

### Supplementary Figure Legends

**Figure S1. miRNAs microarray profiling analysis demonstrates differential expression of miRNAs in mucosal melanoma (MM) tissues and normal mucosal nevi.** (A) Hierarchical clustering heat map based on statistically significant dysregulated miRNAs in 10 MM as compared to three normal mucosal nevi. The miRNAs with a fold change  $\geq 2$  and  $P$ -value  $\leq 0.05$  were regarded as significantly different. (B) Volcano plot of significantly dysregulated miRNAs in MM tissues compared to mucosal nevi tissues.

**Figure S2. The effects of overexpression of miR-23a-3p on mucosal melanoma cells.** (A) HMVII and VMRC-MELG cells were transfected with miR-23a-3p mimic or control (miR-Ctrl), and miR-23a-3p expression was quantified by qRT-PCR at 48 h after transfection. (B) HMVII and VMRC-MELG cells were infected with lentiviral Lenti-pMIR-23a or Lenti-pMIR-Ctrl, and the miR-23a-3p expression was quantified at 48 h after infection. (C) VMRC-MELG cells were stained with PI at 24 and 48 h after transfection with miR-23a-3p mimic or miR-Ctrl, and cell cycle distribution was analyzed by flow cytometry. (D) Cell apoptotic death events were measured by Annexin V-FITC/PI staining and flow cytometry at 24 h after transfection with miR-23a-3p mimic or miR-Ctrl. \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .

**Figure S3. Expression of ADCY1 in mucosal melanoma fresh-frozen tissues and cell lines.** (A) ADCY1 mRNA and miR-23a-3p expression was measured by qRT-PCR in 20 fresh-frozen MM tissues and was normalized to the mean level in normal mucosal nevi, and ADCY1 mRNA levels were significantly higher in MM tissues with low miR-23a-3p expression than in those with high miR-23a-3p expression. (B) ADCY1 mRNA expression was measured by qRT-PCR in three MM cell lines, and was normalized to the mean level in HEMs. GAPDH was used as an endogenous control. \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .

**Figure S4. ADCY1 knockdown regulates EMT-related markers in mucosal melanoma.** (A) HMVII and VMRC-MELG cells were transfected with two ADCY1 siRNAs, and ADCY1 mRNA expression was quantified by qRT-PCR at 48 h after transfection. (B) HMVII and VMRC-MELG cells were stably transfected with ADCY1-specific shRNA, and ADCY1 mRNA expression was quantified by qRT-PCR at 96 h after transfection. (C) Western blot analysis of EMT-related markers in cells transfected with two ADCY1 siRNAs.

Figure S1

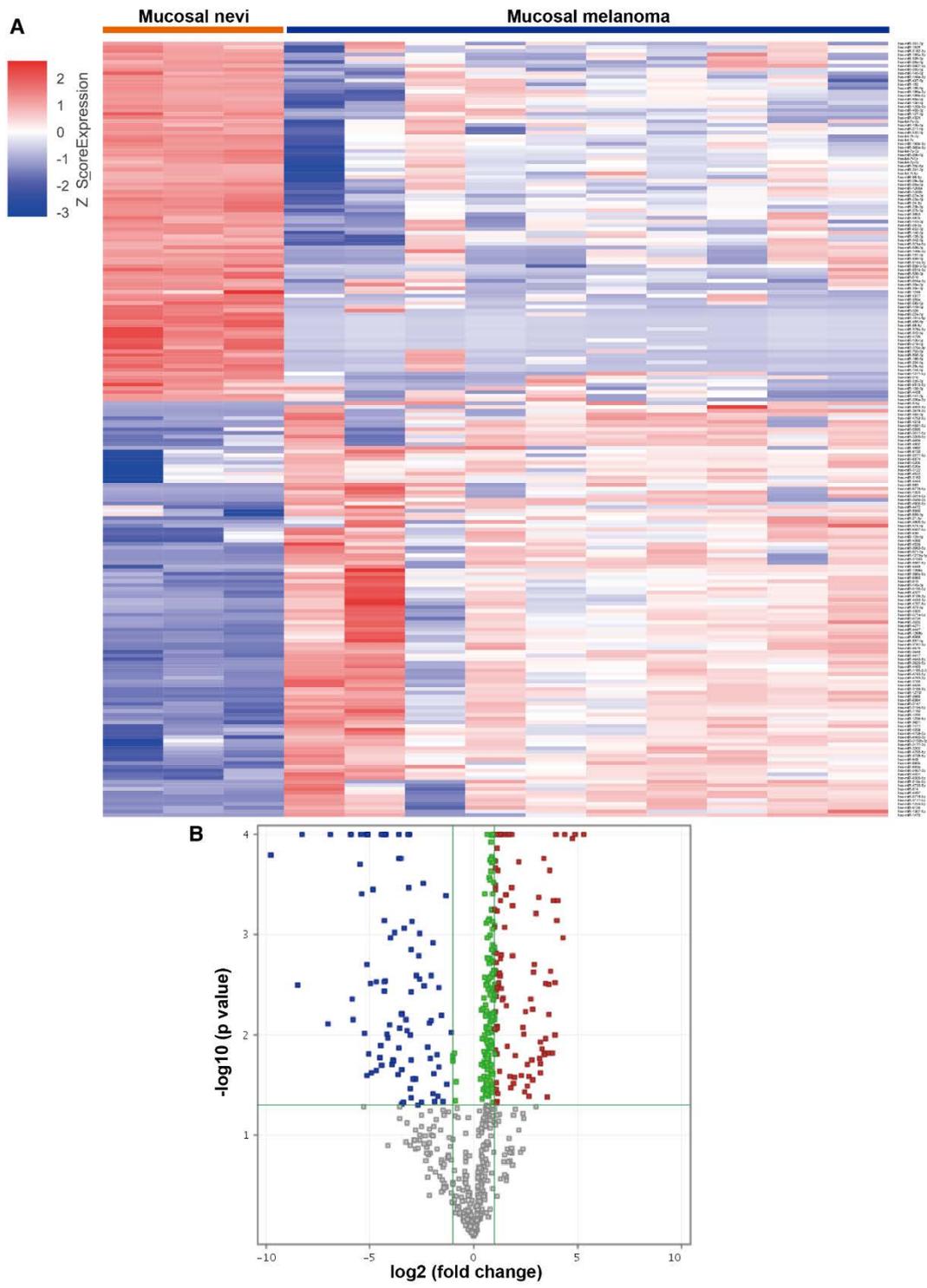




Figure S3

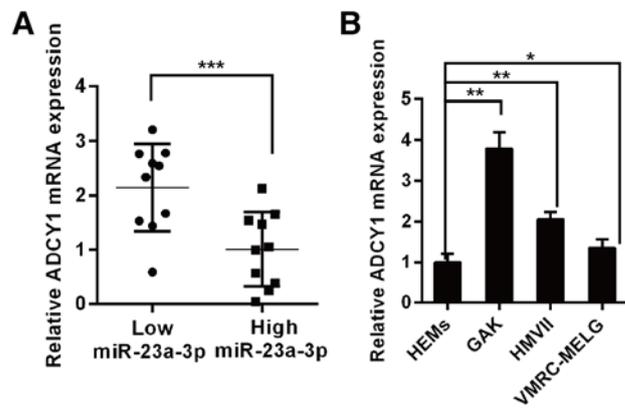


Figure S4

