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Title: Deciphering the role of Non-coding RNA (miR-LncRNA) and its clinical significance in pediatric patients of Wilms Tumor

FINDING

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This thesis investigates the role of long non-coding RNA (lncRNA) Urothelial Cancer Associated 1 (UCA1) in Wilms Tumor (WT), a pediatric kidney cancer, and its potential as a biomarker for diagnosis, prognosis, and therapeutic targeting. Despite advancements in understanding the genetic landscape of WT, including mutations in WT1, WT2, and loss of heterozygosity (LOH), there has been limited research on the role of non-coding RNAs in the disease. The study focuses on UCA1, known to regulate key processes such as cell proliferation, migration, and invasion in various cancers, hypothesizing that it plays a critical role in WT progression.

The research aims to assess the expression of UCA1 and its interacting microRNAs (miRs) in WT tissue and exosomes, exploring its function as a regulatory molecule and its potential clinical significance. Exosomes, extracellular vesicles that carry biological molecules between cells, are increasingly being studied as non-invasive diagnostic tools. The thesis posits that exosomal UCA1 can be used as a biomarker for early detection and prognosis in WT patients.

The study collected tumor samples and adjacent normal tissues from pediatric patients undergoing nephroureterectomy. It also measured exosomal UCA1 levels from urine samples. Quantitative polymerase chain reaction (qPCR) was employed to analyze UCA1 expression, while bioinformatics tools helped construct a competitive endogenous RNA (ceRNA) network to identify significant interactions between UCA1, and its interacting miRs. This allowed for the exploration of UCA1's potential role in modulating key tumor-promoting pathways.

The findings demonstrated that UCA1 was significantly upregulated in WT tissues and exosomes, correlating with tumor stage and poor prognosis. UCA1's interaction with specific miRs, as part of the ceRNA network, was shown to influence WT progression by regulating critical pathways involved in cell proliferation and metastasis. Furthermore, exosomal UCA1 was found to be a promising non-invasive biomarker, with elevated levels detectable in urine samples of WT patients, indicating its utility for early diagnosis.