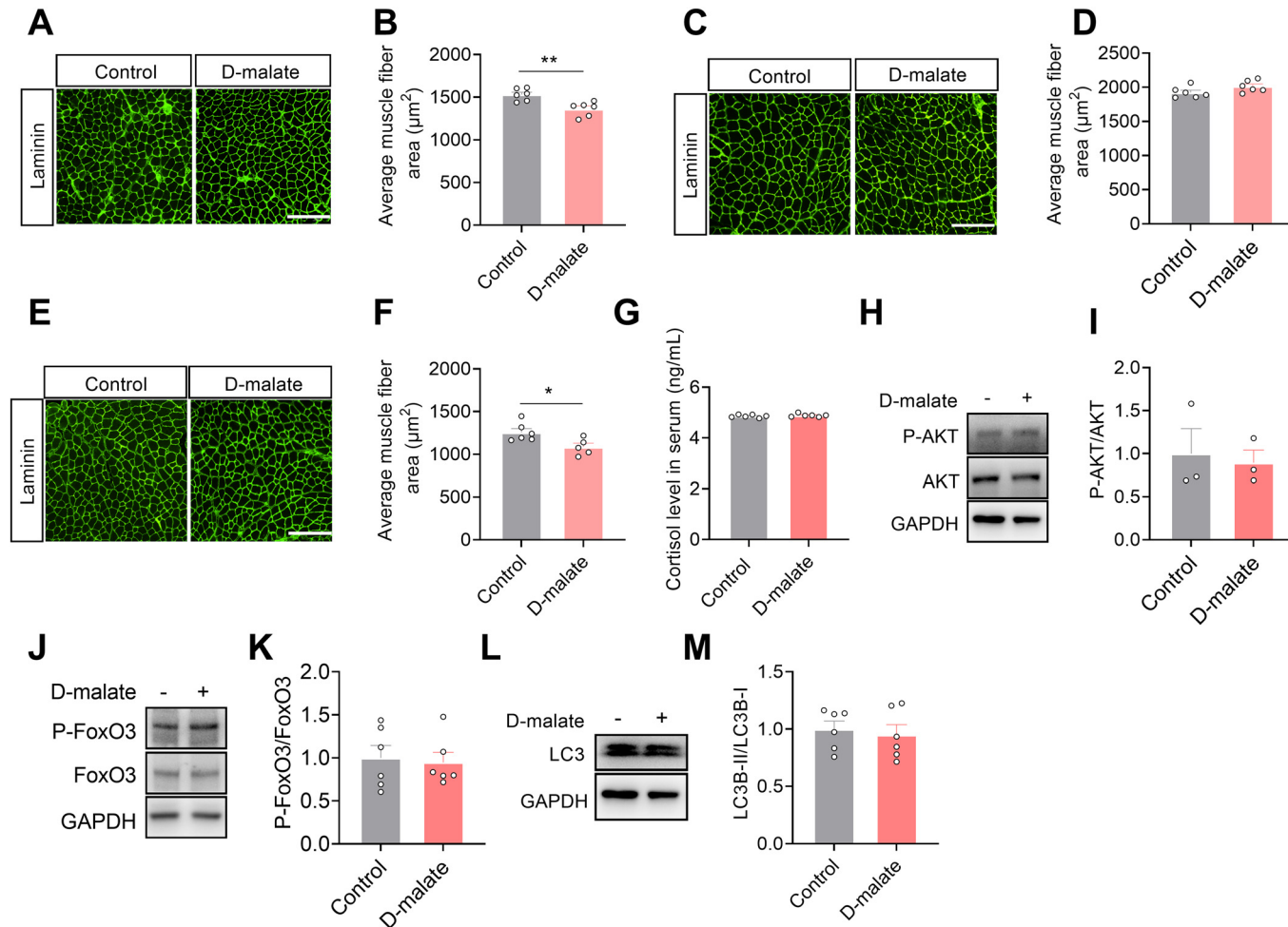# Expanded View Figures

Figure EV1. The effects of ᴅ-malate in CSA of TA/SOL/EDL and protein turnover.

(**A–F**) The laminin immunofluorescent staining and frequency histogram of muscle fiber cross-sectional area statistical analysis in tibialis anterior (**A**, **B**), solus (**C**, **D**), and extensor digitorum longus (**E**, **F**) ($n = 6$). Scale bars, 200 μm. (**G**) Serum cortisol level of 12-week-old male mice with 6-week ᴅ-malate treatment ($n = 6$). (**H–M**) The protein expression of P-AKT (**H**, **I**), P-FoxO3 (**J**, **K**) and LC3 (**L**, **M**) in gastrocnemius ($n = 6$). Data information: t test was used in this figure where error bars represent SEM, and $*P < 0.05$; $**P < 0.01$. Source data are available online for this figure.
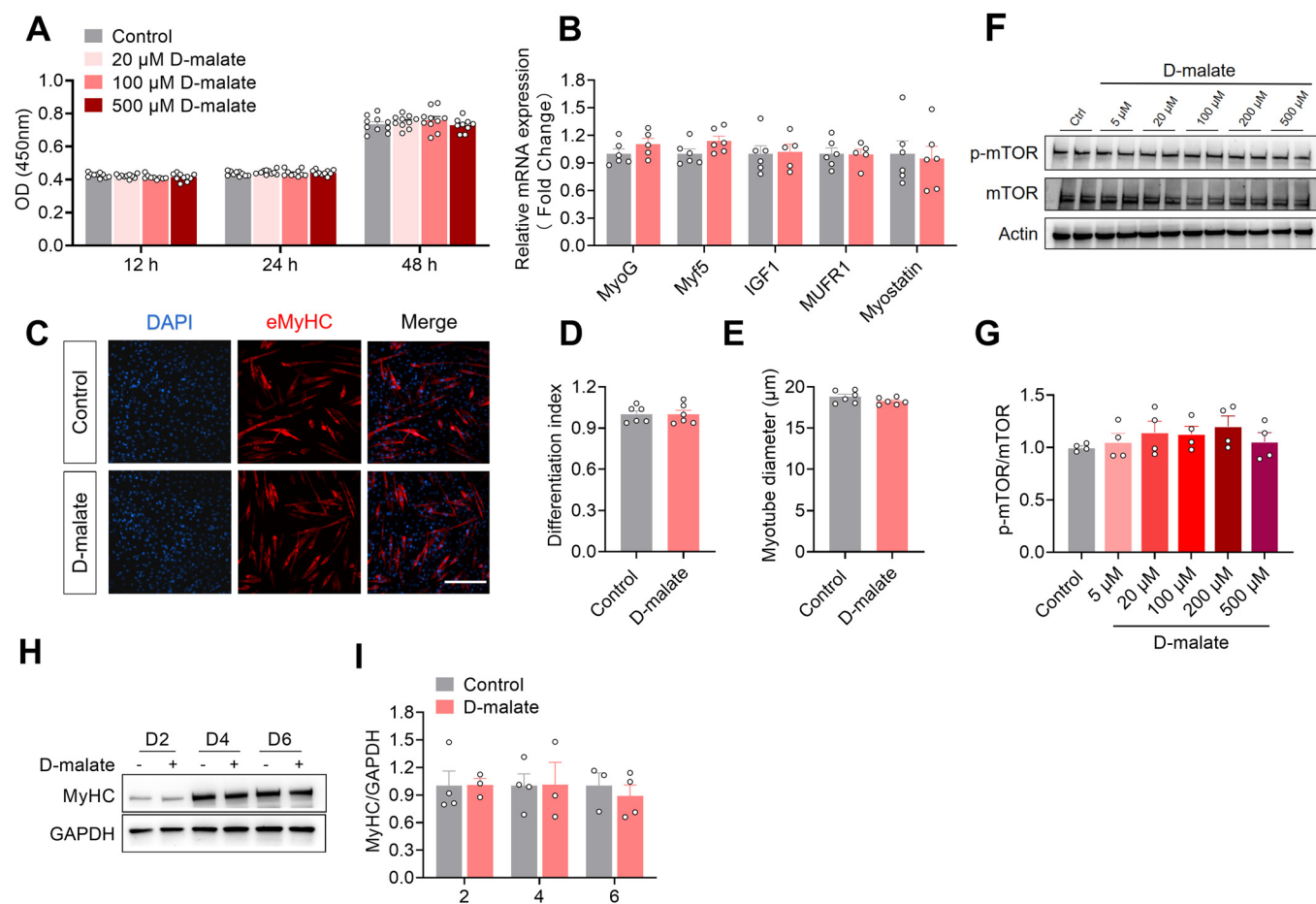
Figure EV2. ᴅ-malate had no function in the proliferation, differentiation and P-mTOR of C2C12.

(**A**) OD value of CCK-8 to detect proliferation activity of C2C12 cells ($n = 10$). (**B**) The mRNA expression of MyoG, Myf5, IGF1, MUFR1, Myostatin in C2C12 cells ($n = 5$–6). (**C–E**) Immunofluorescence images (**C**) of C2C12 cells after induced differentiation, differentiation index (**D**) and myotube diameter (**E**) ($n = 6$). Scale bars, 200 μm. (**F, G**) The protein expression of p-mTOR/mTOR in C2C12 cells ($n = 4$). (**H, I**) The protein expression of MyHC in C2C12 cells with 100 μM ᴅ-malate treatment for 2 days, 4 days and 6 days, ctrl group didn't receive ᴅ-malate treatment. ($n = 3$). Data information: t test was used in this figure where error bars represent SEM. Source data are available online for this figure.
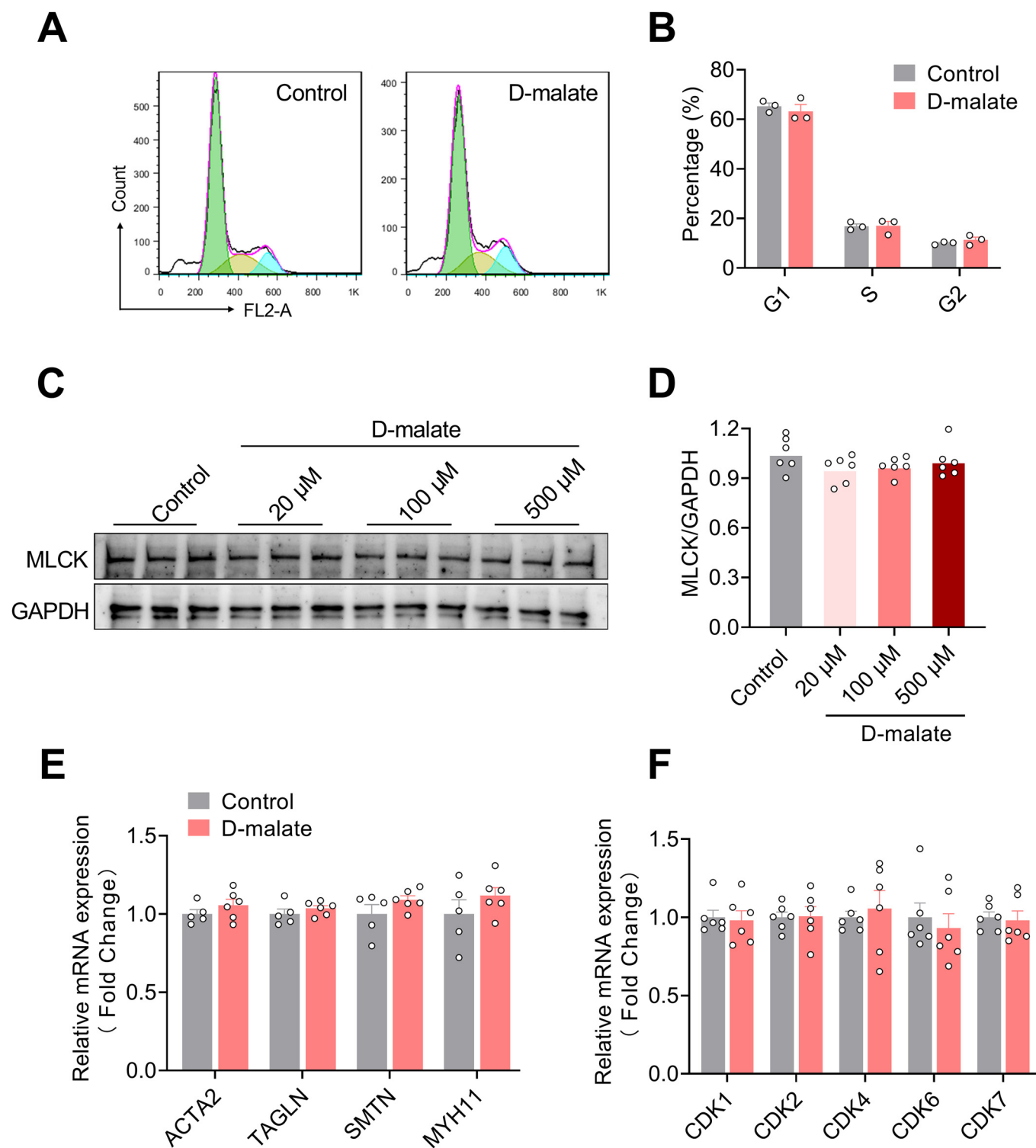
Figure EV3. ᴅ-malate had no function in cell cycle and vasomotor function of vascular smooth muscle cell.

(A, B) Representative image (A) and statistical graph (B) of vascular smooth muscle cell cycle by flow cytometry ($n = 5$–6). (C, D) The protein expression of MLCK in vascular smooth muscle cells ($n = 6$). (E) The mRNA expression of ACTA2, TAGLN, SMTN and MYH11 in vascular smooth muscle cells ($n = 5$–6). (F) The mRNA expression of cyclin-dependent kinases in vascular endothelial cells ($n = 6$). Data information: t test was used in this figure where error bars represent SEM. Source data are available online for this figure.
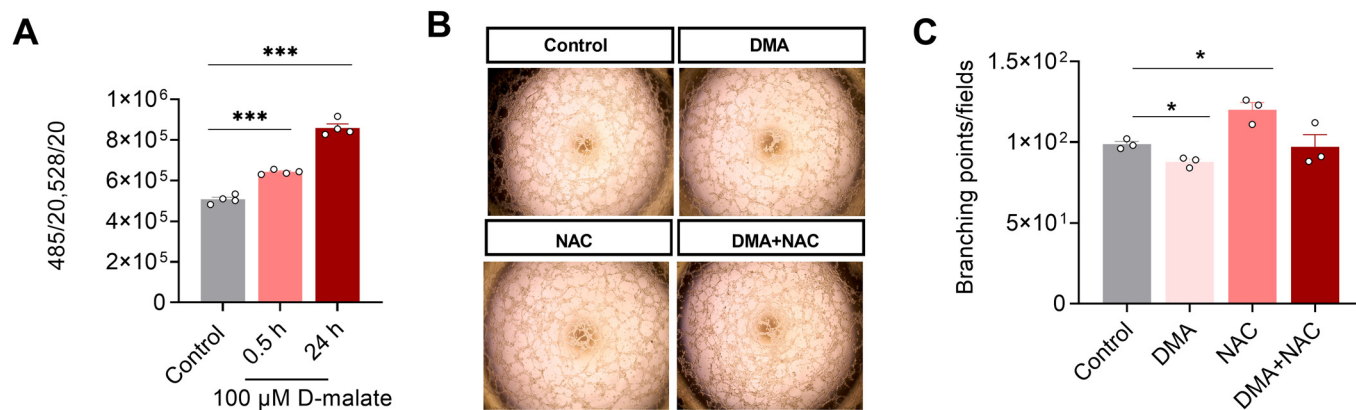
Figure EV4. D-malate inhibits vascular endothelial cell proliferation is independent of ROS.

(A) The ROS content in vascular endothelial cell was detected by ROS kit ($n = 4$). (B, C) Representative images (B) and statistics (C) of vascular endothelial cell tube formation test within NAC and D-malate treatment ($n = 3$). Data information: *t* test was used in this figure where error bars represent SEM, and *$P < 0.05$; ***$P < 0.001$. Source data are available online for this figure.