



**Figure S1.** Growth rate of ScATG8 transgenic *P. patens* under different stress conditions. Protonemal length of ScATG8<sup>OE</sup> transgenic *P. patens* under cold(A), heat(C), and salt(E). Protonema growth rate of ScATG8<sup>OE</sup> transgenic *P. patens* under cold(B), heat(D), and salt(F). For each treatment, total of 20 colonies were used. Values were presented means of  $n = 20 \pm SD$ , significance was determined by the ANOVA (\* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ ).