SIRT3 promotes the development of esophageal squamous cell carcinoma by regulating HK2 through the AKT signaling pathway

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INTRODUCTION
Sirtuin-3 (SIRT3) is a mitochondrial NAD+-dependent deacetylase that plays an important role in cellular metabolism, proliferation, apoptosis and oxidative stress. SIRT3 is closely related to tumor occurrence and development. Recent studies have indicated that SIRT3 may act as a tumor suppressor or oncogene in various cell types, and the molecular mechanisms are complex. Researchers found that high expression of SIRT3 was associated with poorer prognoses in esophageal squamous cell carcinoma (ESCC) patients. However, the cellular metabolism mechanism of SIRT3 in ESCC is still unclear.

AIM
In the present study, we explored whether SIRT3 regulates the proliferation and migration of ESCC cells and investigated the mechanisms underlying the oncogene role of SIRT3.

METHOD
siRNA was used to transfect Eca109 cells and downregulate SIRT3. The proliferation and migration of Eca109 cells were examined by a CCK-8 assay, colony formation assay and Transwell assay. Quantitative real-time PCR (qRT-PCR) and western blot analysis were used to detect SIRT3, HK2, AKT and p-AKT in Eca109 cells.

RESULTS
Reduced SIRT3 expression downregulated HK2 expression and inhibited AKT activation in esophageal squamous cell carcinoma. A: Reduced SIRT3 expression inhibited cell proliferation. **P < 0.01, LSD. B: Reduced SIRT3 expression inhibited cell migration (100x magnification), **P < 0.01 (LSD).

SIRT3 promoted cell proliferation and migration of esophageal squamous cell carcinoma. A: Reduced SIRT3 expression inhibited cell proliferation. **P < 0.01, LSD. B: Reduced SIRT3 expression inhibited cell migration (100x magnification), **P < 0.01 (LSD).

Reduced SIRT3 expression inhibited the viability of ECA109 cells. After transfection for 24 hours, the CCK-8 assay was used to detect the viability of ECA109 cells at different times. Significant differences in viability were not observed between the three groups at 24 hours. **P < 0.05 (ANOVA). The viability was significantly inhibited when compared to the NC groups and MOCK groups at 48, 72 and 96 hours. P < 0.05 (LSD).

CONCLUSIONS
SIRT3 promotes esophageal squamous cell carcinoma proliferation and migration. We also found that SIRT3 inhibits AKT activation and HK2 expression. These results indicate that SIRT3 promotes the development of esophageal squamous cell carcinoma by regulating HK2 through the AKT signaling pathway, which may occur via the regulation of glycosylation to promote ESCC development and progression.

REFERENCES

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