Supplementary Figure Legends

Supplementary Fig. 1: MSGs expression level in MCF7 cell line. qRT-PCR analysis was used to evaluate the 19 MSGs expression in the tumorigenic low metastatic breast cancer cell line, MCF7. GAPDH was used as a control. Data represent the mean of triplicate experiments with SD.

Supplementary Fig. 2: Validation of the inverse correlation between candidate genes and MSGs expression. In an independent set of MCF7 cultures transfected with a scrambled siRNA (negative control) or siRNAs to each of 19 MSGs at 96 h time point, qRT-PCR was performed to validate the expression of BCAR4, CA9, WINK3, TXNRD1, MMP16, SRMS, LPXN, TARP, APH1B, CXCR7, CYP4V2, NRIP3, CNTNAP4. The data are expressed as fold change compared to negative control (siNeg), arbitrarily set a 1.0. GAPDH was used as a control. Dotted line indicates 1.5-fold threshold.

Supplementary Fig. 3: Expression of UGT1A isoforms in MCF7 and MDA-MB-231T cell lines. qRT-PCR was performed to evaluate the expression of 5 UGT1A isoforms, -A1, A-A3, -A4, -A5, -A6, -A7, -A8, -A9, -A10 in MCF7 (light grey bars) and MDA-MB-231T (black bars) cell lines. Specific oligo primers used in this assay are described in Table S3. GAPDH was used as a control.

Supplementary Fig. 4: Effect of UGT1A, DNM3, OAS1 knockdown or IL11RA overexpression on breast cancer cell proliferation. MTT assay was used to evaluate proliferation/viability over 72 h of culture of MDA-MB-231T cells stably transfected with either empty vector (pLKO), scramble shRNA (NT) or two specific shRNAs targeting either UGT1A1 or UGT1A9 (A), DNM3 (B), OAS1 (C), PDE5A (E). MTT assay was also used to measure the
cell proliferation of MCF7 clones expressing either empty vector or IL11RA (D). Data represent the mean ± SD of three independent experiments.

**Supplementary Fig. 5: Increased PDE5A expression in metastatic BT474-M1 cell line.**

Western blot analysis was performed to evaluate the PDE5A expression level in the breast cancer cell line BT474 and its metastatic subtype, BT474-M1. β-actin was used as loading control.