Inhibitory effect of microRNA-24 on fatty acid-binding protein expression on 3T3-L1 adipocyte differentiation


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ABSTRACT. We examined the effect of microRNAs on 3T3-L1 adipocyte differentiation and expression of adipocyte-specific gene fatty acid-binding protein 4 (FABP4). We screened and identified adipo-related microRNAs during 3T3-L1 adipocyte differentiation with a microRNA microarray. High expression plasmids of miR-24 and miR-21 were constructed and transfected into 3T3-L1 preadipocytes by lipofectamine. The effects of miR-24 and miR-21 on 3T3-L1 adipocyte differentiation were observed, and the protein and mRNA expression levels of FABP4 and AP-1 were determined. The expression profiles of microRNAs significantly changed during 3T3-L1 adipocyte differentiation. The expression of 33 microRNAs was downregulated, among which downregulation of miR-24 was the most extensive. There were 17 microRNAs with upregulated expression; the highest levels were found for miR-21. miR-24 significantly inhibited 3T3-L1
adipocyte differentiation and maturity, while miR-21 had no significant effect. In addition, miR-24 significantly inhibited the expression of FABP4, while it upregulated AP-1 expression, but had no effect on the level of FABP4 mRNA. miR-21 had no effect on FABP4 protein and mRNA expression. AP-1 silencing could, at least partially, reverse the inhibitory effect of miR-24 on FABP4 expression. We conclude that microRNA expression profiles change significantly during 3T3-L1 adipocyte differentiation and that miR-24 plays an important role in regulating adipocyte differentiation and FABP4 expression. The mechanism involved may be the upregulation of AP-1.

**Key words:** MicroRNA; 3T3-L1 preadipocyte; FABP4; AP-1; Adipocyte differentiation