



Supplementary Figure 2 Exogenous application of KAR₁ alleviated cold stress tolerance in *Arabidopsis*. **A**, Control ($\frac{1}{2}$ MS medium). **B**, KAR₁ ($\frac{1}{2}$ MS medium containing 1 μ l KAR₁). **C**, statistical analysis of survival rate under cold stress. **D**, H₂O₂ contents under cold stress. The seeds of the *Arabidopsis* Columbia-0 (Col-0) were surfaces sterilized with 70% (v/v) ethanol for 2 minutes, then incubated in 10% (v/v) sodium hypochlorite (NaClO) for 10 minutes at room temperature, and washed thrice with double distilled water. The sterilized seeds were plated on Control (without KAR₁), and KAR₁ (1 ml) supplemented $\frac{1}{2}$ Murashige and Skoog (MS) medium containing 1%

(w/v) sucrose and 0.8% (w/v) agar and placed at 4 degrees Celsius (°C) for two days. Seeds were germinated in a growth room 16/8 h (day/night) photoperiod at 22 °C. For phenotypical analysis under cold stress, five-day-old *Arabidopsis* seedlings were cold acclimatized to 4 °C for 12 hours and then subjected to cold treatment at -20 °C for an hour. The plants were again kept at 4 °C for 12 hours, the plants were then shifted to a plant growth room with a 16/8 h photoperiod at 22 °C, approximately 120 $\mu\text{mol photons/m}^2/\text{s}$, and 75% humidity. The recovery rate was measured ten days after the cold-shock treatment. Photographs were taken by a Nikon D90 having Nikon DX AF-S NIKKOR 18-105 mm lens (Nikon Corporation, Tokyo, Japan). For H_2O_2 analysis, the samples were randomly taken from the leaves of five plants of each treatment after 0 (control at 22 °C), 3-, 6-, and 12 hours of cold treatment (4 °C). Samples were immediately frozen in liquid nitrogen, the stored at -80 °C. The hydrogen peroxide (H_2O_2), was analysed by an H_2O_2 assay kit (Nanjing Jiancheng Bioengineering Institute, Nanjing, China), respectively, as previously described by Ni et al. (2018). One-way ANOVA was used to analysed all data, and HSD Tukey's test was used to perform multiple comparisons at $P < 0.05$ significant level ($n = 5$). Bars with uncommon letters showing significant difference at $P < 0.05$. "h" represents the duration (in hours) under cold stress.