, Prachi Sharma, Manish Kumar Mishra, Preeti Rani & Shelly Sehgal*

Centre for Molecular Biology, Central University of Jammu, Jammu and Kashmir 181143, India

Received 7 July 2025; revised 3 December 2025

Thyroid cancer incidence has been reported to increase eminently in India in recent years with a significant preponderance in the females, highlighting the urgent need for deeper insights into its molecular mechanisms to improve diagnosis and treatment. While conventional genetic alterations have been widely studied, increasing evidence points to the vital role of non-coding RNAs especially long non-coding RNAs (lncRNAs) in the pathogenesis and progression of thyroid malignancies. These lncRNAs influence various cellular processes, including proliferation, apoptosis, migration, and invasion, primarily through interactions with microRNAs, proteins, and DNA. This review focuses on specific lncRNAs SNHG3, LINC00152, LUCAT1, UCA1, FER1L4, FALEC, and LINC01315 that are dysregulated in thyroid cancer. These molecules are involved in critical signaling pathways such as the AKT/mTOR/ERK, TGF-β, and IL-6/JAK2/STAT3 pathways. Moreover, they function as competing endogenous RNAs (ceRNAs), binding to and sequestering tumor-suppressive microRNAs, leading to the upregulation of oncogenes. Understanding these mechanisms provides valuable insights into thyroid tumor biology. Targeting these lncRNAs may offer promising therapeutic approaches and enhance the development of molecular markers for prognosis and treatment response. This review aims to highlight the emerging importance of lncRNAs in thyroid cancer and their potential as novel molecular tools in clinical oncology.

Keywords: Cancer invasion, Cancer progression, LncRNA, miRNAs, Papillary thyroid carcinoma, Thyroid carcinoma