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Supplementary Material

Altered localization of ZmPIN1a proteins in plasma membranes responsible for enhanced-polar auxin transport in etiolated maize seedlings under microgravity conditions in space

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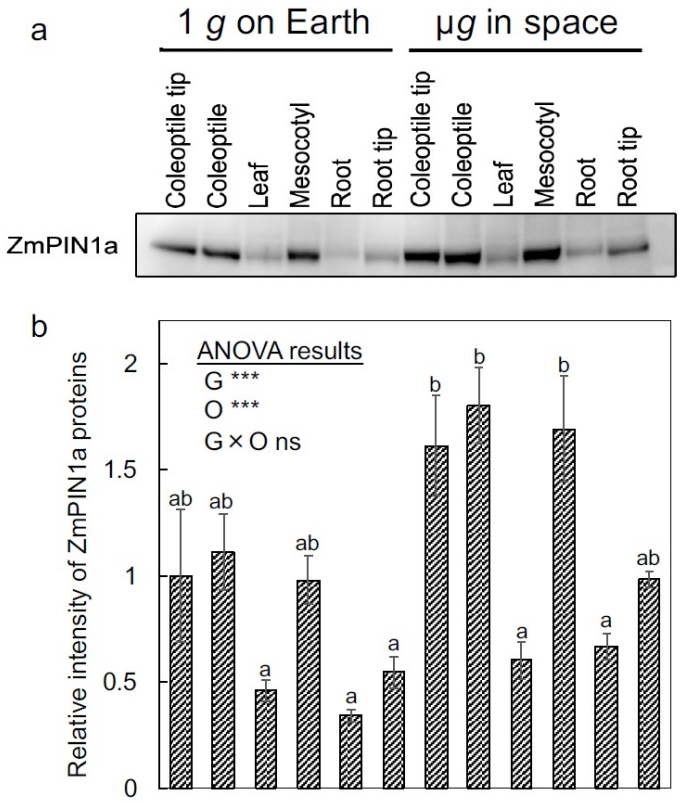

Fig. S1. Effect of μ*g* conditions in space on the accumulation of ZmPIN1a proteins in etiolated maize seedlings. The amount of ZmPIN1a proteins in the coleoptile tip, subapical region of the coleoptiles, the mesocotyls, the primary leaf, the root tip, and the root were determined using western blotting analysis with designing specific polyclonal antibody of ZmPIN1a. a: Eight μg of total proteins were loaded into each lane and separated through SDS-PAGE. After SDS-PAGE and blotting of the gel onto PVDF membrane, the signal of ZmPIN1a proteins was detected with affinity-purified anti-ZmPIN1a antibodies. b: Relative intensity of ZmPIN1a proteins. Data are shown as mean ± s.e. (n = 3). Asterisks denote the significance of 2-way ANOVA: $^{**}P < 0.01$, $^{*}P < 0.05$, ns: not significant. Abbreviations indicate each factor: G: gravity conditions, O: organ differences. Different letters denote significant differences among independent samples ($P < 0.05$, Tukey test).

Table S1. Two-way ANOVA of the effects of gravity conditions and organ differences on the accumulations of *ZmPIN1a* mRNA for the data in Fig. 1a

Significance codes: $**P < 0.01$, $*P < 0.05$, $'P < 0.1$, $P < 1$. The legend corresponds to G, gravity conditions; O, organ differences; Df, degrees of freedom; Sum Sq, sum of squares; Mean Sq, mean square; F-value, Fisher's statistics; *P*-value, associated value of probability

	Df	Sum Sq	Mean Sq	F-value	*P*-value
G	1	0.1938	0.1938	0.4317	0.5236
O	2	2.0314	1.0157	2.2622	0.1467
G×O	2	3.8624	1.9312	4.3012	0.0391*

Table S2. Two-way ANOVA of the effects of gravity conditions and organ differences on the accumulations of *ZmAUX* mRNA for the data in Fig. 1b

Significance codes: $**P < 0.01$, $*P < 0.05$, $'P < 0.1$, $P < 1$. The legend corresponds to G, gravity conditions; O, organ differences; Df, degrees of freedom; Sum Sq, sum of squares; Mean Sq, mean square; F-value, Fisher's statistics; *P*-value, associated value of probability

	Df	Sum Sq	Mean Sq	F-value	*P*-value
G	1	0.0166	0.0166	0.2705	0.6125
O	2	0.5992	0.2996	4.8952	0.0279 *
G×O	2	0.4296	0.2148	3.5099	0.0631 '

Table S3. Two-way ANOVA of the effects of gravity conditions and organ differences on the amounts of ZmPIN1a proteins for the data in Fig. 2

Significance codes: $**P < 0.01$, $*P < 0.05$, $'P < 0.1$, $P < 1$. The legend corresponds to G, gravity conditions; O, organ differences; Df, degrees of freedom; Sum Sq, sum of squares; Mean Sq, mean square; F-value, Fisher's statistics; *P*-value, associated value of probability

	Df	Sum Sq	Mean Sq	F-value	*P*-value
G	1	2.0269	2.0269	13.8773	0.0029**
O	2	0.0754	0.0377	0.2581	0.7767
G×O	2	0.0083	0.0041	0.0284	0.9721

Table S4. Two-way ANOVA of the effects of gravity conditions and organ differences on the amounts of ZmPIN1a proteins for the data in Supplementary Fig. 1

Significance codes: $**P < 0.01$, $*P < 0.05$, $'P < 0.1$, $P < 1$. The legend corresponds to G, gravity conditions; O, organ differences; Df, degrees of freedom; Sum Sq, sum of squares; Mean Sq, mean square; F-value, Fisher's statistics; *P*-value, associated value of probability

	Df	Sum Sq	Mean Sq	F-value	*P*-value
G	1	2.1275	2.1275	27.1155	2.461e-05***
O	5	5.6041	1.1208	14.2850	1.563e-06***
G×O	5	0.3822	0.0764	0.9741	0.4534

Table S5. Two-way ANOVA of the effects of gravity conditions and organ differences on the accumulations of *ZmPIN1c* mRNA for the data in Supplementary Fig. 2

Significance codes: $**P < 0.01$, $*P < 0.05$, $'P < 0.1$, $P < 1$. The legend corresponds to G, gravity conditions; O, organ differences; Df, degrees of freedom; Sum Sq, sum of squares; Mean Sq, mean square; F-value, Fisher's statistics; *P*-value, associated value of probability

	Df	Sum Sq	Mean Sq	F-value	*P*-value
G	1	0.9660	0.9660	3.9466	0.0703 '
O	2	8.3378	4.1689	17.0318	0.0003 ***
G×O	2	1.7539	0.8770	3.5827	0.0603 '