



**Supplementary Figure 1**      **Effect of UBIAD1 mutations on VKD carboxylation normalized by protein expression levels** UBIAD1 or its variants was transiently expressed in UBIAD1-deficient FIXgla-PC/HEK293 reporter cells. Transfected cells were incubated with a cell culture medium containing 1  $\mu$ M vitamin K<sub>3</sub> for 24 hours. The carboxylation activity was determined using ELISA (**Figure 5A**). UBIAD1 expression was determined by western blot (**Figure 5D**). Wild-type UBIAD1 activity was normalized to 100%. Data are presented as mean  $\pm$  SD of three independent experiments (n=3). \* T-test, P<0.001, compared with the wild-type UBIAD1 (WT).