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THE ROLE AND MECHANISMS OF ACTION OF microRNAs IN CANCER

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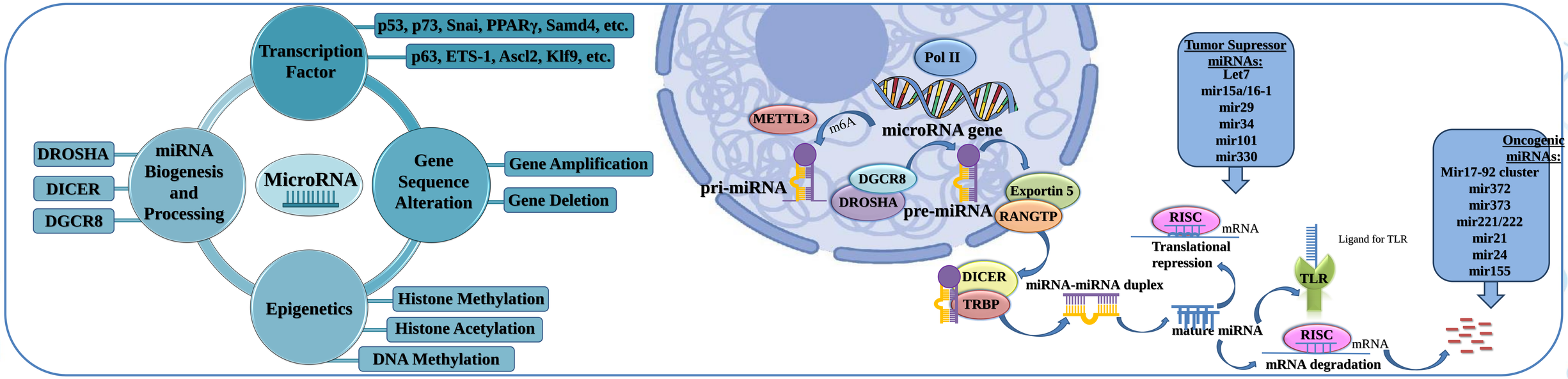
Introduction

MicroRNAs (miRNAs) are a family of small non-coding RNAs that function in post-transcriptional gene regulation, act as tumor suppressors or oncogenes in different types of cancer. The dysregulated miRNAs have been shown to affect the hallmarks of cancer, including sustaining proliferative signaling, evading growth suppressors, resisting cell death, activating invasion and metastasis, and inducing angiogenesis.

Results

Abnormal miRNA expression in malignant cells has been often attributed to alterations in genomic microRNA copy numbers and gene locations (deletion or translocation) and dysregulation of some key transcription factors, such as c-Myc and p53. Similarly, the epigenetic alterations were elucidated in the context of their association with cancer, including global genomic DNA hypomethylation, aberrant DNA hypermethylation of tumor suppressor genes and disruption of the histone modification patterns.



The purpose

To highlight various mechanisms of dysregulation of miRNA expression and their role in formation and development of human cancer.

Material and methods

Various databases (miRCancer, OncomiR, miRactDB, miRbase, miRDB) have been studied to highlight the mechanisms of miRNA dysregulation in cancer and 23 scientific articles have been analyzed.

Conclusions

In malignant cells, miRNAs are heavily dysregulated by multiple mechanisms, including deletion or translocation of miRNA genes, abnormal transcriptional control, epigenetic changes that can be used as useful biomarkers for cancer diagnosis and prognosis.

Keywords

MicroRNAs, cancer, miRNA expression, epigenetic changes, biomarkers