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Alternative Splicing of RPS24 Plays a Role in Cancer Development and Progression

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Although alternative splicing (AS) is a major mechanism that adds diversity to gene expression patterns, its precise role in generating variability in ribosomal proteins, known as ribosomal heterogeneity, remains unclear. The ribosomal protein S24 (RPS24) gene, encoding a ribosome component, undergoes AS. However, in-depth studies have been challenging because of the three microexons between exons 4 and 6. We conducted a detailed analysis of RPS24 AS isoforms using a direct approach to investigate the splicing junctions related to these microexons, focusing on four AS isoforms. Each of these isoforms shows tissue specificity and relative differences in the expression among cancer types. Significant differences in the proportions of these RPS24 AS isoforms between cancerous and normal tissues across diverse cancer types were also observed. Notably, our study highlighted a significant correlation between the expression levels of a specific RPS24 AS isoform and the process of epithelial-mesenchymal transition in lung and breast cancers. Additionally, our research uncovered evidence that another RPS24 isoform is involved in protecting against brain tumor development. Collectively, our research contributes to a better understanding of the intricate regulatory mechanisms governing ribosomal protein genes through AS and highlights the biological implications of RPS24 AS isoforms in tissue development and tumorigenesis.