**Cell counting kit-8 (CCK-8) assay.**

Transfected cells were added to 96-well plates and CCK8 reagent was added to each well (TransGene, Beijing, China) for 2 h at 37°C, protected from light, after 1, 2, 3, 4, and 5 days of incubation. Absorbance was measured at 450 nm.

**Colony formation**

Cells were seeded in 6-well plates (500 cells/well) and incubated for 2 weeks. The colonies formed were fixed with 4% paraformaldehyde and stained with crystal violet (Beyotime).

**Edu assay**

Cells in logarithmic growth were inoculated in 24-well plates, EdU solution (Ribobio) was added to each well, with incubation for 2 h. Apollo dyeing solution was configured according to the instructions and 300 µL was added to each well. Hoechst reaction solution was dissolved in deionized water at 1:100, and 300 µL was added to each well. Images were taken with a fluorescence microscope (DM4000B-1, Leica, Frankfurt, German).

**Wound healing assay**

The bottom surface of a 6-well plate was marked every 1 cm. When the cells were at 90% confluency, a vertical line was drawn along the middle of the plate. Images were taken at 0 h and 48 h with a microscope according to the different marker positions and recorded.

**Transwell assay**

For cell migration experiments, 30,000 cells were dispersed in the top layer of the Transwell. A total of 400 µL of complete medium was added to the bottom layer, and 200 µL of serum-free medium was added to the top layer. After 48 h incubation, cells were fixed, and stained with crystal violet. The upper layer of cells was removed with a cotton swab and imaged using a microscope on the chambers. For cell invasion assays, Matrigel matrix (BD Biosciences, Franklin Lakes, NJ, USA) was spread on the upper layer of the chambers. After substrate fixation, the remaining steps were the same as for the cell migration assay.