

## **Data S1. Supplementary methods**

*Specimen analysis.* The specimens were fixed in 4% paraformaldehyde at a volume 5 times that of the tissue for 12-24 h. For embedding, hard paraffin wax (melting point 56-58°C or 60-62°C) was used. The molten wax was poured into metal molds, and the tissue cassettes were submerged in the wax. The blocks were then placed on a cooling stage (4-6 h) until

complete solidification. Finally, 3- $\mu$ m thick sections were cut for further analysis.

Immunostaining (Table SI) was performed using the UltraView Universal DAB Kit (catalog no. 760-500; Roche Tissue Diagnostics) with HRP-conjugated multimer antibodies and DAB chromogen, according to the manufacturer's protocol. Observation was performed under a conventional bright-field microscope at x400 magnification.

Table SI. Immunohistochemistry antibodies from Roche Diagnostics.

Indicators	Proportion of dilution	Catalog no.	Temperature of incubation, °C	Duration of incubation, min
H&E	1:250	760-2208	Room temperature	According to standard procedure
ER	1:250	790-4325	37	32
PR	1:250	790-4296	37	32
HER2	1:50	790-4493	37	32
GATA3	1:250	760-500	37	32
CK7	Predilution	790-4462	37	32
CK5/6	Predilution	790-4554	37	32
p40	Predilution	790-4950	37	32
Ki-67	Predilution	790-4286	37	32

H&E, hematoxylin and eosin; ER, estrogen receptor; PR, progesterone receptor; HER2, human epidermal growth factor receptor 2; GATA3, guanine-adenine-thymine-adenine-binding protein 3; CK, cytokeratin; p53, tumor protein p53; Ki-67, proliferation index.