**Supplementary Materials**

**Supplementary Figure Legends**

**Figure S1.**

(A) Box-plots indicated ABAT mRNA expression in different subtypes of breast cancer from MEBTABRIC dataset.

(B) Expression of ABAT was examined by western blotting in tumor samples from 21 cases of luminal and 9 cases of triple-negative breast cancer.

(C) ABAT expression was analyzed by quantitative real-time PCR in the indicated cell lines.

(D) Expression of ABAT, E-cadherin, Snail, and other EMT markers was examined by western blotting in the indicated cell lines.

**Figure S2.**

(A) Cell growth for BT549 cells with stable empty vector or ABAT expression as well as ABAT-expressing BT549 cells treated with or without vigabatrin (0.2 mM) or GABA (10 mM) was measured by cell-count assay for a period of 2 days. Data were shown as a percentage over control cells (mean ± SD in two independent experiments), and no significant change was observed by Student's t-test.

(B, C) Migratory ability (B) and invasiveness (C) of BT549 cells with stable empty vector or ABAT expression as well as ABAT-expressing BT549 cells treated with or without vigabatrin (0.2 mM) or GABA (10 mM) were analyzed. The percentage of migratory and invasive cells was shown in the bar graph (mean ± SD in three separate experiments). Scale bar = 100 μm (right). *$p < 0.01$ by Student's t-test.

**Figure S3.**

(A) When $Ca^{2+}$ was omitted from the buffer, representative recordings of $Ca^{2+}$ changes following treatment with GABA (2 mM) , or treantment with CGP (10 uM), picrotoxin (10 uM) or CPA (10 uM) followed by co-application of GABA (2 mM) were shown in MDA-MB231 cells. Scale bar = 30 μm (right).

(B) Average GABA-evoked changes in fluorescence intensities [F(%)] were analyzed for different drug

treatment as indicated in (A).

**Figure S4.**

(A) Expression of basal markers (EGFR and vimentin) and luminal marker (ER) was analyzed by western blotting in a representative panel of breast cancer cell lines (left panel). Fluorescence intensities were analyzed in in 4 basal and 4 luminal cell lines (right panel).

(B, C) Nuclear translocation of NFAT2 was measured by immunofluorescent staining in MDA-MB231 (B) and SUM159 cells (C) with stable empty vector or ABAT expression. Scale bar = 10 μm (right).

**Figure S5.**

(A) Soft-agar assay was performed using BT549 cells with stable empty vector or ABAT expression as well as ABAT-expressing BT549 cells treated with or without vigabatrin (0.2 mM). Data were presented as a percentage of empty vector cell lines (mean ± SD in three separate experiments). *$p < 0.01$ by Student's t-test.

(B) Box-plots indicated ABAT expression in different histological grades of breast cancer from GSE1456 dataset.

**Figure S6.**

(A) Analysis of the GSE12276 dataset for the relationship between ABAT expression and metastatic tendency of primary tumors.

(B) Kaplan-Meier survival analysis for DMFS of patients in the GSE25066 dataset according to ABAT expression status. The p value was determined using the log-rank test.

(C) Kaplan-Meier survival analysis for RFS of patients with basal subtype in an aggregate breast cancer dataset according to ABAT expression status. The p value was determined using the log-rank test.

## Supplementary Figures

Figure S1

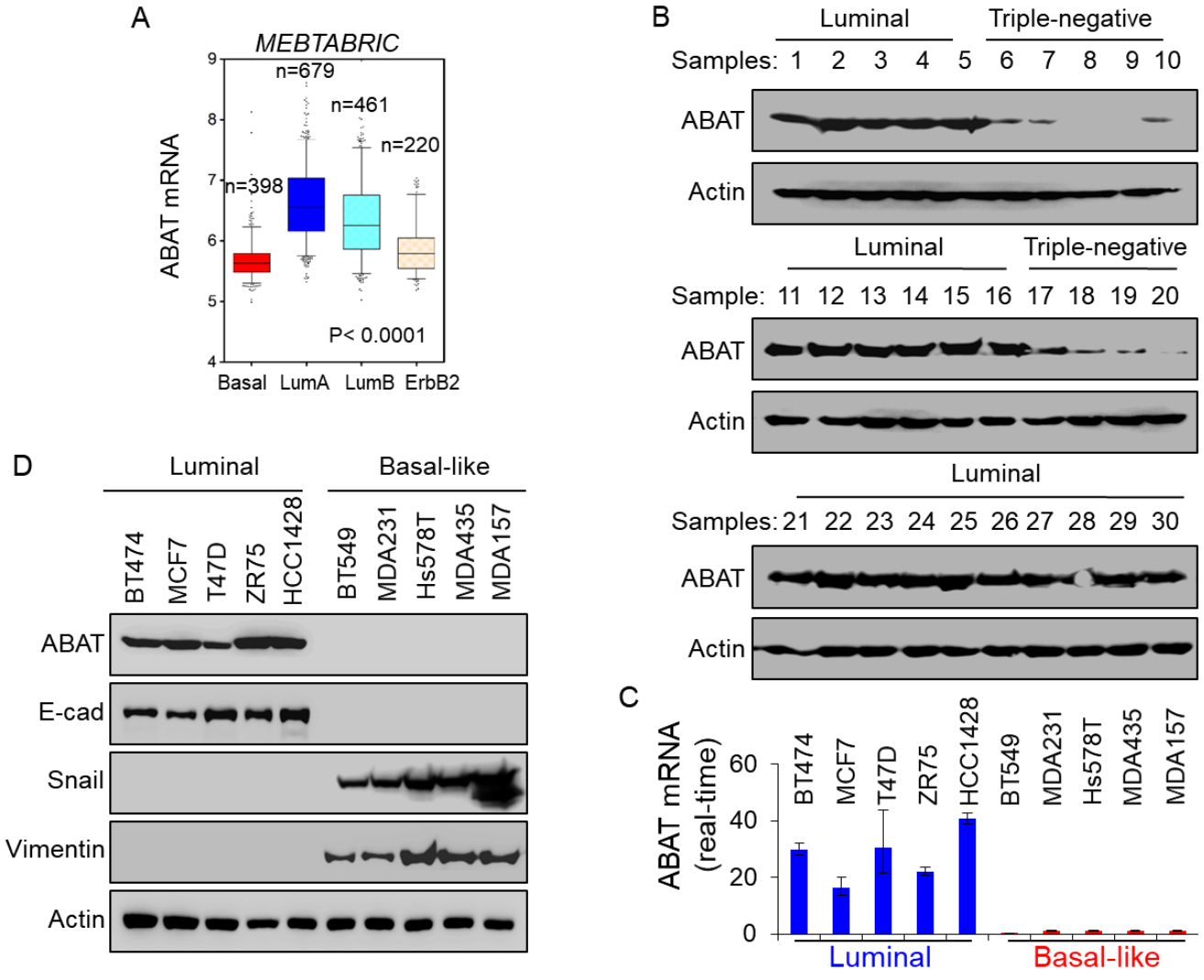


Figure S2

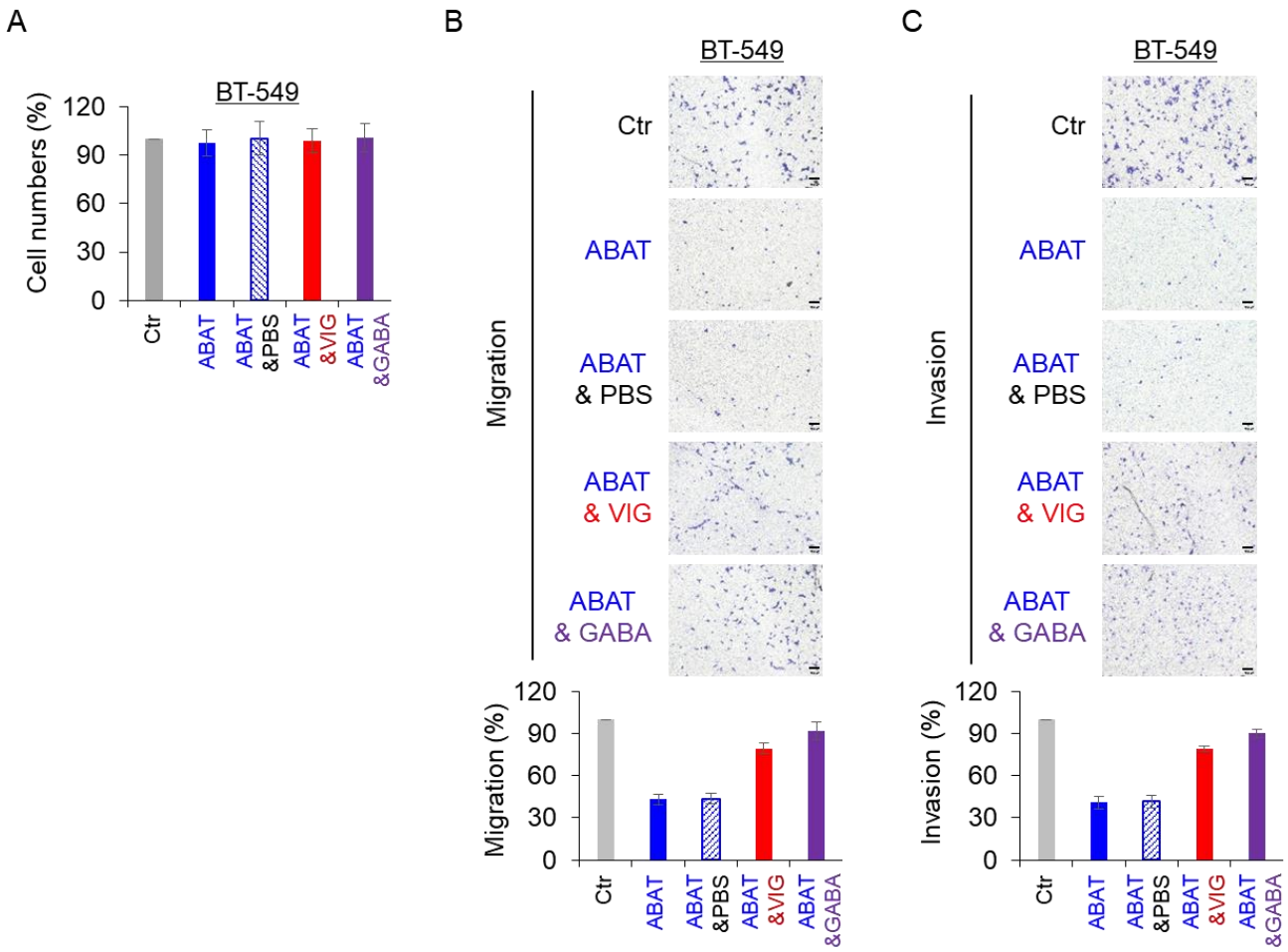

A
BT-549
Cell numbers (%)
120
90
60
30
0
Ctr
ABAT
ABAT &PBS
ABAT &VIG
ABAT &GABA
B
BT-549
Migration
Ctr
ABAT
ABAT & PBS
ABAT & VIG
ABAT & GABA
Migration (%)
C
BT-549
Invasion
Invasion (%)

Figure S3

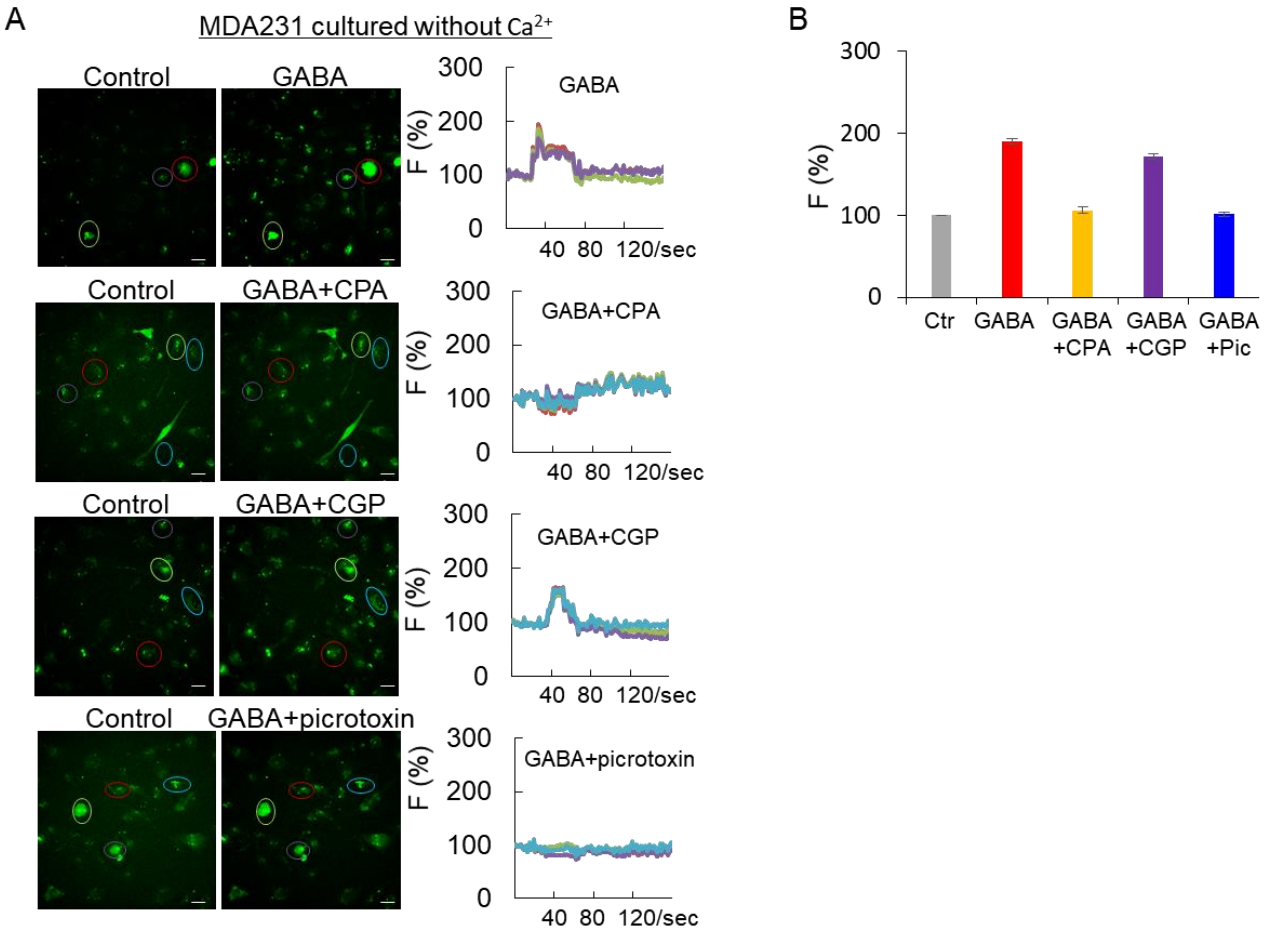

A
MDA231 cultured without Ca2+
Control
GABA
GABA
Control
GABA+CPA
GABA+CPA
Control
GABA+CGP
GABA+CGP
Control
GABA+picrotoxin
GABA+picrotoxin
F (%)
300
200
100
0
40 80 120/sec
B
F (%)
300
200
100
0
Ctr
GABA
GABA +CPA
GABA +CGP
GABA +Pic

Figure S4

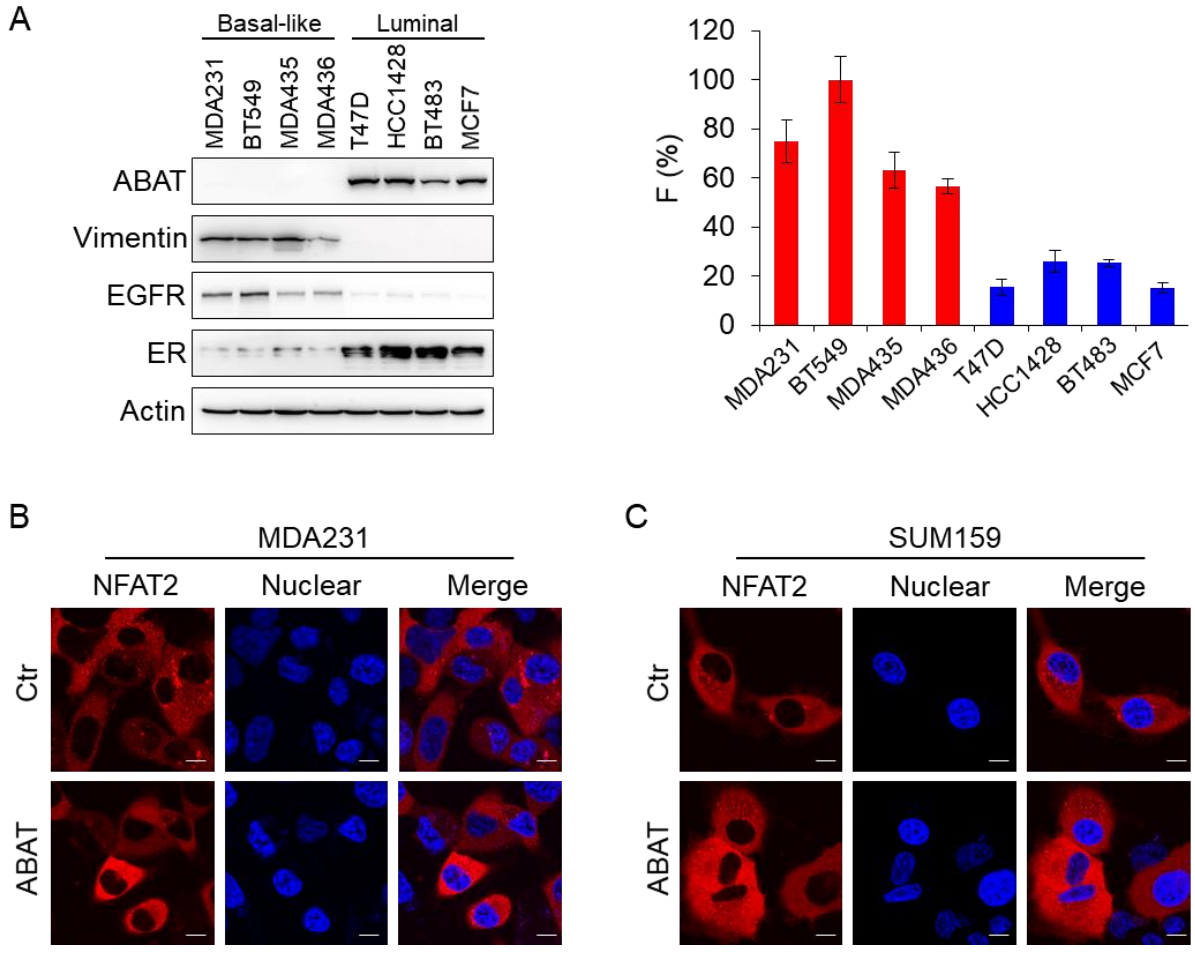

A
Basal-like
Luminal
MDA231
BT549
MDA435
MDA436
T47D
HCC1428
BT483
MCF7
ABAT
Vimentin
EGFR
ER
Actin
F (%)
120
100
80
60
40
20
0
B
MDA231
NFAT2
Nuclear
Merge
Ctr
ABAT
C
SUM159
NFAT2
Nuclear
Merge
Ctr
ABAT

Figure S5

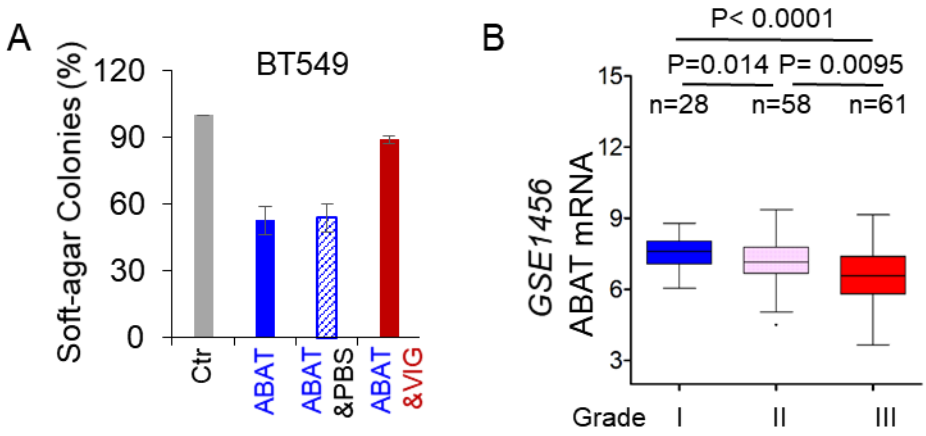
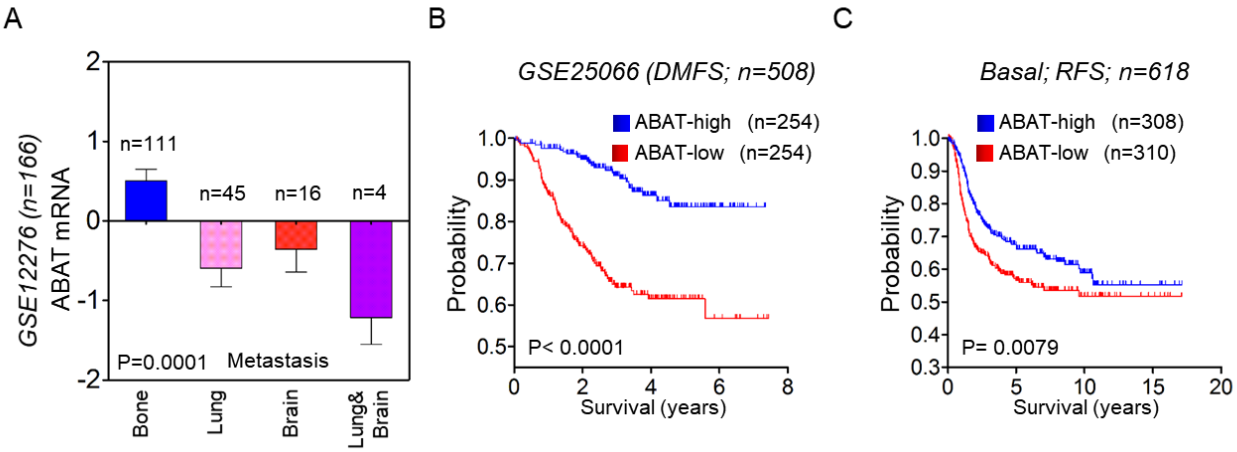

A
BT549
Soft-agar Colonies (%)
120
90
60
30
0
Ctr
ABAT
ABAT &PBS
ABAT &VIG
B
P< 0.0001
P=0.014
P= 0.0095
n=28
n=58
n=61
GSE1456
ABAT mRNA
15
12
9
6
3
Grade I
II
III

Figure S6


A
B
C
GSE12276 (n=166)
ABAT mRNA
n=111
n=45
n=16
n=4
P=0.0001
Metastasis
Bone
Lung
Brain
Lung& Brain
GSE25066 (DMFS; n=508)
ABAT-high (n=254)
ABAT-low (n=254)
Probability
P< 0.0001
Survival (years)
Basal; RFS; n=618
ABAT-high (n=308)
ABAT-low (n=310)
Probability
P= 0.0079
Survival (years)