Supplementary File 2. Supplementary Tables

Supplementary File 2A. Embryo viability of WT, *pin3;4;7* and *pin2;3;4;7*

Genotype of self-fertilized parent	Proportion of viable embryos in siliques of self-fertilized parent (no. of non-aborted seeds / total no. of seeds)	Percentage of viable seeds in siliques of self-fertilized parent
WT	293/293	100.0
pin3/pin3;pin4/pin4;pin7/pin7	275/276	99.6
pin2/pin2;pin3/pin3;pin4/pin4;pin7/pin7	271/271	100.0

Difference between *pin3;4;7* and WT and between *pin2;3;4;7* and WT was not significant by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction.

Supplementary File 2B. Embryo viability of *toz*, *mp*, *pin1*, *pin1,3;4;7*, *pin1,3;2;4;7* and *pin1,3,6;4;7;8*

Genotype of self-fertilized parent	Proportion of viable embryos in siliques of self-fertilized parent (no. of non-aborted seeds / total no. of seeds)	Percentage of viable seeds in siliques of self-fertilized parent
TOZ/toz-1	202/278	72.7
MP/mp^{G12}	264/265***	99.6
PIN1/pin1-1	254/260***	97.7
PIN1/pin1-134	257/258***	99.6
PIN1/pin1-1,pin3/pin3;pin4/pin4;pin7/pin7	269/272***	98.9
PIN1/pin1-134,pin3/pin3;pin4/pin4;pin7/pin7	280/281***	99.6
PIN1/pin1-1,pin3/pin3;pin2/pin2;pin4/pin4;pin7/pin7	276/278***	99.3
PIN1/pin1-1,pin3/pin3,pin6/pin6;pin4/pin4;pin7/pin7;pin8/pin8	266/268***	99.2

Difference between negative control for completely penetrant embryo lethality (mp^{G12}) and positive control for completely penetrant embryo lethality (*toz-1*), between *pin1-1* and *toz-1*, between *pin1-134* and *toz-1*, between *pin1-1,3;4;7* and *toz-1*, between *pin1-134,3;4;7* and *toz-1*, between *pin1-1,3;2;4;7* and *toz-1*, and between *pin1-1,3,6;4;7;8* and *toz-1* was significant at $P<0.001$ (***) by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction. Difference between *pin1-1* and mp^{G12}, between *pin1-134* and mp^{G12}, between *pin1-1,3;4;7* and mp^{G12}, between *pin1-134,3;4;7* and mp^{G12}, between *pin1-1,3;2;4;7* and mp^{G12}, and between *pin1-1,3,6;4;7;8* and mp^{G12} was not significant by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction.

Supplementary File 2C. Embryo viability of *pin1*, *pin1,3;4;7*, *pin1,3;2;4;7* and *pin1,3,6;4;7;8*

Genotype of self-fertilized parent	Proportion of embryo-viable mutants in progeny of self-fertilized parent (no. of mutant seedlings / total no. of seedlings)	Percentage of embryo-viable mutants in progeny of self-fertilized parent
PIN1/pin1-1	66/239	27.6
PIN1/pin1-134	53/227	23.3
PIN1/pin1-1,pin3/pin3;pin4/pin4;pin7/pin7	52/196	26.5
PIN1/pin1-1-134,pin3/pin3;pin4/pin4;pin7/pin7	56/228	24.6
PIN1/pin1-1,pin3/pin3;pin2/pin2;pin4/pin4;pin7/pin7	61/263	23.2
PIN1/pin1-1,pin3/pin3,pin6/pin6;pin4/pin4;pin7/pin7;pin8/pin8	65/260	25.0

Difference between observed and theoretical frequency distributions of embryo-viable mutants in the progeny of self-fertilized heterozygous parents was not significant by Pearson's chi-squared (χ^2) goodness-of-fit test (α=0.05, dF=1).

Supplementary File 2D. Embryo viability of WT, *abcb1*, *abcb19*, *abcb1;19* and *twd1*

Genotype of self-fertilized parent	**Proportion of viable embryos in siliques of self-fertilized parent (no. of non-aborted seeds / total no. of seeds)**	**Percentage of viable seeds in siliques of self-fertilized parent**
WT	294/294	100
abcb1/abcb1	269/272	98.9
abcb19/abcb19	271/276	98.2
abcb1/abcb1;abcb19/abcb19	276/332***	83.1
twd1/twd1	245/265***	92.4

Difference between *abcb1;19* and WT, and between *twd1* and WT was significant at $P<0.001$ (***). and between *abcb1* and WT, and between *abcb19* and WT was not significant by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction.

Supplementary File 2E. Embryo viability of *toz*, *mp*, *pin1,3,6* and *pin1,3,6;abcb1;19*

Genotype of self-fertilized parent	Proportion of viable embryos in siliques of self-fertilized parent (no. of non-aborted seeds / total no. of seeds)	Percentage of viable seeds in siliques of self-fertilized parent
TOZ/toz-1	202/277	72.9
MP/mp^{G12}	255/256***	99.6
PIN1/pin1-1,pin3/pin3,PIN6/pin6	263/266***	98.9
PIN1/pin1-1,PIN3/pin3,PIN6/pin6;abcb1/abcb1;abcb19/abcb19	240/284*/***	84.5

Difference between negative control for completely penetrant embryo lethality (mp^{G12}) and positive control for completely penetrant embryo lethality (*toz-1*) and between *pin1-1,3,6* and *toz-1* was significant at $P<0.001$ (***), and between *pin1-1,3,6;abcb1;19* and *toz-1* was significant at $P<0.05$ (*) by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction. Difference between *pin1-1,3,6;abcb1;19* and mp^{G12} was significant at $P<0.001$ (***), and between *pin1-1,3,6* and mp^{G12} was not significant by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction. Linkage in *cis* between *pin1-1* and *pin6* in *PIN1/pin1-1,pin3/pin3,PIN6/pin6* was confirmed by phenotyping the progeny of the self-fertilized *PIN1/pin1-1,pin3/pin3,PIN6/pin6* plants used for the embryo viability analysis for the presence of seedlings with cup-shaped cotyledons, which are characteristic of *pin1,6* double homozygous mutant (Sawchuk et al., 2013). Linkage in *cis* between *pin1-1*, *pin3* and *pin6* in *PIN1/pin1-1,PIN3/pin3,PIN6/pin6;abcb1/abcb1;abcb19/abcb19* was confirmed by phenotyping the progeny of the self-fertilized *PIN1/pin1-1,PIN3/pin3,PIN6/pin6;abcb1/abcb1;abcb19/abcb19* plants used for the embryo viability analysis for the presence of seedlings with cup-shaped cotyledons and by genotyping those cup-shaped-cotyledon seedling for the *pin3* mutation.

Sawchuk, M. G., Edgar, A. and Scarpella, E. (2013). Patterning of leaf vein networks by convergent auxin transport pathways. *PLoS Genet.* **9**, e1003294.

Supplementary File 2F. Embryo viability of *pin1,3,6* and *pin1,3,6;abcb1;19*

Genotype of self-fertilized parent	Proportion of embryo-viable mutants in progeny of self-fertilized parent (no. of mutant seedlings / total no. of seedlings)	Percentage of embryo-viable mutants in progeny of self-fertilized parent
PIN1/pin1-1,pin3/pin3,PIN6/pin6	80/361	22.2
PIN1/pin1-1,PIN3/pin3,PIN6/pin6;abcb1/abcb1;abcb19/abcb19	74/335	22.1

Difference between observed and theoretical frequency distributions of embryo-viable mutants in the progeny of self-fertilized heterozygous parents was not significant by Pearson's chi-squared ($\chi 2$) goodness-of-fit test (α=0.05, dF=1). Genotype of the mutants seedlings of *PIN1/pin1-1,pin3/pin3,PIN6/pin6* was confirmed by genotyping all mutant seedlings for *pin1-1* and *pin6* mutation. Genotype of the mutants seedlings of *PIN1/pin1-1,PIN3/pin3,PIN6/pin6;abcb1/abcb1;abcb19/abcb19* was confirmed by genotyping all mutant seedlings for *pin1-1*, *pin3* and *pin6* mutation.

Supplementary File 2I. Embryo viability of *pin1,3,6* and *pin1,3,6;aux1;lax1*

Genotype of self-fertilized parent	**Proportion of embryo-viable mutants in progeny of self-fertilized parent (no. of mutant seedlings / total no. of seedlings)**	**Percentage of embryo-viable mutants in progeny of self-fertilized parent**
PIN1/pin1-1,pin3/pin3,PIN6/pin6	87/390	22.3
PIN1/pin1-1,pin3/pin3,PIN6/pin6;aux1/aux1-355;lax1/lax1-064	109/489	22.3

Difference between observed and theoretical frequency distributions of embryo-viable mutants in the progeny of self-fertilized heterozygous parents was not significant by Pearson's chi-squared ($\chi 2$) goodness-of-fit test (α=0.05, dF=1). Genotype of the mutants seedlings of both *PIN1/pin1-1,pin3/pin3,PIN6/pin6* and *PIN1/pin1-1,pin3/pin3,PIN6/pin6;aux1/aux1-355;lax1/lax1-064* was confirmed by genotyping all mutant seedlings for *pin1-1* and *pin6* mutation.

Supplementary File 2H. Embryo viability of *toz*, *mp*, *pin1,3,6* and *pin1,3,6;aux1;lax1*

Genotype of self-fertilized parent	Proportion of viable embryos in siliques of self-fertilized parent (no. of non-aborted seeds / total no. of seeds)	Percentage of viable seeds in siliques of self-fertilized parent
TOZ/toz-1	185/244***	75.8
MP/mp^{G12}	220/220	100
PIN1/pin1-1,pin3/pin3,PIN6/pin6	259/261***	99.2
PIN1/pin1-1,pin3/pin3,PIN6/pin6;aux1/aux1-355;lax1/lax1-064	280/282***	99.3

Difference between negative control for completely penetrant embryo lethality (mp^{G12}) and positive control for completely penetrant embryo lethality (*toz-1*), between *pin1-1,3,6* and *toz-1*, and between *pin1-1,3,6;aux1-355;lax1-064* and *toz-1* was significant at $P<0.001$ (***) by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction. Difference between *pin1-1,3,6* and mp^{G12}, and between *pin1-1,3,6;aux1-355;lax1-064* and mp^{G12} was not significant by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction. Linkage in *cis* between *pin1-1* and *pin6* in *PIN1/pin1-1,pin3/pin3,PIN6/pin6* and *PIN1/pin1-1,pin3/pin3,PIN6/pin6;aux1/aux1-355;lax1/lax1-064* was confirmed by phenotyping the progeny of the self-fertilized plants used for the embryo viability analysis for the presence of seedlings with cup-shaped cotyledons, which are characteristic of *pin1,6* double homozygous mutant (Sawchuk et al., 2013).

Sawchuk, M. G., Edgar, A. and Scarpella, E. (2013). Patterning of leaf vein networks by convergent auxin transport pathways. *PLoS Genet.* **9**, e1003294.

Supplementary File 2I. Embryo viability of *pin1,3,6* and *pin1,3,6;aux1;lax1*

Genotype of self-fertilized parent	Proportion of embryo-viable mutants in progeny of self-fertilized parent (no. of mutant seedlings / total no. of seedlings)	Percentage of embryo-viable mutants in progeny of self-fertilized parent
PIN1/pin1-1,pin3/pin3,PIN6/pin6	87/390	22.3
PIN1/pin1-1,pin3/pin3,PIN6/pin6;aux1/aux1-355;lax1/lax1-064	109/489	22.3

Difference between observed and theoretical frequency distributions of embryo-viable mutants in the progeny of self-fertilized heterozygous parents was not significant by Pearson's chi-squared (χ2) goodness-of-fit test (α=0.05, dF=1). Genotype of the mutants seedlings of both *PIN1/pin1-1,pin3/pin3,PIN6/pin6* and *PIN1/pin1-1,pin3/pin3,PIN6/pin6;aux1/aux1-355;lax1/lax1-064* was confirmed by genotyping all mutant seedlings for *pin1-1* and *pin6* mutation.

Supplementary File 2G. Embryo viability of WT, *aux1*, *lax1*, *aux1*;*lax1* and *aux1*;*lax1*;*2*;*3*

Genotype of self-fertilized parent	Proportion of viable embryos in siliques of self-fertilized parent (no. of non-aborted seeds / total no. of seeds)	Percentage of viable seeds in siliques of self-fertilized parent
WT	272/274	99.3
aux1/aux1-355	266/267	99.6
lax1/lax1-064	265/267	99.2
aux1/aux1-355;*lax1/lax1-064*	278/281	98.9
aux1/aux1-21;*lax1/lax1*;*lax2/lax2-1*;*lax3/lax3*	261/262	99.6

Difference between *aux1-355* and WT, between *lax1-064* and WT, between *aux1-355*;*lax1-064* and WT, and between *aux1-21*;*lax1*;*2-1*;*3* and WT was not significant by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction.

Supplementary File 2F. Embryo viability of *pin1,3,6* and *pin1,3,6;abcb1;19*

Genotype of self-fertilized parent	**Proportion of embryo-viable mutants in progeny of self-fertilized parent (no. of mutant seedlings / total no. of seedlings)**	**Percentage of embryo-viable mutants in progeny of self-fertilized parent**
PIN1/pin1-1,pin3/pin3,PIN6/pin6	80/361	22.2
PIN1/pin1-1,PIN3/pin3,PIN6/pin6;abcb1/abcb1;abcb19/abcb19	74/335	22.1

Difference between observed and theoretical frequency distributions of embryo-viable mutants in the progeny of self-fertilized heterozygous parents was not significant by Pearson's chi-squared (χ2) goodness-of-fit test (α=0.05, dF=1). Genotype of the mutants seedlings of *PIN1/pin1-1,pin3/pin3,PIN6/pin6* was confirmed by genotyping all mutant seedlings for *pin1-1* and *pin6* mutation. Genotype of the mutants seedlings of *PIN1/pin1-1,PIN3/pin3,PIN6/pin6;abcb1/abcb1;abcb19/abcb19* was confirmed by genotyping all mutant seedlings for *pin1-1*, *pin3* and *pin6* mutation.

Supplementary File 2I. Embryo viability of *pin1,3,6* and *pin1,3,6;aux1;lax1*

Genotype of self-fertilized parent	Proportion of embryo-viable mutants in progeny of self-fertilized parent (no. of mutant seedlings / total no. of seedlings)	Percentage of embryo-viable mutants in progeny of self-fertilized parent
PIN1/pin1-1,pin3/pin3,PIN6/pin6	87/390	22.3
PIN1/pin1-1,pin3/pin3,PIN6/pin6;aux1/aux1-355;lax1/lax1-064	109/489	22.3

Difference between observed and theoretical frequency distributions of embryo-viable mutants in the progeny of self-fertilized heterozygous parents was not significant by Pearson's chi-squared ($\chi 2$) goodness-of-fit test (α=0.05, dF=1). Genotype of the mutants seedlings of both *PIN1/pin1-1,pin3/pin3,PIN6/pin6* and *PIN1/pin1-1,pin3/pin3,PIN6/pin6;aux1/aux1-355;lax1/lax1-064* was confirmed by genotyping all mutant seedlings for *pin1-1* and *pin6* mutation.

Supplementary File 2J. Embryo viability of *axr1*;*axl*, *tir1*;*afb2*, *gn*;*pin1*,*3*;*4*;*7* and *gn*;*pin1*,*3*,*6*;*4*;*7*;*8*

Genotype of self-fertilized parent	Proportion of viable embryos in siliques of self-fertilized parent (no. of non-aborted seeds / total no. of seeds)	Percentage of viable seeds in siliques of self-fertilized parent
AXR1/axr1-12;*AXL/axl*	900/978	92
TIR1/tir1;*AFB2/afb2*	777/781***	99.5
GN/gn-13;*PIN1/pin1-1*,*pin3/pin3*;*pin4/pin4*;*pin7/pin7*	482/484***	99.6
GN/gn-13;*PIN1/pin1-1*,*pin3/pin3*,*pin6/pin6*;*pin4/pin4*;*pin7/pin7*;*pin8/pin8*	571/575***	99.3

Difference between negative control for completely penetrant embryo lethality (*tir1*;*afb2*) and positive control for completely penetrant embryo lethality (*axr1-12*;*axl*), between *gn*;*pin1-1*,*3*;*4*;*7* and *axr1-12*;*axl*, and between *gn*;*pin1-1*,*3*,*6*;*4*;*7*;*8* and *axr1-12*;*axl* was significant at $P<0.001$ (***) by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction. Difference between *gn*;*pin1-1*,*3*;*4*;*7* and *tir1*;*afb2*, and between *gn*;*pin1-1*,*3*,*6*;*4*;*7*;*8* and *tir1*;*afb2* was not significant by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction.

Supplementary File 2K. Embryo viability of *gn;pin1,3;4;7* and *gn;pin1,3,6;4;7;8*

Genotype of self-fertilized parent	Proportion of embryo-viable mutants in progeny of self-fertilized parent (no. of mutant seedlings / total no. of seedlings)	Percentage of embryo-viable mutants in progeny of self-fertilized parent
GN/gn-13;PIN1/pin1-1,pin3/pin3;pin4/pin4;pin7/pin7	256/3624	7.1
GN/gn-13;PIN1/pin1-1,pin3/pin3,pin6/pin6;pin4/pin4;pin7/pin7;pin8/pin8	222/3231	6.9

Difference between observed and theoretical frequency distributions of embryo-viable mutants in the progeny of self-fertilized heterozygous parents was not significant by Pearson's chi-squared (χ^2) goodness-of-fit test (α=0.05, dF=1).

Supplementary File 2L. Embryo viability of WT, *axr1* and *tir1*;*afb2*

Genotype of self-fertilized parent	**Proportion of viable embryos in siliques of self-fertilized parent (no. of non-aborted seeds / total no. of seeds)**	**Percentage of viable seeds in siliques of self-fertilized parent**
WT	408/412	99
axr1-3	391/403	97
tir1;*afb2*	300/303	99

Difference between *axr1-3* and WT, and between *tir1*;*afb2* and WT was not significant by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction.

Supplementary File 2M. Embryo viability of *toz*, *mp*, *pin1,3,6;4;7;8*, *pin1,3,6;4;7;8;axr1*, *pin1,3,6;4;7;8;tir1;afb2*

Genotype of self-fertilized parent	Proportion of viable embryos in siliques of self-fertilized parent (no. of non-aborted seeds / total no. of seeds)	Percentage of viable seeds in siliques of self-fertilized parent
TOZ/toz-1	190/239	79.5
MP/mp^{G12}	261/262***	99.6
PIN1/pin1-1,pin3/pin3,pin6/pin6;pin4/pin4;pin7/pin7;pin8/pin8	243/244***	99.6
PIN1/pin1-1,pin3/pin3,pin6/pin6;pin4/pin4;pin7/pin7;pin8/pin8;axr1/axr1-3	240/248***	96.8
PIN1/pin1-1,pin3/pin3,pin6/pin6;pin4/pin4;pin7/pin7;pin8/pin8;tir1/tir1;afb2/afb2	473/475***	99.6

Difference between negative control for completely penetrant embryo lethality (*mp*^{G12}) and positive control for completely penetrant embryo lethality (*toz-1*), between *pin1-1,3,6;4;7;8* and *toz-1*, between *pin1-1,3,6;4;7;8;axr1-3* and *toz-1*, and between *pin1-1,3,6;4;7;8;tir1;afb2* and *toz-1* was significant at $P<0.001$ (***) by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction. Difference between *pin1-1,3,6;4;7;8* and *mp*^{G12}, between *pin1-1,3,6;4;7;8;axr1-3* and *mp*^{G12}, and between *pin1-1,3,6;4;7;8;tir1;afb2* and *mp*^{G12} was not significant by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction.

Supplementary File 2N. Embryo viability of ***pin1,3,6;4;7;8;axr1*** and ***pin1,3,6;4;7;8;tir1;afb2***

Genotype of self-fertilized parent	**Proportion of embryo-viable mutants in progeny of self-fertilized parent (no. of mutant seedlings / total no. of seedlings)**	**Percentage of embryo-viable mutants in progeny of self-fertilized parent**
PIN1/pin1-1,pin3/pin3,pin6/pin6;pin4/pin4;pin7/pin7;pin8/pin8;axr1/axr1-3	66/277	23.8
PIN1/pin1-1,pin3/pin3,pin6/pin6;pin4/pin4;pin7/pin7;pin8/pin8;tir1/tir1;afb2/afb2	77/324	23.8

Difference between observed and theoretical frequency distributions of embryo-viable mutants in the progeny of self-fertilized heterozygous parents was not significant by Pearson's chi-squared (χ^2) goodness-of-fit test (α=0.05, dF=1).

Supplementary File 2O. Embryo viability of *toz*, *mp*, *gn* and *gn*;*axr1*

Genotype of self-fertilized parent	**Proportion of viable embryos in siliques of self-fertilized parent (no. of non-aborted seeds / total no. of seeds)**	**Percentage of viable seeds in siliques of self-fertilized parent**
TOZ/toz-1	206/259	79.5
MP/mp^{G12}	243/247***	98.4
GN/gn-13	248/252***	98.4
GN/gn-13;*axr1/axr1-3*	264/270***	97.8
GN/gn-13;*axr1/axr1-12*	214/224***	95.6

Difference between negative control for completely penetrant embryo lethality (mp^{G12}) and positive control for completely penetrant embryo lethality (*toz-1*), between *gn-13* and *toz-1*, between *gn-13*;*axr1-3* and *toz-1*, and between *gn-13*;*axr1-12* and *toz-1* was significant at $P<0.001$ (***) by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction. Difference between *gn-13* and mp^{G12}, between *gn-13*;*axr1-3* and mp^{G12}, and between *gn-13*;*axr1-12* and mp^{G12} was not significant by Kruskal-Wallis and Mann-Whitney test with Bonferroni correction.

Supplementary File 2P. Embryo viability of *gn* and *gn*;*axr1*

Genotype of self-fertilized parent	Proportion of embryo-viable mutants in progeny of self-fertilized parent (no. of mutant seedlings / total no. of seedlings)	Percentage of embryo-viable mutants in progeny of self-fertilized parent
GN/gn-13	101/411	24.6
GN/gn1-13;*axr1-3*	74/321	23.0
GN/gn1-13;*axr1-12*	70/276	25.4

Difference between observed and theoretical frequency distributions of embryo-viable mutants in the progeny of self-fertilized heterozygous parents was not significant by Pearson's chi-squared (χ^2) goodness-of-fit test (α=0.05, dF=1).

Supplementary File 2Q. Genotyping strategies

Line	Strategy
gn-13	*GN*: 'SALK_045424 gn LP' and 'SALK_045424 gn RP'; *gn*: 'SALK_045424 gn RP' and 'LBb1.3'
gn-18	*GN*: 'Salk026031 LP gnp close' and 'Salk026031 RP gnp close'; *gn*: 'Salk026031 RP gnp close' and 'LBb1.3'
fwr (gn^{fwr})	'FWR for' and 'FWR REV2'; *EcoR*I
van7/emb30-7 (gn^{van7})	'van7 Hpa1 FP' and 'van7 Hpa1 RP'; *Hpa*I
pin1-1	'pin1-1 F' and 'pin1-1 R'; *Tat*I
pin1-134	'pin1-1 F' and 'pin1-134 R mse-I'; *Mse*I
pin3-3	'pin3-3 F' and 'pin3-3 R'; *Sty*I
pin4-2	*PIN4*: 'PIN4 forw geno II' and 'PIN4en rev Ikram'; *pin4*: 'PIN4en rev Ikram' and 'en primer'
$pin7^{En}$	*PIN7*: 'PIN7en forw Ikram' and 'PIN7en rev'; *pin7*: 'PIN7en rev Ikram II' and 'en primer'
eir1-1 (*pin2*)	'eir1-1 F' and 'eir1-1 R'; *Bse*LI
pin6	*PIN6*: 'PIN6 spm F' and 'PIN6 spm R'; *pin6*: 'PIN6 spm F' and 'Spm32'
pin8-1	*PIN8*: 'SALK_107965 LP' and 'SALK_107965 RP'; *pin8*: 'SALK_107965 RP' and 'LBb1.3'
pgp1-100 (*abcb1*)	*ABCB1*: 'SALK_083649 pgp1-100 LP' and 'SALK_083649 pgp1-100 RP'; *abcb1*: 'SALK_083649 pgp1-100 RP' and 'LBb1.3'
mdr1-101 (*abcb19*)	*ABCB19*: 'SALK_033455 atmdr1-101 LP' and 'SALK_033455 atmdr1-101 RP'; *abcb19*: 'SALK_033455 atmdr1-101 RP' and 'LBb1.3'
ucu2-4 (*twd1*)	*UCU2*: 'SALK_012836 twd1 LP' and 'SALK_012836 twd1 RP'; *ucu2*: 'SALK_012836 twd1 RP' and 'LBb1.3'
aux1-21	'aux1-21 Fwd' and 'aux1-21 Rev'; *ApaL*I
lax1	*LAX1*: 'lax1 Fwd' and 'lax1 WT Rev'; *lax1*: 'lax1 fwd' and 'lax123 mutant Rev'
lax2-1	*LAX2*: 'lax2 Fwd' and 'lax2 WT Rev'; *lax2*: 'lax2 fwd' and 'lax123 mutant Rev'
lax3	*LAX3*: 'lax3 Fwd' and 'lax3 WT Rev'; *lax3*: 'lax3 fwd' and 'dSpm5'
aux1-355	*AUX1*: 'SALK_020355 LP (aux1)' and 'SALK_020355 RP (aux1)'; *aux1*: 'SALK_020355 RP (aux1)' and 'LBb1.3'
lax1-064	*LAX1*: 'SALK_071064 lax1 LP' and 'SALK_071064 lax1 RP'; *lax1*: 'SALK_071064 lax1 RP' and 'LBb1.3'
axr1-3	'AXR1-Acc1' and 'AXR1-15'; *Sal*I
axr1-12	'axr1-12 forw' and 'axr1-12 rev'; *Dra*I
axl	*AXL*: 'AXL SAIL LP' and 'AXL SAIL RP'; *axl*: 'AXL SAIL RP' and 'LB3'
tir1-1	'tir1-1F2' and 'tir1-1R2', *Bsa*I
afb2-3	*AFB2*: 'AFB2+F' and 'AFB2-TR'; *afb2*: 'pROK-LB' and 'AFB2-TR'

Supplementary File 2R. Light paths

Fluorophore	**Laser**	**Wavelength (nm)**	**Main dichroic beam splitter**	**First secondary dichroic beam splitter**	**Second secondary dichroic beam splitter**	**Emission filter (detector)**
YFP	Ar	514	HFT 405/514/594	NFT 595	NFT 515	BP 520–555 IR (PMT3)
GFP; Autofluorescence	Ar	488	HFT 405/488/594	NFT 545	NFT 490 (PMT3); Plate (META)	BP 505–530 (PMT3); 550–574 (META)
GFP	Ar	488	HFT 405/488/594	NFT 545	NFT 490	BP 505–530 (PMT3)
Lignin	Diode	405	HFT 405/514/594	Mirror	NFT 490	BP 420–480 (PMT2)