

Supplemental Figure Legends

Figure S1: FACS analysis of ALDH+ breast cancer stem cells from breast cancer patients.

Figure S2: FACS analysis of ALDH+ breast cancer stem cells from breast cancer cell MCF-7.

Figure S3: Confirmation of overexpression of piR-2158 in MDA-MB-231 (A) and MCF-7 (B) breast cancer cells upon piRNA mimic transfection. Data are presented as mean \pm SEM. ** $p < 0.01$.

Figure S4: piR-2158 overexpression decreased cell proliferation, EMT and cell stemness in MCF-7. A-C: Cell proliferation analysis by CCK8 assay (A) and ki67 staining (B and C) in MCF-7 cells with or without piR-2158 overexpression. D: QRT-PCR analysis of stem cell genes KLF4, NANOG, SOX2 and OCT4 in MCF-7 cells transfected with piR-2158 mimic or control. E: QRT-PCR analysis of EMT markers Slug, Vimentin, Fibronectin and ZEB1 in MCF-7 cells transfected with piR-2158 mimic or control. Data are presented as the mean \pm SEM ($n = 3$). * $p < 0.05$, ** $p < 0.01$.

Figure S5: Knockdown of piR-2158 in MDA-MB-231 cells induced the cell proliferation, migration and cell stemness. A: Validation of piR-2158 knockdown by its antisense inhibitor in MDA-MB-231 cells. B-D: Cell proliferation analysis by CCK8 assay (B) and ki67 staining (C and D) in MDA-MB-231 cells with or without knockdown of piR-2158. E: Wound healing assay in MDA-MB-231 cells with or without knockdown of piR-2158. F: Quantitative analysis of E. G: QRT-PCR analysis of EMT markers Slug, Vimentin, Fibronectin and ZEB1 in MDA-MB-231 cells with or without knockdown of piR-2158. H: QRT-PCR analysis of stem cell genes KLF4, NANOG, SOX2 and OCT4 in MDA-MB-231 cells with or without knockdown of piR-2158. Data are presented as the mean \pm SEM ($n = 3$). * $p < 0.05$, ** $p < 0.01$.

Figure S6: Knockdown of piR-2158 in MCF-7 cells induced the cell proliferation, EMT and cell stemness. A: Validation of piR-2158 knockdown in MCF-7 cells. B-D: Cell proliferation analysis by CCK8 assay (B) and ki67 staining (C and D) in MCF-7 cells with or without knockdown of piR-2158. E: QRT-PCR analysis of stem cell genes KLF4, NANOG, SOX2 and OCT4 in MCF-7 cells with or without knockdown of piR-2158. F: QRT-PCR analysis of EMT markers in MCF-7 cells with or without knockdown of piR-2158. Data are presented as the mean \pm SEM ($n = 3$). * $p < 0.05$, ** $p < 0.01$.

Figure S7: Confirmation of overexpression of piR-2158 in 4T1 breast cancer cells. Data are presented as mean \pm SEM. ** $p < 0.01$.

Figure S8: GSEA analysis of the differently expressed genes (DEGs) indicating their enrichment in the pathways including Wnt signaling, EMT, stem cell pluripotency, etc.

Figure S9: Expression analysis of *IL11* in MDA-MB-231 cells after transfection with piR-2158 and/or FOSL1. Data are presented as mean \pm SEM. * $p < 0.05$, ** $p < 0.01$.

Figure S10: piR-2158 suppressed tube formation directly by targeting *IL11* in HUVECs. A: Overexpression of piR-2158 in HUVECs. B: Downregulation of *IL11* by piR-2158 overexpression in HUVECs. C: Representative images of HUVECs tube formation with or without overexpression of piR-2158. Data are presented as mean \pm SEM. * $p < 0.05$, ** $p < 0.01$.

Figure S11-S14: The original images of western blots.

Figure S1

Primary tumor cells from BC patients

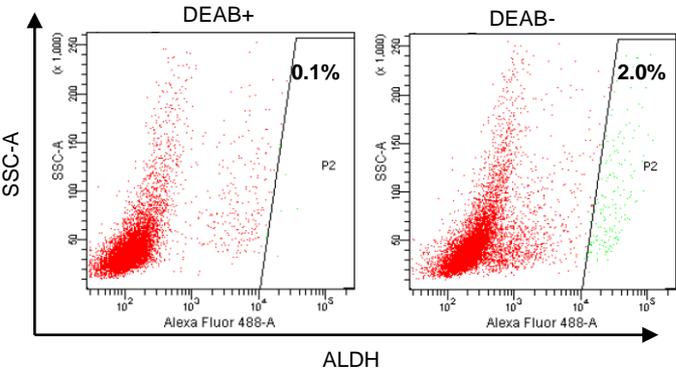


Figure S2

MCF-7

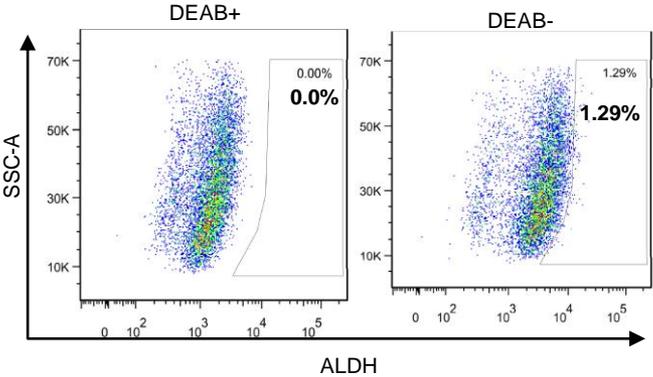


Figure S3

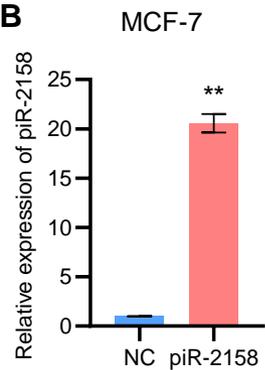
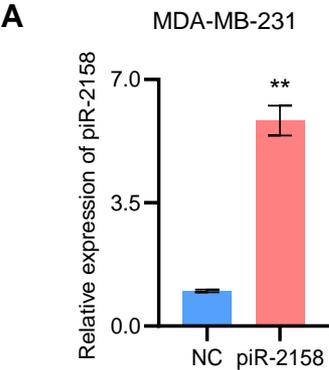


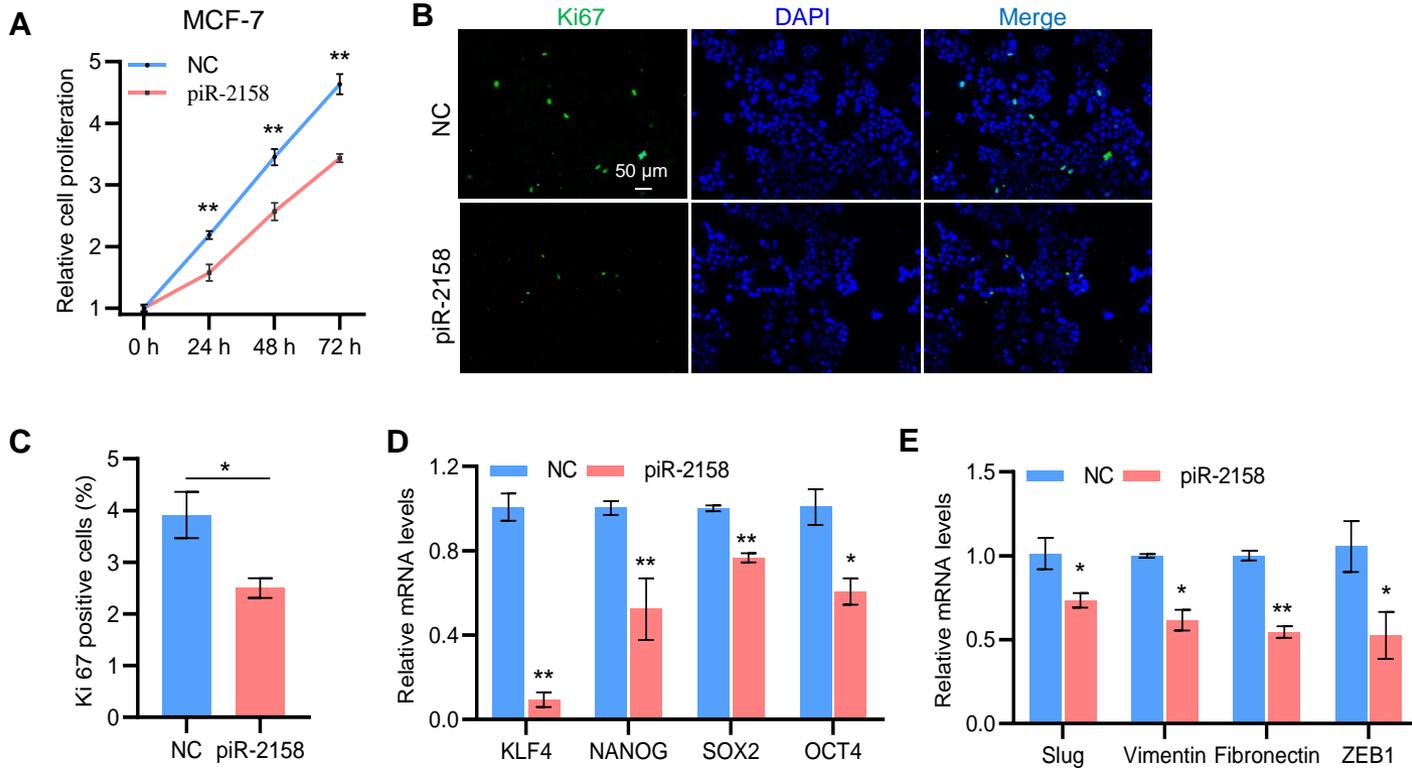
Figure S4

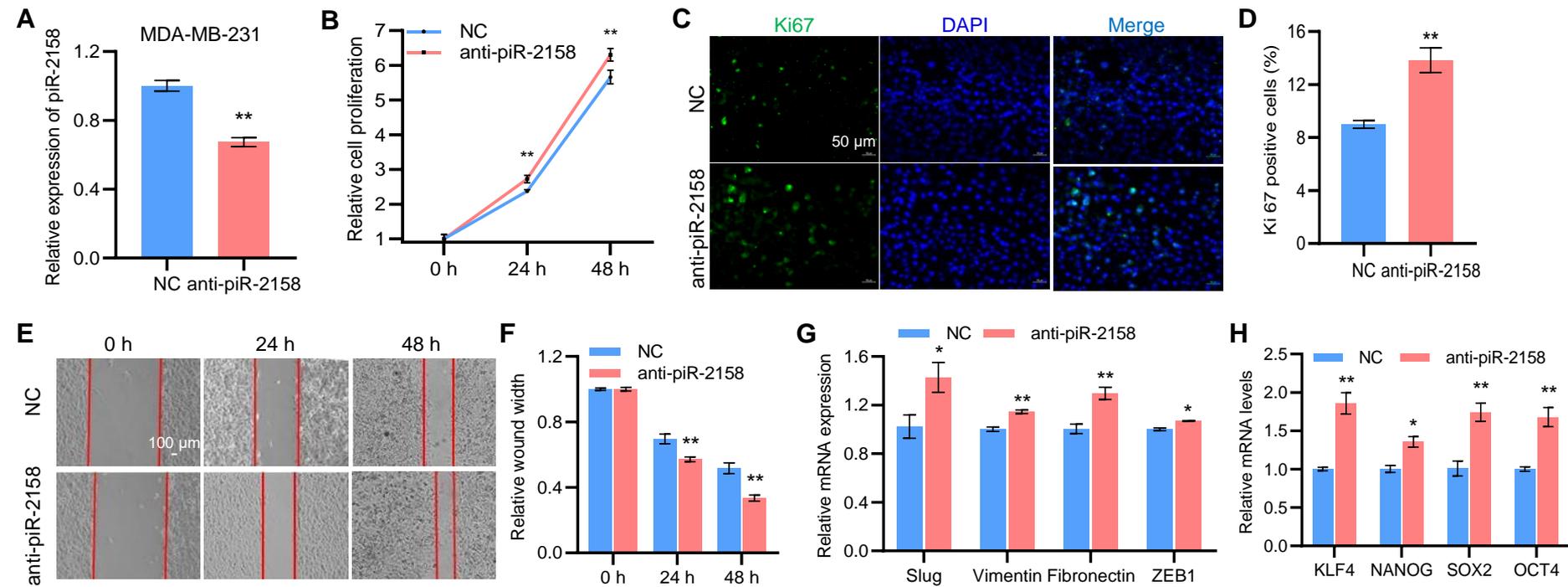
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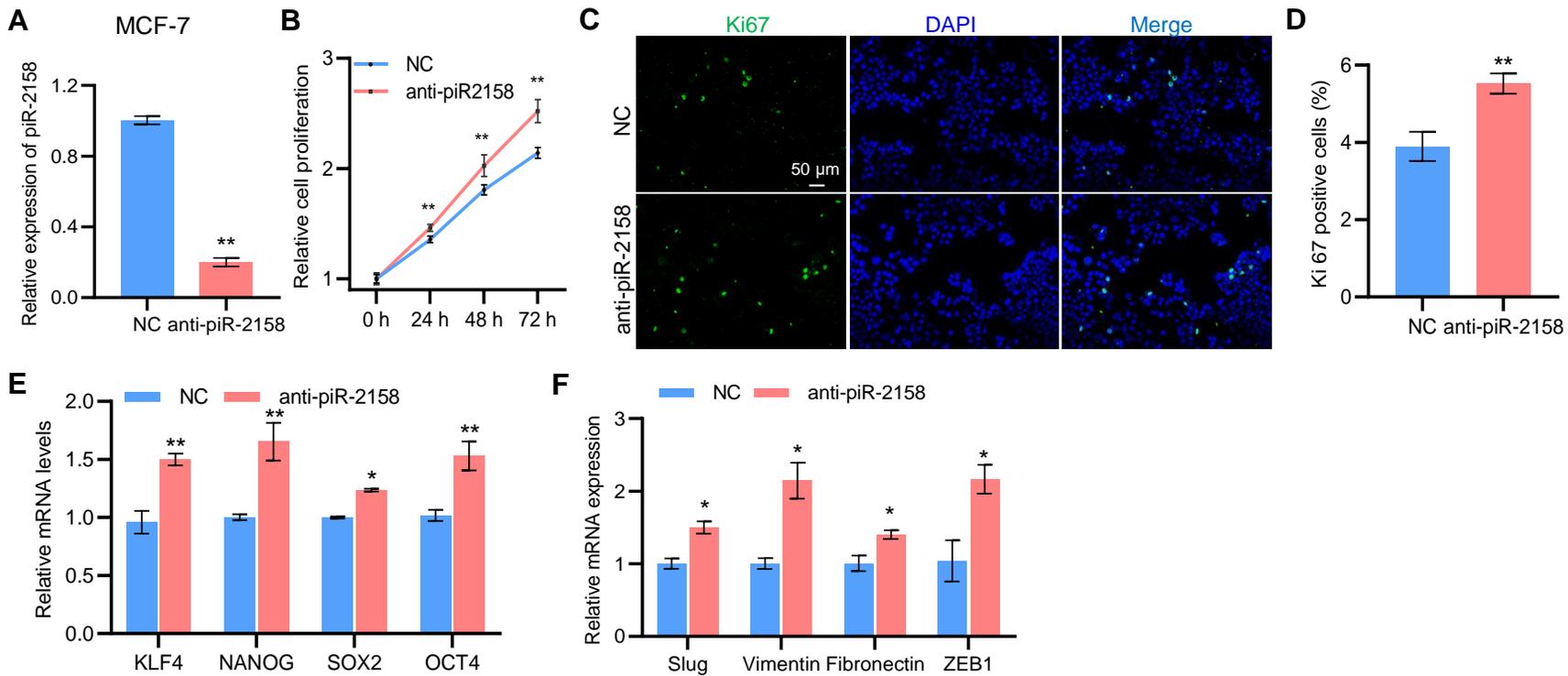
Figure S6

Figure S7

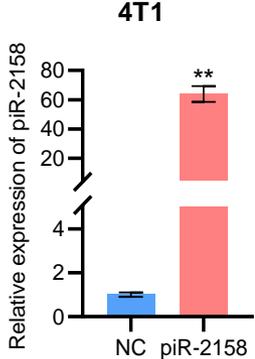


Figure S8

GSEA_pathway_Wikipathway_TOP20

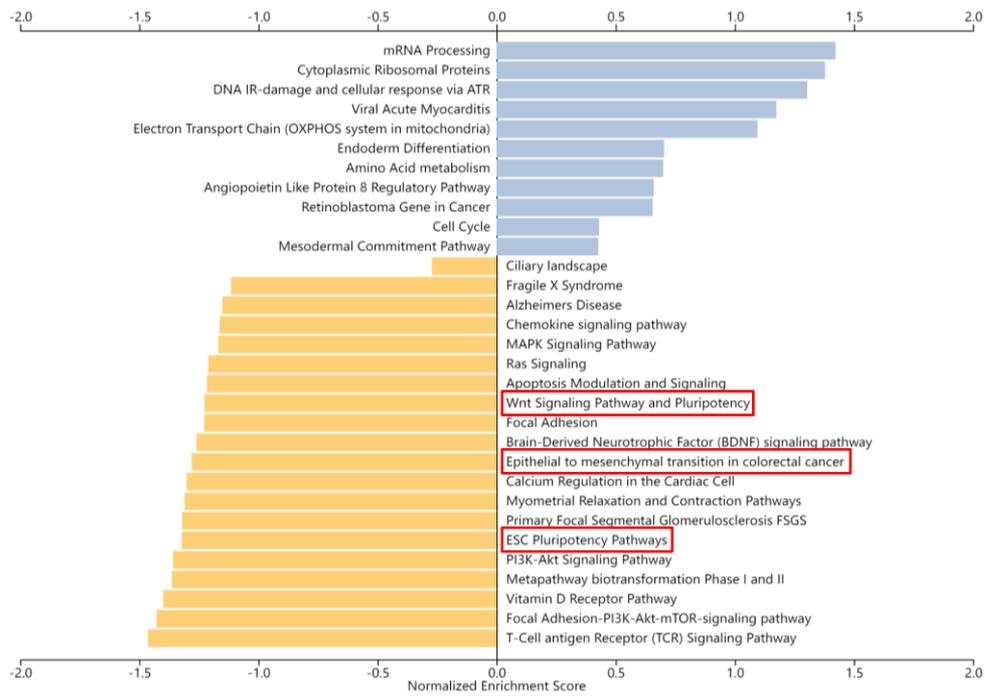


Figure S9

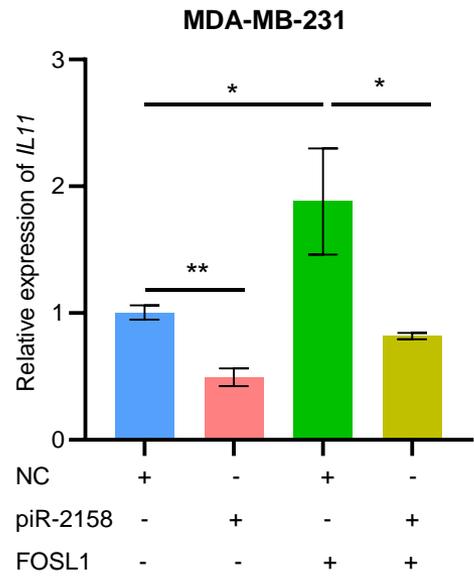


Figure S10

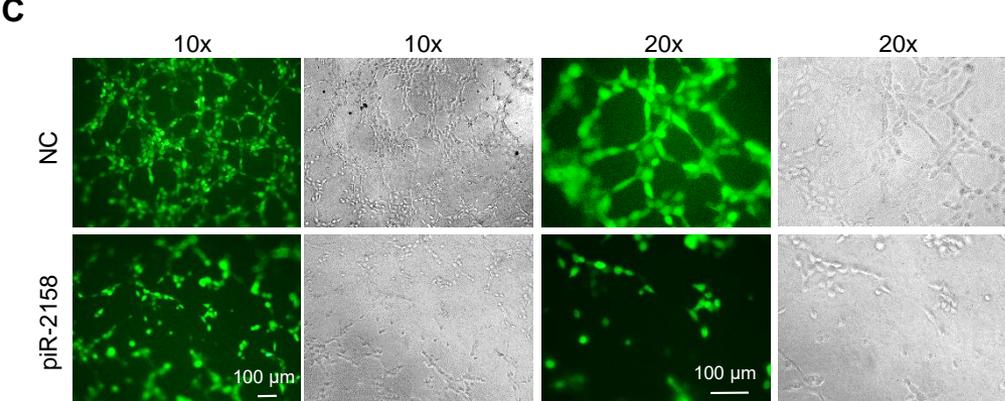
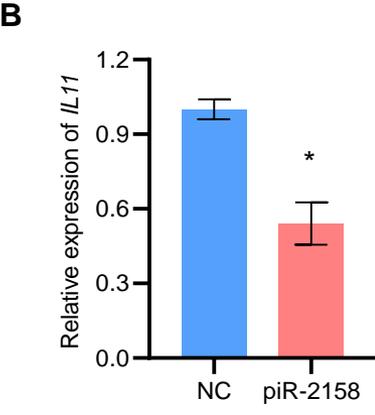
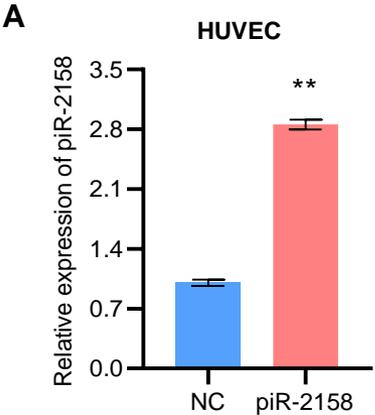


Figure S11

Original uncropped images for Figure 21

MDA-MB-231 NC

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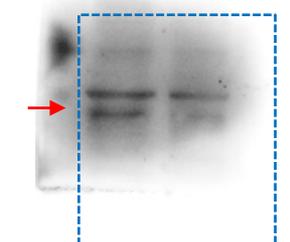
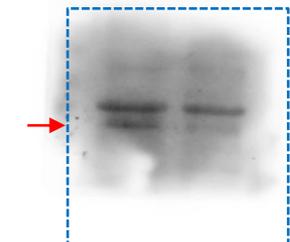
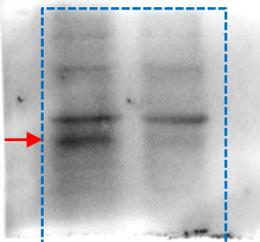
MDA-MB-231 piR-2158

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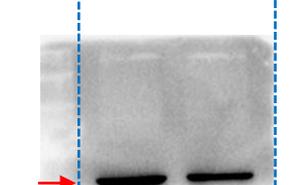
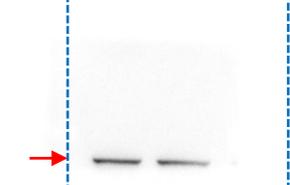
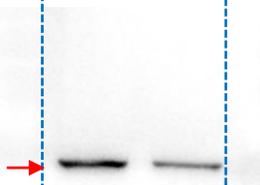
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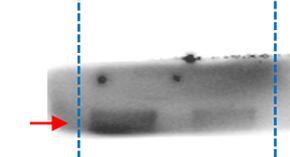
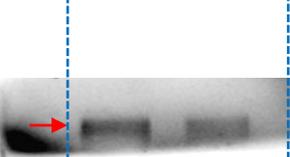
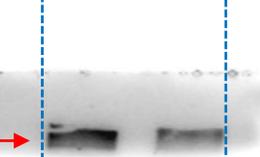
Slug



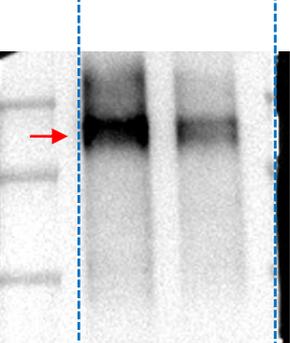
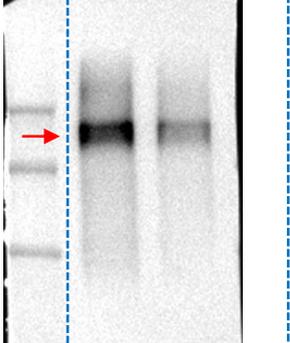
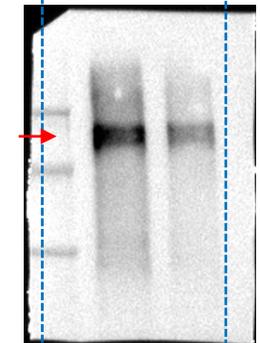
Vimentin



Fibronectin



ZEB1



GAPDH

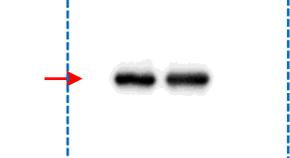
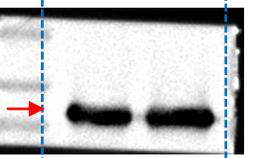


Figure S12

Original uncropped images for Figure 2L

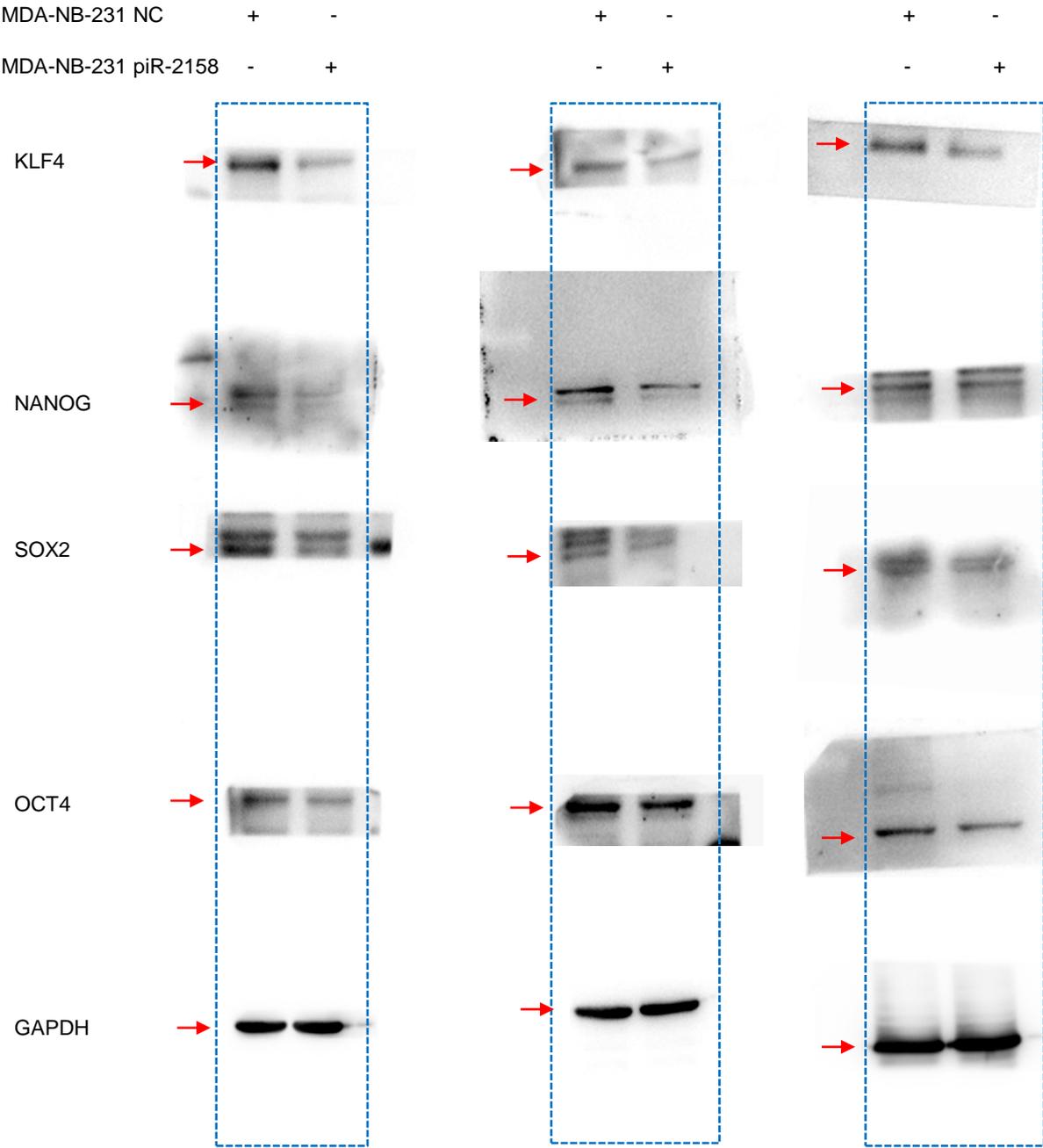


Figure S13

Original uncropped images for Figure 4I

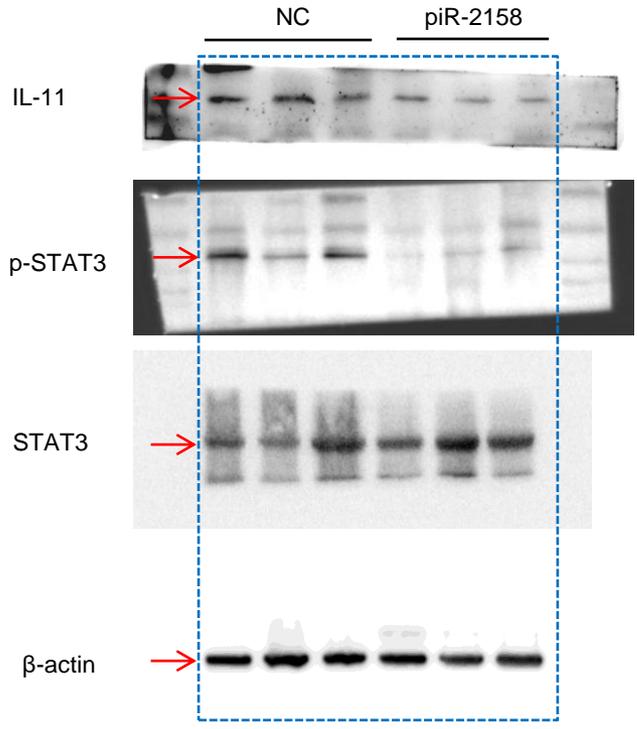


Figure S14

Original uncropped images for Figure 6C

