**Additional files**

**Figure s1 Purity of isolated CD4+ cells.**

CD4+ cells (5×105) suspended in 100 μL PBS were incubated with 2 μL anti-CD4 FITC antibody, washed with 1 mL buffer, centrifuged at 300 g for 10 min, and then analyzed with flow cytometer.

**Figure s2** **Expression of several differentially expressed miRNAs and genes in lymphocytes and CD4+ T cells.**

(A & B) To validate microarray data, the expression levels of indicated miRNAs and genes were determined with real-time qPCR (n = 4). (C & D) Real-time qPCR analysis of miRNA-451a and *ETS1*. Data were represented as mean ± SD with two-tailed unpaired t-test. \*\*, \*\*\* indicated a p value less than 0.01, 0.001.

**Figure s3 The transfection efficiency of miRNA-451a/miRNA-3646 silencing or overexpression.**

The levels of (A & B) miRNA-451a and (C & D) miRNA-3646 after lentiviral infection were determined with real-time qPCR. Data were represented as mean ± SD based on one-way ANOVA (n = 3). NC, negative control. \*\*\* indicated a p value less than 0.001.

**Figure s4 MiRNA-3646 inhibits the differentiation of CD4+ T cells towards TH2 cells**

(A & C) Representative images of flow cytometry analysis showing GATA3+CD4+ cells. (B & D) The protein levels of IL5 and IL13 in CD4+ T cells detected by Western blot after silencing or over-expression of miRNA-3646. Data were represented as mean ± SD based on one-way ANOVA (n = 3). NC, negative control.

**Figure s5 Expression levels of miRNA-451a in CD4+ T cells.**

Cells infected with LV-miRNA-451a and/or LV-OE-ETS1 were harvested to analyze the expression of miRNA-451a via real-time qPCR. The quantitative analysis was presented as mean ± SD calculated based on three separate experiments with One-Way ANOVA (n = 3). NC, negative control; OE, over-expression. \*\*\* indicated a p value less than 0.001. ns indicated a p value over 0.05.