

Supplementary methods

Hematoxylin and eosin (H&E) protocol details. The tissue specimens were fixed immediately after dissection in 4% neutral buffered formalin. Fixation was performed at room temperature (~25°C) for 6-24 h (typically 48 h) to ensure thorough penetration and preservation of tissue morphology. After standard tissue processing and paraffin embedding, serial sections were cut at a thickness of 3 μ m using a rotary microtome. The staining was performed according to a standard H&E protocol as follows: Sections were deparaffinized in xylene and rehydrated through a graded series of ethanol solutions to distilled water. For hematoxylin, staining was performed at room temperature for 5-8 min. Sections were briefly differentiated in 1% acid ethanol (70%) and rinsed thoroughly in running tap water for bluing. For eosin, counterstaining was performed at room temperature for 1-2 min. Following staining, sections were dehydrated through a graded alcohol series, cleared in xylene and mounted with a synthetic resin (e.g., neutral balsam). Finally, images were captured using an optical light microscope (magnification, x100-200; Nikon Corporation) and presented.

Immunohistochemical protocol details. Immunohistochemistry was performed according to standard immunohistochemical operating procedures. The samples were blocked for non-specific binding with 10% normal goat serum (no. PV-9000; Beijing Zhongshan Golden Bridge Biotechnology Co., Ltd., at room temperature for 15 min and incubated with

specific rabbit primary antibody (Table SI) against target antigens at 37°C for 4 h. Luciferase (Roche Diagnostics GmbH) was added and incubated at room temperature for 30 min. The Roche immunohistochemistry automatic staining machine was then used. Representative images were captured using a light microscope (magnification, x100-200; Nikon Corporation).

RT-qPCR protocol details. DNA was extracted from the patient's pathological sections and reverse transcribed using the PrimeScript RT reagent kit (cat. no. RR037A; Takara Bio, Inc.) according to the manufacturer's instructions. Fluorescence RT-qPCR was performed using SYBR Premix Ex Taq™ II (Takara Bio, Inc.) in a 10- μ l PCR mixture on a Bio-Rad CFX96 Real-Time PCR system (Bio-Rad Laboratories, Inc.), according to the manufacturer's instructions. Gene-specific primers (Table SII) were designed and purchased from Thermo Fisher Scientific, Inc. A GAPDH reference gene was used as the endogenous control for each reaction. The cycling conditions were 95°C for 2-10 min, then 40-45 cycles of 95°C for 30 sec, 58°C for 30 sec and 72°C for 20 sec, followed by a 72°C step for 7 min. Each reaction was repeated three times. Gene expression was reported as a mean C_q value (1) (average fold-change relative to GAPDH) using CFX Manager™ software (version 3.0; Bio-Rad Laboratories, Inc.).

Reference

1. Livak KJ and Schmittgen TD: Analysis of relative gene expression data using realtime quantitative PCR and the 2(Delta Delta C(T)) method. *Methods* 25: 402408, 2001.

Table SI. Information on the primary antibodies used for immunohistochemical detection of the patient's pathological sections.

Antibody	Dilution	Catalog. no	Supplier
Estrogen receptor	1:400	RMA-1065	Fuzhou Maixin Biotechnology Development Co., Ltd.
Progesterone receptor	1:400	RMA-0895	Fuzhou Maixin Biotechnology Development Co., Ltd.
Cytokeratin 7	1:400	MAB-0828	Fuzhou Maixin Biotechnology Development Co., Ltd.
Cytokeratin 20	1:400	MAB-0834	Fuzhou Maixin Biotechnology Development Co., Ltd.
Ki-67	1:400	RMA-0542	Fuzhou Maixin Biotechnology Development Co., Ltd.
Postmeiotic segregation increased 2	1:400	ZA-0542	Beijing Zhongshan Golden Bridge Biotechnology Co., Ltd.
MutL Homolog 1	1:400	ZM-0154	Beijing Zhongshan Golden Bridge Biotechnology Co., Ltd.
MutS Homolog 2	1:400	ZA-0622	Beijing Zhongshan Golden Bridge Biotechnology Co., Ltd.
MutS Homolog 6	1:400	ZM-0367	Beijing Zhongshan Golden Bridge Biotechnology Co., Ltd.

Table SII. Primer information for genetic testing of the patient's pathological biopsy sample.

Gene name	Primer sequence
<i>PD-L1</i>	
Forward	5'-TGGCTTCGCTGCCATAAAC-3'
Reverse	5'-GGCTGGTTTTTGTAGCTCTGTT-3'
<i>KRAS</i>	
Forward	5'-AAACTTGTGGTAGTTGGAGCT-3'
Reverse	5'-CTACCCTCTCACGAAACTCTG-3'
<i>KRAS-BLK</i>	
Forward	5'-PO4-GAGCT(LNA)G(LNA)GTG(LNA)GCGTAGG-PO4-3'
<i>NRAS</i>	
Forward	5'-TGTTGGTGTGGACAAGTATGAG-3'
Reverse	5'-CTCTATGGTGGGATCATATTC-3'
<i>BRAF</i>	
Forward	5'-TCATAATGCTTGCTCTGATAGGA-3'
Reverse	5'-GGCCAAAATTTAATCAGTGGA-3'
<i>PI3KCA</i>	
Forward	5'-GATTGGTTCTTTCTGTCTCTG-3'
Reverse	5'-CTCAAAGCAATTTCTACACGAG-3'
<i>GAPDH</i>	
Forward	5'-CTCTGCTCCTCCTGTTCGAC-3'
Reverse	5'-GCGCCCAATACGACCAA ATC-3