Supplementary figure legends

**Supplementary Figure 1.** The length distribution of reads for ten miR-seq samples

**Supplementary Figure 2.** Flow diagram illustrating microRNA quantification techniques used and sample sizes of each step of the analysis. NAT: normal adjacent tissue.

**Supplemental Figure 3.** Identification of differentially expressed miRNAs between N0 and N1+ groups of patients.

**Supplementary Figure 4.** The receiver operator characteristic (ROC) curve as well as area under curve (AUC) was determined using CART. The results show that AUC is 0.79 in 43 lung ADC samples (cohort 1 +2).

**Supplementary Figure 5.** Higher miR-31 expression is associated with adverse outcome in T2N0 patients (n=75, log-rank p=0.0194)

**Supplementary Figure 6.** IPA showing the top five canonical pathways for miR-31 target genes is the CDK5 (A), PTEN (B), p70S6K (C), ERK/MAPK (D) and PI3K/AKT (E)signaling.

**Supplementary Figure 7.** Ectopic expression of miR-31 increases migration/invasion capabilities of H2228 cells. (A) Expression of miR-31 following infection with Lenti-miR vector containing miR-31 precursor was confirmed by TaqMan real-time PCR. (B) Cell invasion assay for miR-31 overexpressing H2228 cells. (C) Cell migration assay for miR-31 overexpressing H2228 cells using transwell membranes (upper panel, representative pictures of migration chambers; bottom panel, average counts from 10 random microscopic fields). The average counts were derived from ten random microscopic fields. (D) Cell proliferation assay for miR-31 overexpressing H2228 cells. Data are presented as mean ± S.D. *P<0.05.

**Supplementary Figure 8.** Knockdown of miR-31 expression affects migration, invasion and proliferation capabilities of H1573 cells. (A) Expression of miR-31 following infection with miRZip-31 anti-miR-31 construct was confirmed by TaqMan real-time PCR. (B) Cell invasion assay after knockdown of miR-31 expression in H1573 cells. (C) Cell migration assays for miR-31 knockdown H1573 cells using transwell membranes (upper panel, representative pictures of migration chambers; bottom panel, average counts from 10 random microscopic fields). (D) Cell
proliferation assay for miR-31 knockdown H1573 cells. The average counts were derived from ten random microscopic fields. Data are presented as mean ± S.D. *P<0.05, **P<0.01.

Supplementary Figure 9. The effect of MEK inhibitor, AZD6244, on miR31 induced cell proliferation and migration. (A) pERK1/2 expression in H2228/miR31 cells after treatment with AZD6244. Cell proliferation (B) and migration (C) assay for miR31 overexpressing H2228 and control cells after treatment with AZD6244.

Supplementary Figure 10. Comparison of miR-31 expression in stably transfected cell lines and patients from the TCGA lung ADC dataset. The middle bar represents the mean, upper and lower border of the box represents 25th and 75th percentiles, and the whiskers go down to the 5th percentile and up to the 95th percentile.

Supplementary Figure 11. Overexpression of miR-31 increases the protein expression of Vimentin, Twist and SNAI1, known markers of EMT.