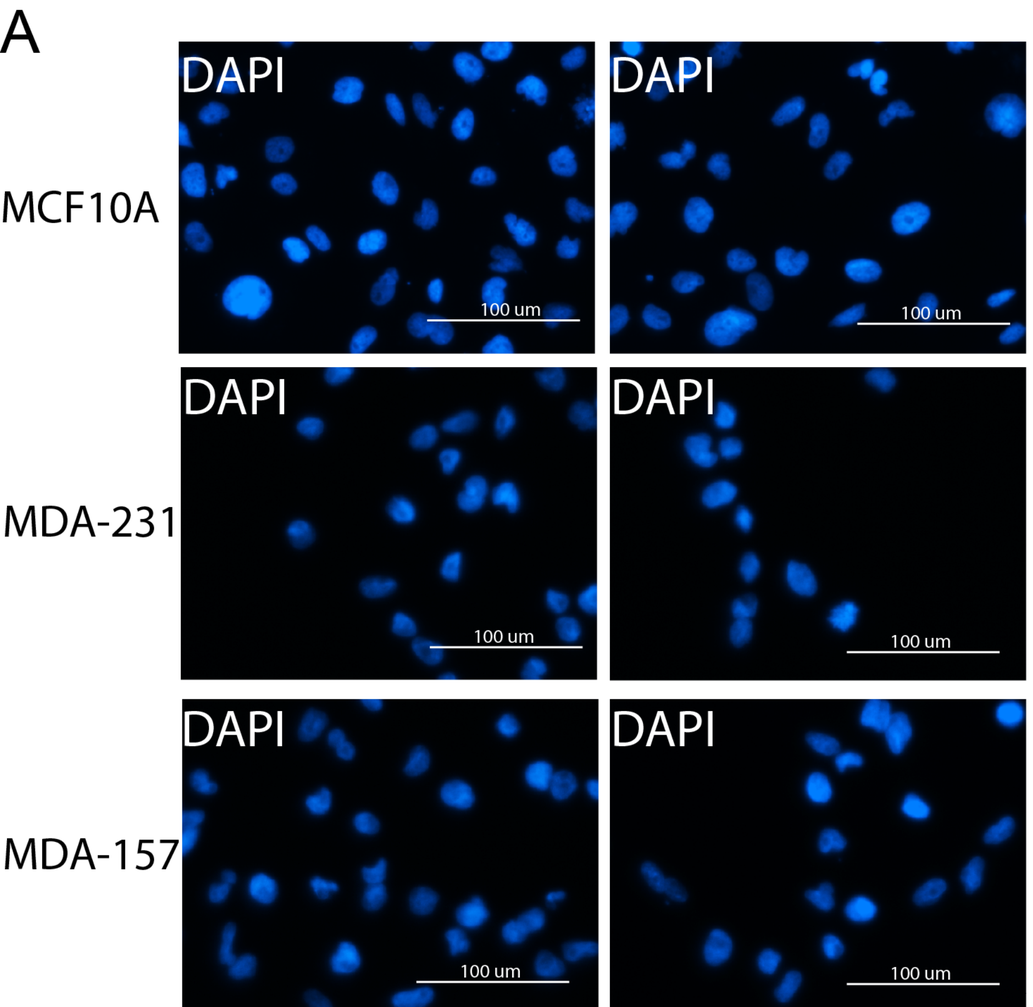
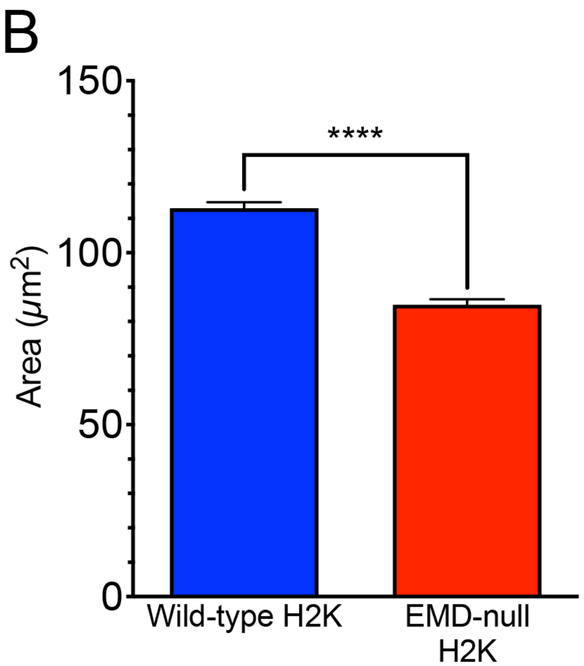
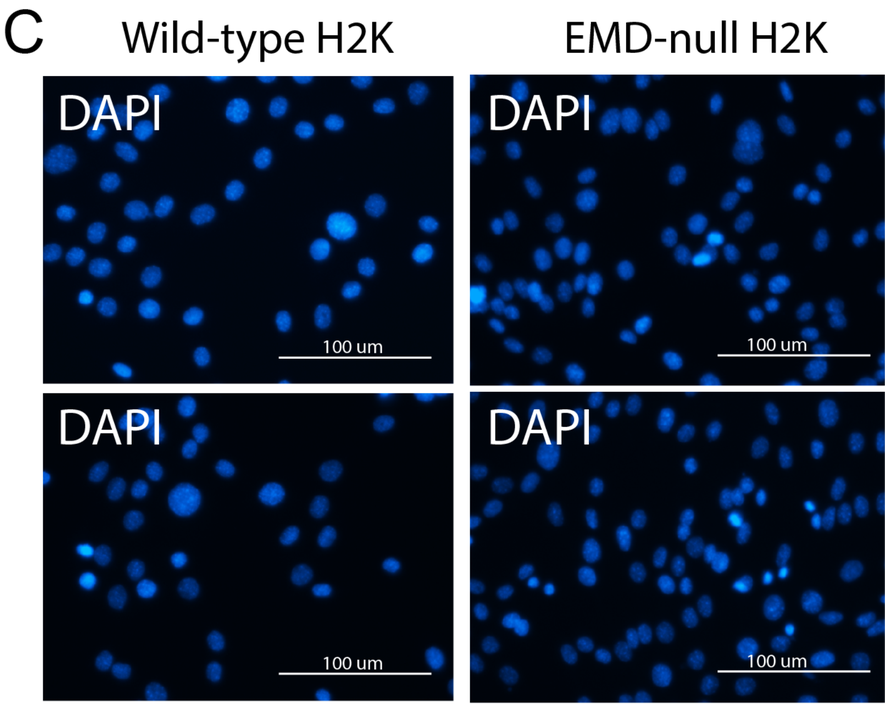
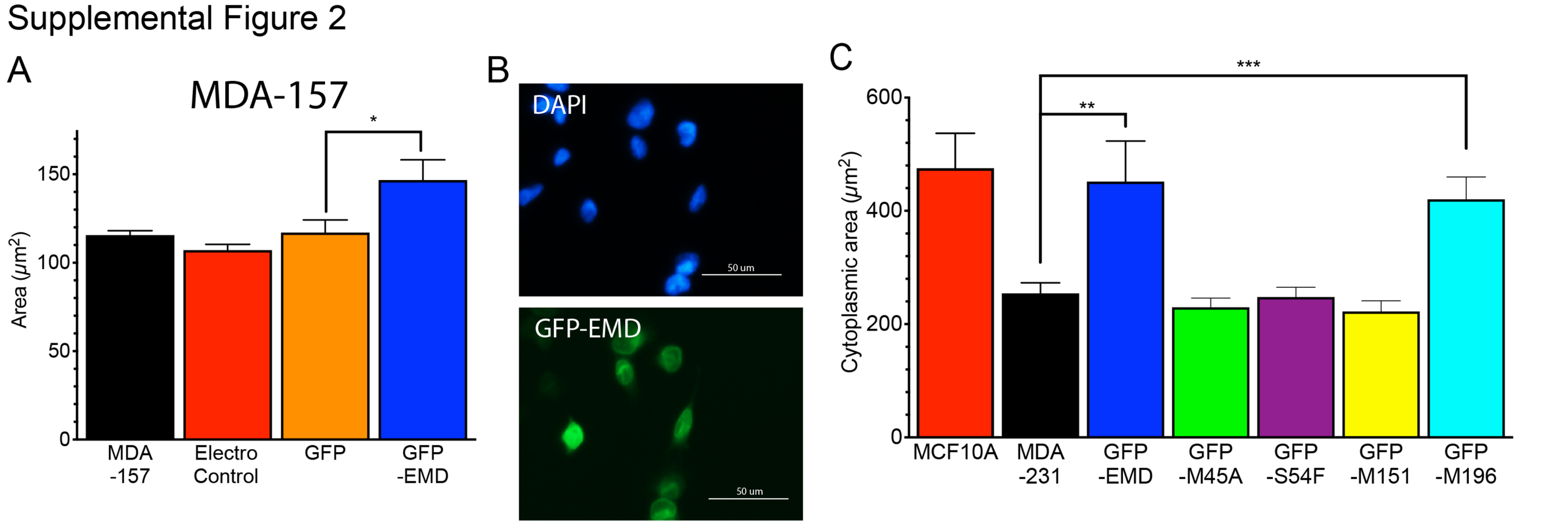
Supplemental Figure 1



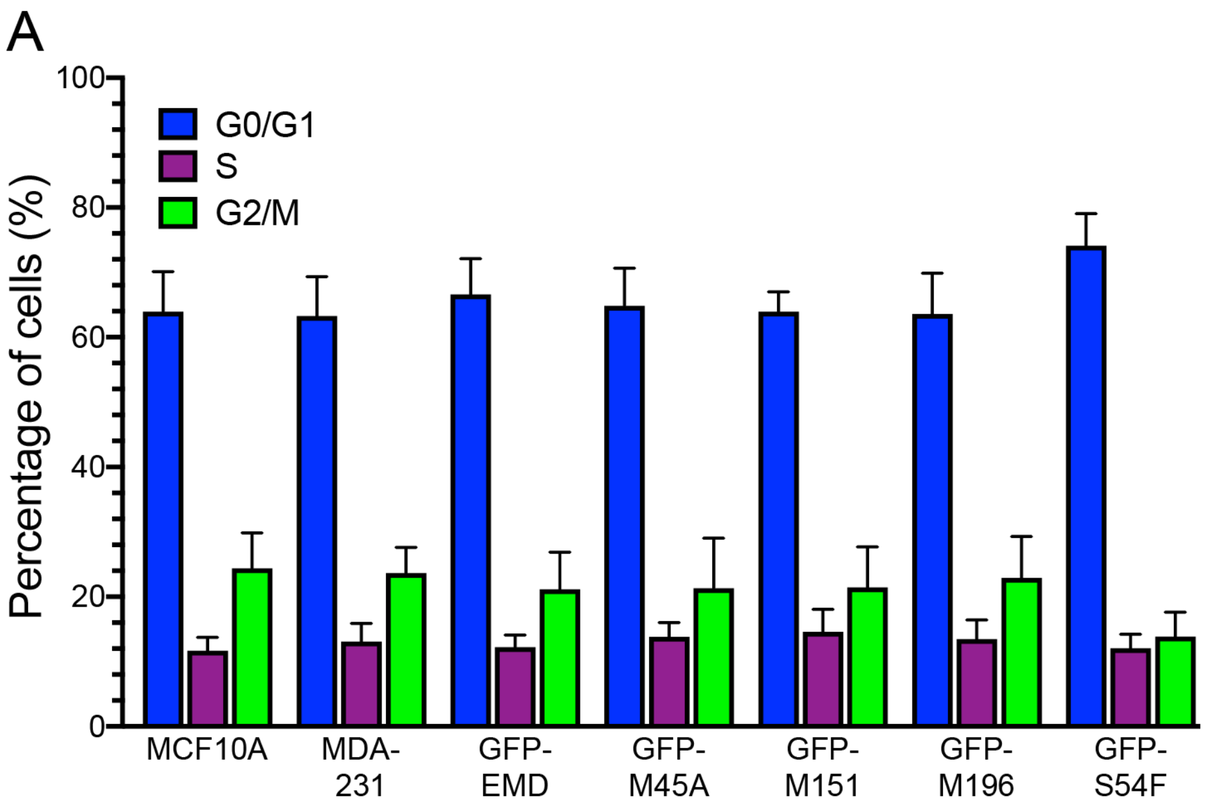


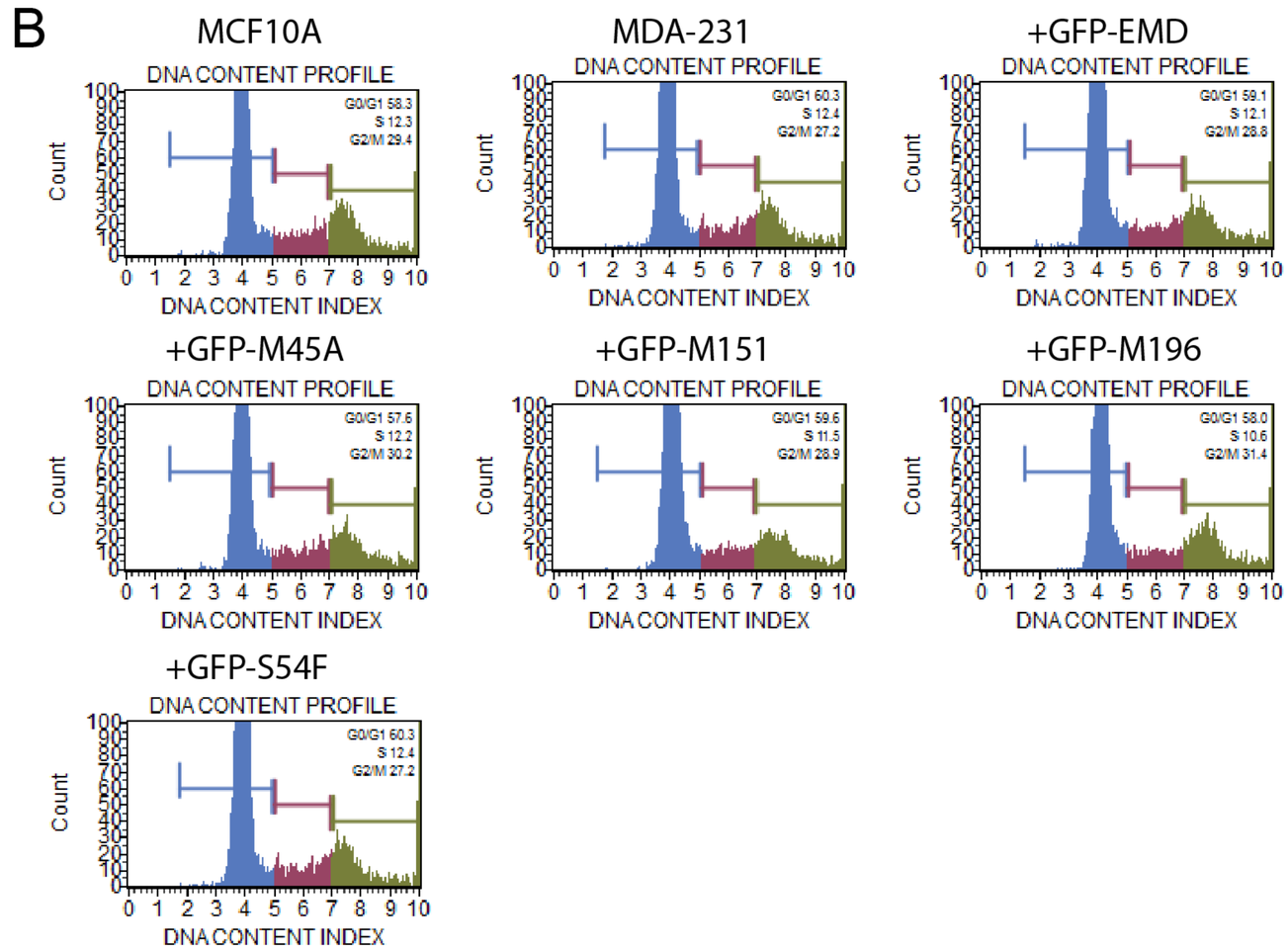


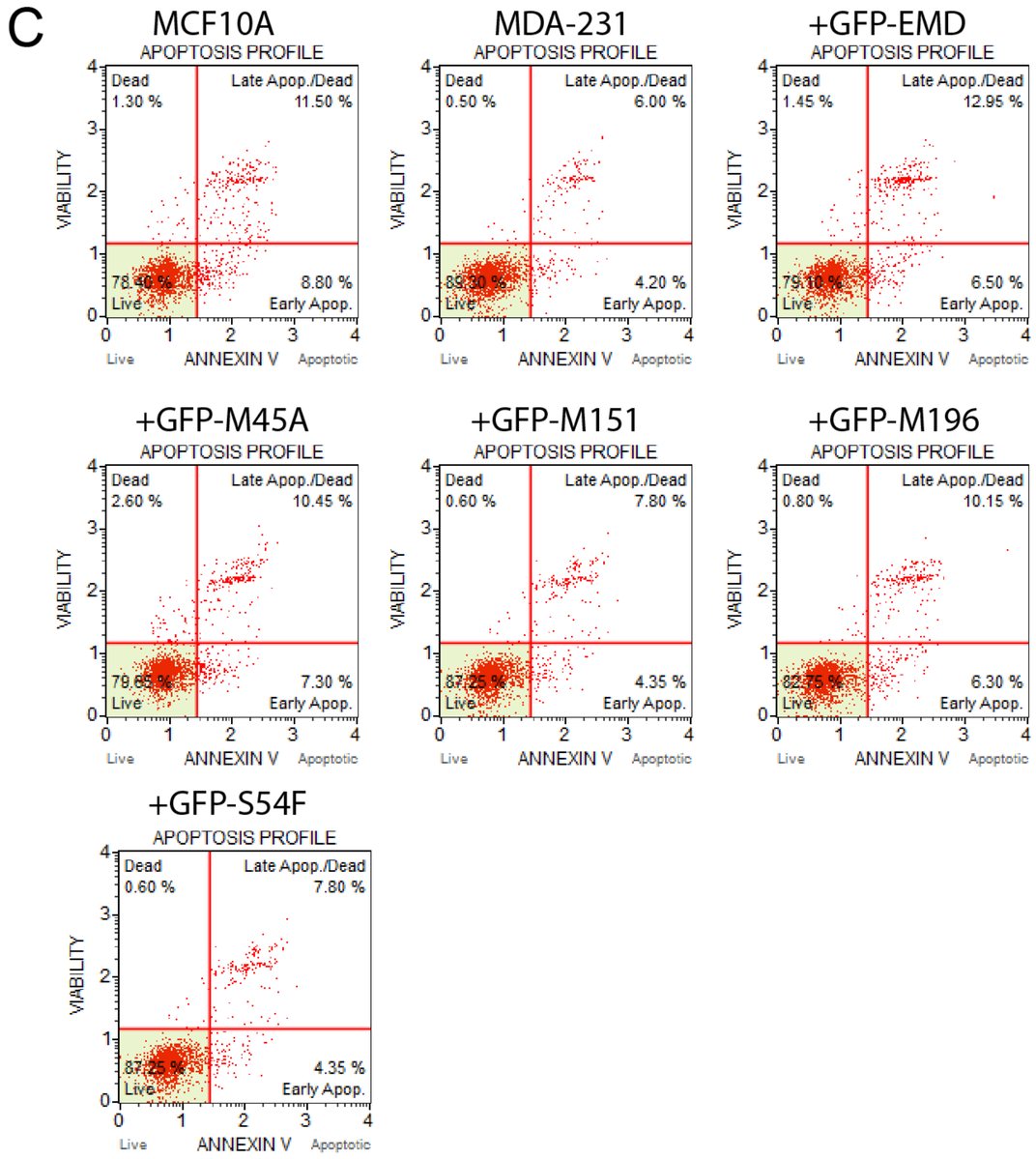
Supplemental Figure 2

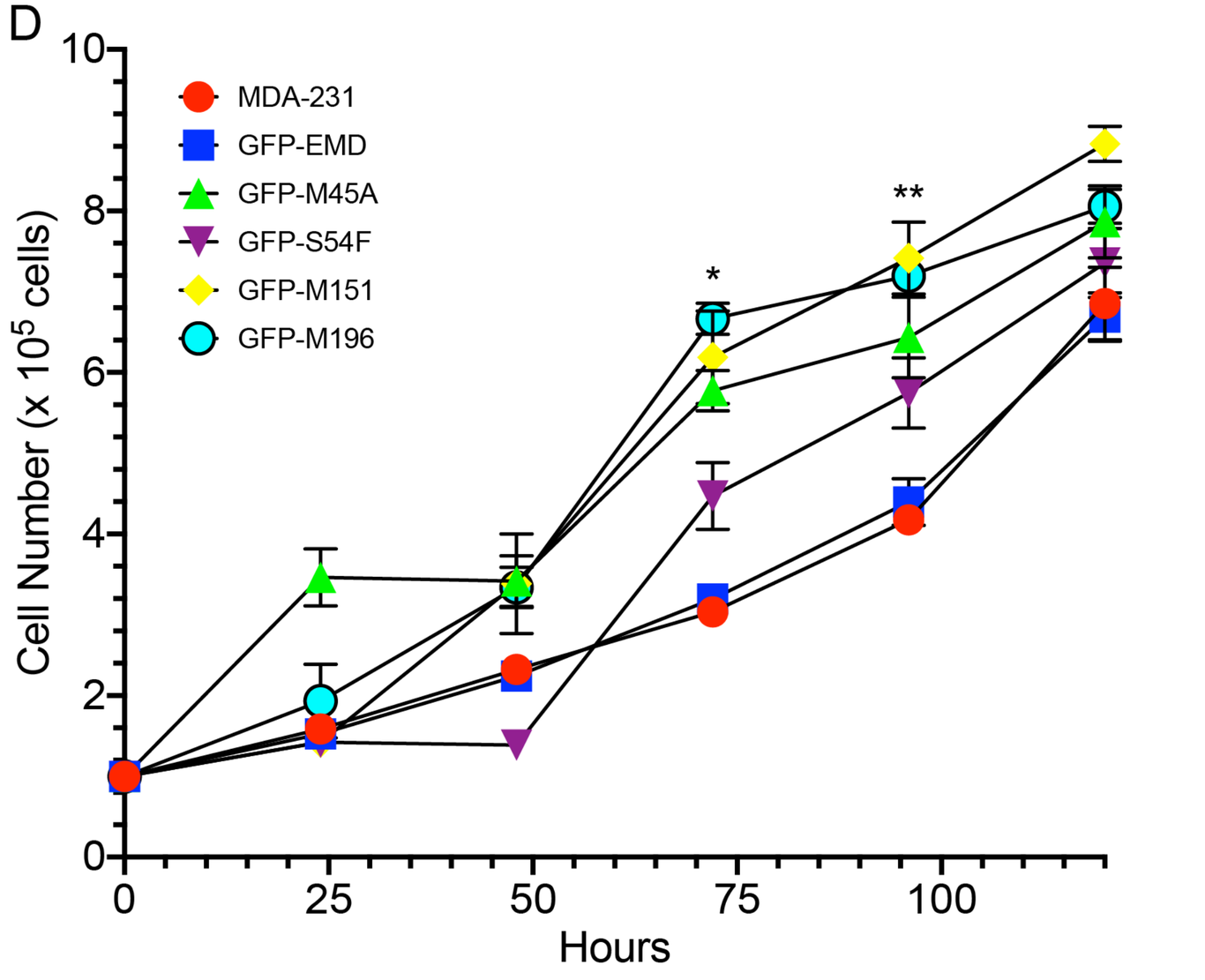


Supplemental Figure 3

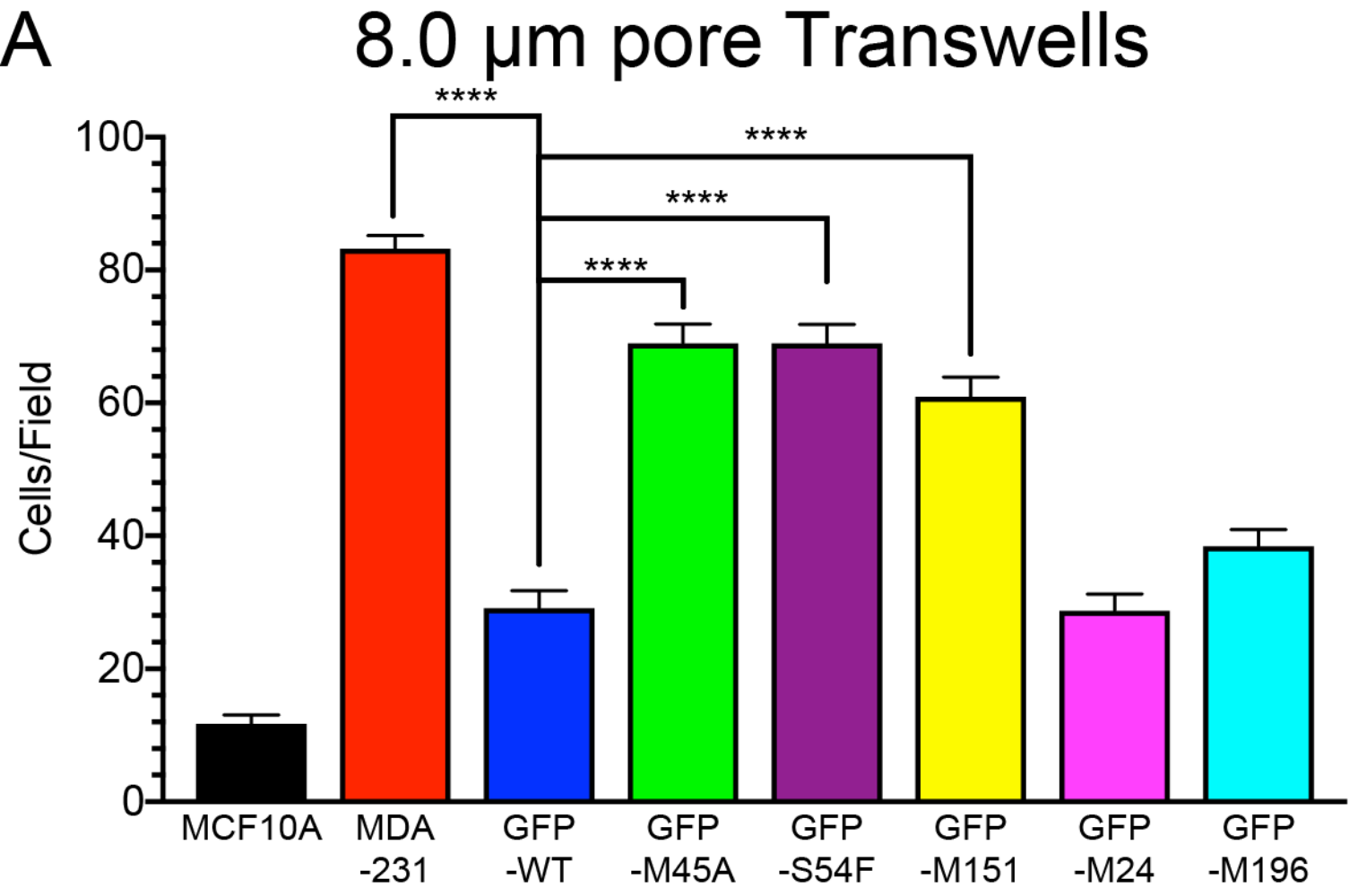




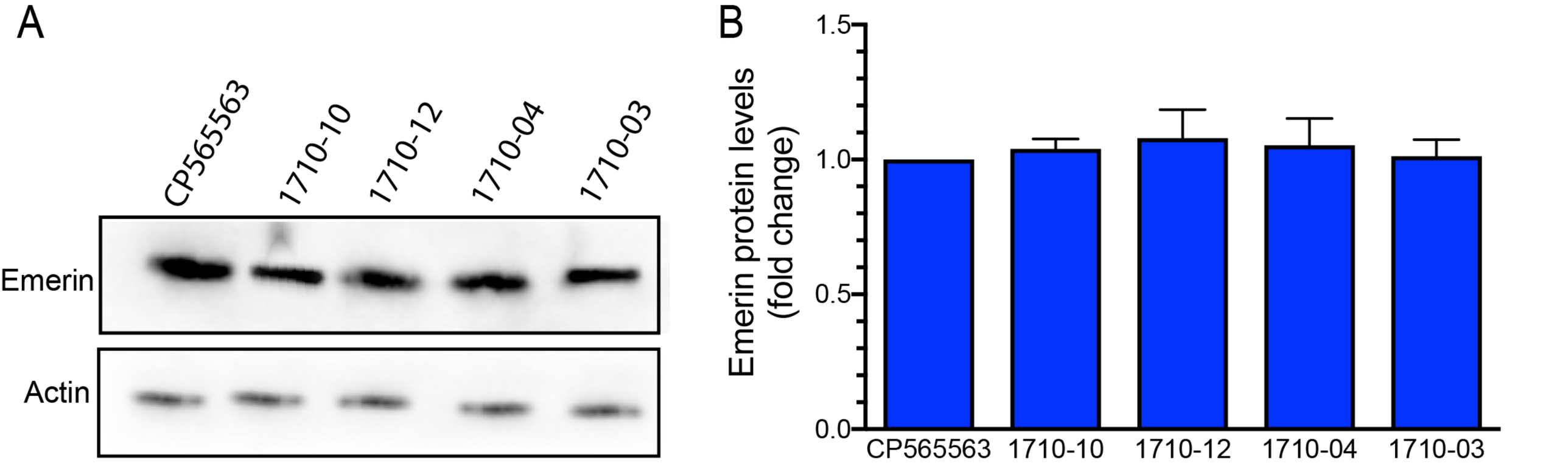




Supplemental Figure 4



Supplemental Figure 5



Supplemental Figure Legends

Supplemental Figure 1: **Emerin-null myogenic progenitor nuclei are smaller than wild-type myogenic progenitor nuclei.** (A) Additional representative DAPI (blue) images of MCF10A, MDA-231, and MDA-157 cells. Scale bars: 100 µm. (B) Nuclear area of wild-type H2K myogenic progenitor cells (blue, n=353) and emerin-null (EMD-null) H2K myogenic progenitor cells (red, n=493). Error bars represent standard error. ****p-value < 0.0001, unpaired t-test. (C) Representative DAPI (blue) images of wild-type H2K cells and emerin-null H2K cells. Scale bars: 100 µm. Thus, reduction of nuclear size in the absence of emerin is not characteristic of only invasive breast cancer cells, but emerin regulation of nuclear size and structure is likely a function shared in most cell types.

Supplemental Figure 2: **GFP-emerin increases nuclear area in MDA-157 cells.** (A) Nuclear area of MDA-157 cells (n=147, black), MDA-157 cells with no plasmid, but electroporated (electroporation control; n=67, red), and MDA-157 cells expressing GFP (n=48, orange) or GFP-emerin (n=64, blue). Error bars represent standard error. *p-value = 0.0111, unpaired t-test (B) Representative DAPI (blue) and GFP-emerin (green) images of MDA-157 cells. Scale bar: 50 µm. (C) Cytoplasmic area of MCF10A cells, MDA-231 cells, or MDA-231 cells expressing GFP-emerin, GFP-M45A, GFP-M151, GFP-M196, or GFP-S54F. Error bars represent standard deviation. **p-value = 0.0097, ***p-value = 0.0003, one-way ANOVA.

Supplemental Figure 3: **GFP-emerin and GFP-emerin mutants do not affect cell cycle progression or apoptosis.** (A) Percentage of total cell number within each phase of the cell cycle for MCF10A cells (n=4), MDA-231 cells (n=4), or MDA-231 cells expressing GFP-emerin (n=4), GFP-M45A (n=4), GFP-M151 (n=4), GFP-M196 (n=4) or GFP-S54F (n=4) is shown. (B) Histograms from a representative experiment for MCF10A cells, MDA-231 cells, or MDA-231 cells expressing GFP-emerin, GFP-M45A, GFP-M151, GFP-M196, or GFP-S54F. There is no

significant difference in cell cycle dynamics between any of the cell lines. (C) Representative Annexin V histograms of MCF10A cells, MDA-231 cells, or MDA-231 cells expressing GFP-emerin, GFP-M45A, GFP-M151, GFP-M196, or GFP-S54F are shown. There is no significant difference in the number of apoptotic or dead cells between any of the cell lines. (D) Growth curve of MDA-231 cells or MDA-231 cells expressing GFP-emerin, GFP-M45A, GFP-M151, GFP-M196, or GFP-S54F. $1x10^5$ cells were plated and the number of cells were counted at 24, 48, 72, 96, and 120 hours. Error bars represent standard error. *t=72, GFP-M45A, p-value = 0.0273; GFP-M151, p-value = 0.0191; GFP-M196, p-value = 0.0152. **t=96, GFP-M45A, p-value = 0.044; GFP-M151, p-value = 0.0231; GFP-M196, p-value = 0.0172, one-way ANOVA. Although there are some growth rate differences seen between some of the cell lines, these differences fail to correlate with increased tumor growth or metastasis in mice; e.g., MDA-231 and GFP-emerin cells grow at the same rate, but exhibit major differences in tumor growth and metastasis.

Supplemental Figure 4: **GFP-emerin expression decreases cell migration through 8.0 µm pores.** (A) The number of cells migrating through 8.0 µm transwell pores is shown for MCF10A cells, MDA-231 cells, and MDA-231 cells expressing GFP, GFP-emerin, GFP-M45A GFP-S54F, GFP-M151, GFP-M24, or GFP-M196. Error bars represent standard deviation. ****p-value < 0.0001 by one-way ANOVA.

Supplemental Figure 5: **Normal control patient samples from multiple sources have similar emerin protein levels.** (A) Western blot analysis of protein lysates from patients without breast cancer. (B) Quantitation of protein lysates. Bands were normalized to actin and the control patient sample used for Figure 6 quantification (CP565563, n=3). Error bars represent standard deviation.