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Review

MicroRNAs in cancer — from research to therapy

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ABSTRACT

MicroRNAs (miRNAs) regulate target gene expression through translation repression or mRNA degradation. These non-coding RNAs are emerging as important modulators in cellular pathways, and they appear to play a key role in tumorigenesis. With increasing understanding of the miRNA target genes and the cellular behaviors influenced by them, modulating the miRNA activities may provide exciting opportunities for cancer therapy. Here the latest findings of which genes are targeted by each miRNA are reviewed, with particular emphasis on the deciphering of their possible mechanisms and the potential of miRNA-based cancer therapeutics.

Contents

1. Introduction

As microRNAs (miRNAs) involve in biological development, cell proliferation, differentiation and apoptosis, dysregulation of miRNAs appears to play a crucial role in cancer pathogenesis [1]. Recent advances in omics technologies have enabled the identification of hundreds of human miRNAs, but most of their targets remain unknown [2]. Although the identification of miRNA targets proceeds at a fast pace, we still know little about their mechanisms of action and the pathways that miRNAs modulate [3]. Identifying miRNAs and their targets that are essential for cancer development and metastasis may provide exciting therapeutic opportunities. Here recent findings of which genes are targeted by each miRNA and the possible mechanisms through which miRNAs affect tumorigenesis are summarized (Fig. 1, Table 1).

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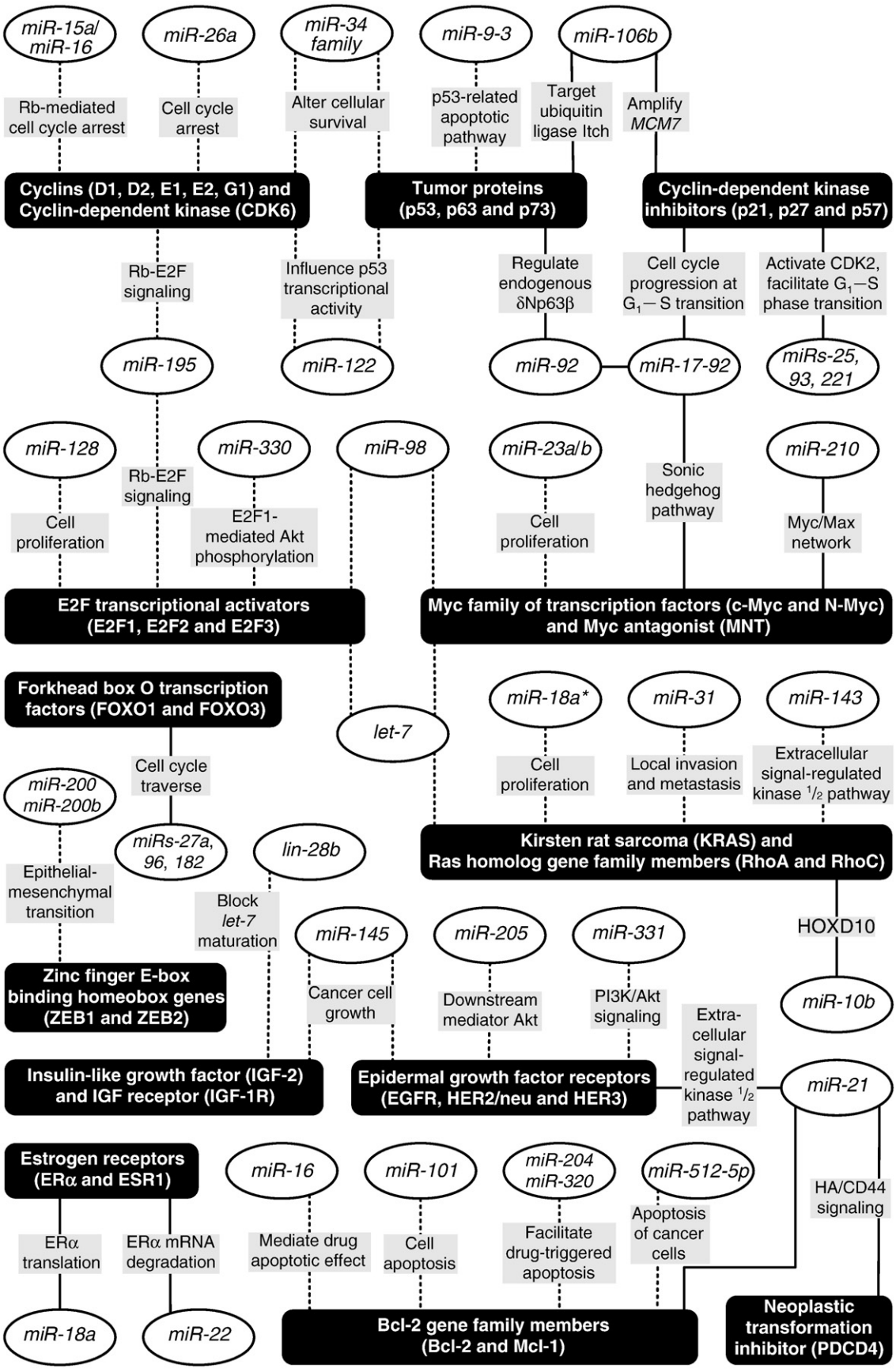

Fig. 1. Graphical annotation of the pathway showing the targets of different upregulated (solid line——) and downregulated (broken line– – –) microRNAs in cancer summarized in this review.