Supplementary table 1. The primers used for qRT-PCR in this study.

|  |  |  |
| --- | --- | --- |
| Gene | Sequence 5'→3' | length (bp) |
| *GAPDH* | F: GACAGTCAGCCGCATCTTCT | 104 |
|  | R: GCGCCCAATACGACCAAATC |  |
| *FAM234B* | F: GACGGTGTTCGAGACCTTGT | 171 |
|  | R: AGCCCCATTTGTGGTGATGT |  |
| *HTR7P1* | F: CCTCCTTTCGGGCTTTCCG | 138 |
|  | R: CTCCAGGCGAGAATCGCTTT |  |
|  |  |  |

Supplementary table 2. Significant changes of *has-miR-1271-5p* and *has-miR-381-3p* expressions between breast cancer and normal tissues (dbDEMC 2.0). adj, adjust.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MicroRNAs | Experiment ID | Cancer Type | Cancer Subtype | Design | logFC | AveExpr | T value | P-value | adj P-value | Status |
| *hsa-miR-1271-5p* | GSE45666 | breast cancer |  | cancer vs normal | -2.27 | 3.09 | -7.94 | 1.26E-12 | 3.24E-11 | DOWN |
|  | GSE45666 | breast cancer | ER positive | cancer vs normal | -2.4 | 3.09 | -7.78 | 3.17E-12 | 1.08E-10 | DOWN |
|  | GSE45666 | breast cancer | ER negative | cancer vs normal | -2.16 | 3.09 | -7.19 | 6.65E-11 | 1.03E-09 | DOWN |
|  | GSE45666 | breast cancer | PR positive | cancer vs normal | -2.47 | 3.09 | -7.69 | 4.88E-12 | 1.78E-10 | DOWN |
|  | GSE45666 | breast cancer | PR negative | cancer vs normal | -2.17 | 3.09 | -7.35 | 2.84E-11 | 5.04E-10 | DOWN |
|  | GSE45666 | breast cancer | HER2+ positive | cancer vs normal | -2.78 | 3.09 | -9.15 | 2.19E-15 | 3.10E-13 | DOWN |
|  | GSE45666 | breast cancer | HER3+ negative | cancer vs normal | -2 | 3.09 | -7.12 | 9.24E-11 | 1.87E-09 | DOWN |
|  | GSE48088 | breast cancer |  | cancer vs normal | -1.88 | 1.64 | -4.27 | 1.35E-04 | 7.83E-03 | DOWN |
|  | GSE44124 | breast cancer |  | cancer vs normal | -0.22 | 5.66 | -5.83 | 3.60E-07 | 4.38E-05 | DOWN |
|  | TCGA\_BRCA | breast cancer | breast invasive carcinoma | cancer vs normal | -0.33 | 1.16 | -9.13 | 3.05E-19 | 1.27E-18 | DOWN |
| *hsa-miR-381-3p* | GSE37407 | breast cancer |  | metastasis | -0.29 | 7.92 | -2.72 | 8.63E-03 | 4.64E-02 | DOWN |
|  | GSE40525 | breast cancer |  | cancer vs normal | -1.14 | 5.3 | -6.95 | 2.10E-10 | 3.04E-09 | DOWN |
|  | GSE40525 | breast cancer | Basal-like | cancer vs normal | -1.47 | 5.3 | -4.35 | 2.92E-05 | 3.38E-04 | DOWN |
|  | GSE40525 | breast cancer | HER2+ | cancer vs normal | -1.45 | 5.3 | -3.77 | 2.55E-04 | 3.12E-03 | DOWN |
|  | GSE40525 | breast cancer | Luminal | cancer vs normal | -1.04 | 5.3 | -5.96 | 2.80E-08 | 3.44E-07 | DOWN |
|  | GSE40525 | breast cancer | ER positive | cancer vs normal | -1.04 | 5.3 | -5.98 | 2.44E-08 | 3.00E-07 | DOWN |
|  | GSE40525 | breast cancer | ER negative | cancer vs normal | -1.46 | 5.3 | -5.51 | 2.19E-07 | 2.99E-06 | DOWN |
|  | GSE40525 | breast cancer | PR positive | cancer vs normal | -0.89 | 5.3 | -4.7 | 7.11E-06 | 5.98E-05 | DOWN |
|  | GSE40525 | breast cancer | PR negative | cancer vs normal | -1.45 | 5.3 | -7.13 | 8.86E-11 | 2.37E-09 | DOWN |
|  | GSE45666 | breast cancer |  | cancer vs normal | -2.33 | 4.14 | -6.56 | 1.43E-09 | 1.60E-08 | DOWN |
|  | GSE45666 | breast cancer | ER positive | cancer vs normal | -2.28 | 4.14 | -5.9 | 3.52E-08 | 2.98E-07 | DOWN |
|  | GSE45666 | breast cancer | ER negative | cancer vs normal | -2.38 | 4.14 | -6.32 | 4.91E-09 | 4.86E-08 | DOWN |
|  | GSE45666 | breast cancer | PR positive | cancer vs normal | -2.31 | 4.14 | -5.72 | 8.35E-08 | 6.18E-07 | DOWN |
|  | GSE45666 | breast cancer | PR negative | cancer vs normal | -2.35 | 4.14 | -6.36 | 4.06E-09 | 4.21E-08 | DOWN |
|  | GSE45666 | breast cancer | HER2+ positive | cancer vs normal | -2.62 | 4.14 | -6.59 | 1.28E-09 | 1.61E-08 | DOWN |
|  | GSE45666 | breast cancer | HER3+ negative | cancer vs normal | -2.19 | 4.14 | -5.98 | 2.53E-08 | 2.63E-07 | DOWN |
|  | GSE44124 | breast cancer |  | cancer vs normal | -0.63 | 5.91 | -4.61 | 2.65E-05 | 1.88E-03 | DOWN |
|  | GSE38167 | breast cancer |  | cancer vs normal | -0.83 | 2.07 | -5.15 | 2.28E-06 | 2.74E-05 | DOWN |
|  | GSE48088 | breast cancer |  | cancer vs normal | -1.16 | 0.68 | -5.93 | 8.69E-07 | 1.12E-04 | DOWN |
|  | GSE61438 | breast cancer |  | cancer vs normal | -1.11 | 8.94 | -6.35 | 1.89E-08 | 7.95E-07 | DOWN |
|  | TCGA\_BRCA | breast cancer | breast invasive carcinoma | cancer vs normal | -0.4 | 2.24 | -11.08 | 3.52E-27 | 2.37E-26 | DOWN |
|  |  |  |  |  |  |  |  |  |  |  |

ER, estrogen receptor; PR, progesterone receptor; HER2, human epidermal growth factor receptor.



**Supplementary Figure 1**. **ONCOMINE analysis of *FAM234B* mRNA expression in breast cancer.** (**A**) Pooled analyses on mRNA expression of *FAM234B* in different cancers types of cancer versus normal samples; (**B**) Box plot of mRNA expression of *FAM234B* in various carcinoma types; (**C**) Box plot of mRNA expression of *FAM234B* in the pathological types of breast cancer; (**D**) mRNA expression of *FAM234B* in breast cancer samples compared with matched normal samples; (**E**) Comparing of the mRNA expression of *FAM234B* in basal-like subtype of breast cancer tissues and luminal subtype of breast cancer tissues.



**Supplementary Figure 2. Association between of *FAM234B* gene expression and clinical pathological parameters in patients with breast cancer (qT-PCR results of clinical samples).** (**A**)-(**I**) Violin plot of *FAM234B* mRNA expression according to age, menopause status, tumor size, lymph node metastasis status, TNM stage, ER status, PR status, HER2 status, and Ki67 expression level, respectively. ER, estrogen receptor; PR, progesterone receptor; HER2, human epidermal growth factor receptor 2; LNM, lymph node metastasis; ns represent no significance. \**P* < 0.05, \*\**P* < 0.01, \*\*\*\**P* < 0.0001.



**Supplementary Figure 3. Expression correlation of *FAM234B* with *HTR7P1* in all breast cancer and distinct molecular subtypes (bc-GenExMiner).** **(**A)-(E) Pearson correlation of *FAM234B* with *HTR7P1* in all breast cancer, luminal A, luminal B, HER2-enrich, and basal-like subtype, respectively. No, number.



**Supplementary Figure 4. Transcriptional expression of *HTR7P1* in breast cancer versus normal samples.** (**A**) Differences in the mRNA expression of *HTR7P1* between breast cancer and normal tissues were not statistically significant (GEPIA); (**B**) qRT-RCR results of *HTR7P1* in BC tissues and normal breast tissues. Error bars represent SD. ns represent no significance.



**Supplementary Figure 5. Relationship between *HTR7P1* expression and various clinicopathological parameters of breast cancer using bc-GenExMiner and GEPIA databases**. (**A**)-(**B**) Violin plot of *HTR7P1* expression according to age; (**C**) Violin plot of *HTR7P1* expression according to ER status; (**D**) Violin plot of *HTR7P1* expression according to PR status; (**E**)Violin plot of *HTR7P1* expression according to HER2 status; (**F**) Violin plot of *HTR7P1* expression according to p53 status; (**G**) Violin plot of *HTR7P1* expression according to triple-negative and basal-like status; (**H**) Violin plot of *HTR7P1* expression according to *NPI*; (**I**) Violin plot of *HTR7P1* expression according to *SBR* grade status; and (**J**) Violin plot of *HTR7P1* expression according to tumor stage (GEPIA). Difference of mRNA expression was compared by *Welch’s* tests and *Dunnett-Tukey-Kramer*'s test. ER, estrogen receptor; PR, progesterone receptor; HER2, human epidermal growth factor receptor 2; SBR, Scarff, Bloom and Richardson; NPI, Nottingham Prognostic Index; TNBC, triple-negative breast cancer; IHC, immunohistochemistry. \**P* < 0.05, \*\*\**P* < 0.001.



**Supplementary Figure 6. Association between of *HTR7P1* gene expression and clinical pathological parameters in patients with breast cancer (qT-PCR results of clinical samples).** (**A**)-(**I**) Violin plot of *HTR7P1* mRNA expression according to age, menopause status, tumor size, lymph node metastasis status, TNM stage, ER status, PR status, HER2 status, and Ki67 expression level, respectively. ER, estrogen receptor; PR, progesterone receptor; HER2, human epidermal growth factor receptor 2; LNM, lymph node metastasis; ns represent no significance. \*\*\**P* < 0.001, \*\*\*\**P* < 0.0001.



**Supplementary Figure 7. Correlation analysis of *has-miR-1271-5p* or *has-miR-381-3p*** **with** ***FAM234B* or *HTR7P1* in breast cancer (starBase).** (**A**)-(**B**) Negative correlation of *has-miR-1271-5p* with *HTR7P1* and *FAM234B* in breast cancer samples; (**C**)-(**D**) Negative correlation of *has-miR-381-3p* with *HTR7P1* and *FAM234B* in breast cancer samples.