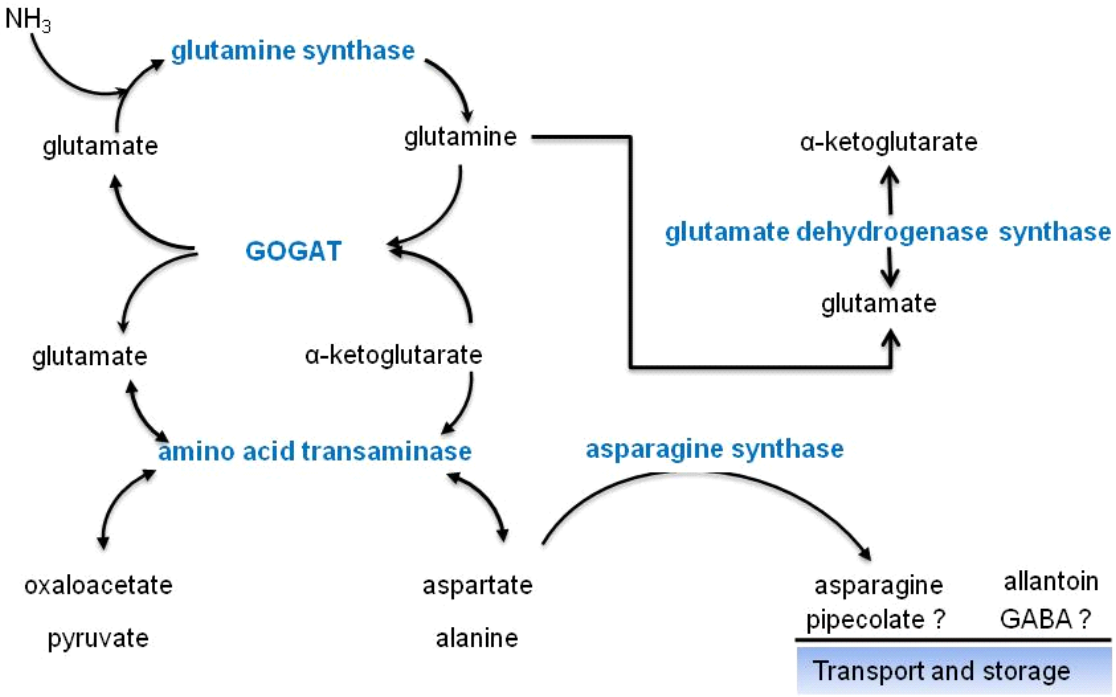
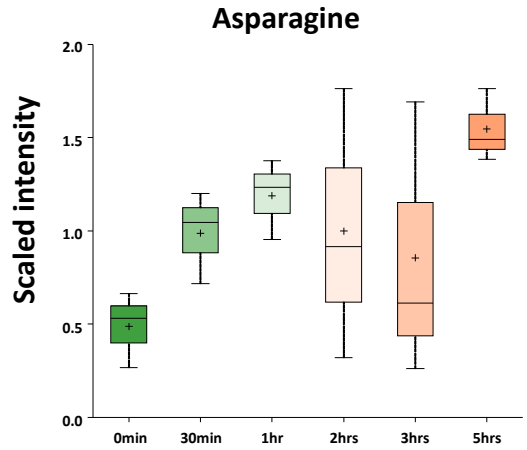
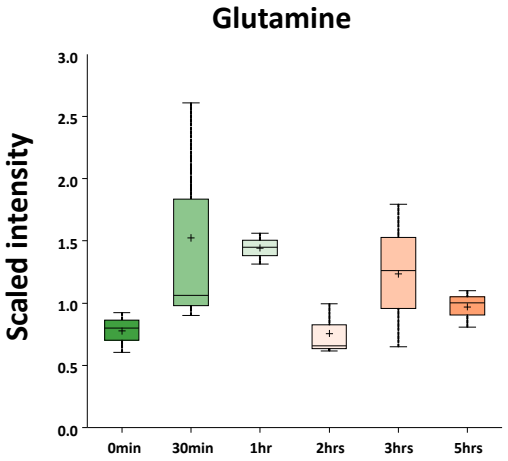
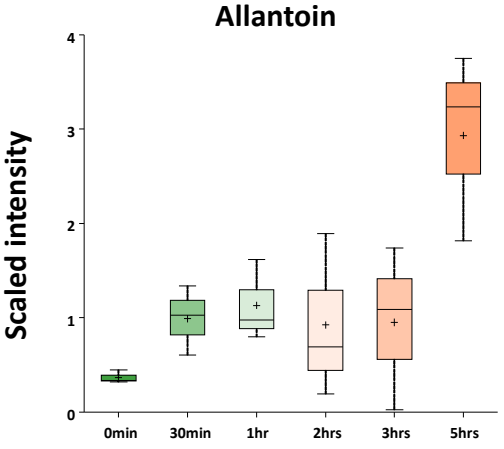
a.


NH3
glutamine synthase
glutamate
glutamine
α-ketoglutarate
glutamate dehydrogenase synthase
GOGAT
glutamate
glutamate
α-ketoglutarate
amino acid transaminase
asparagine synthase
oxaloacetate
pyruvate
aspartate
alanine
asparagine
pipecolate ?
allantoin
GABA ?
Transport and storage

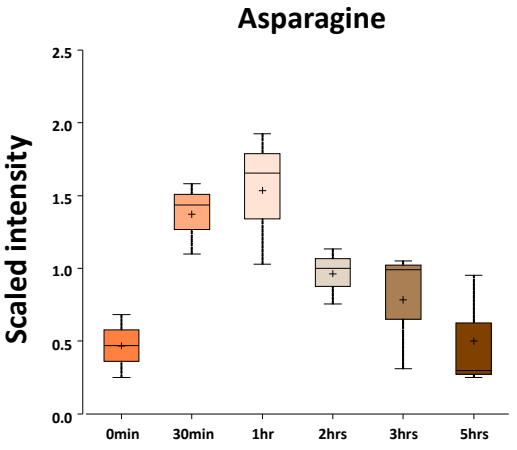
b.

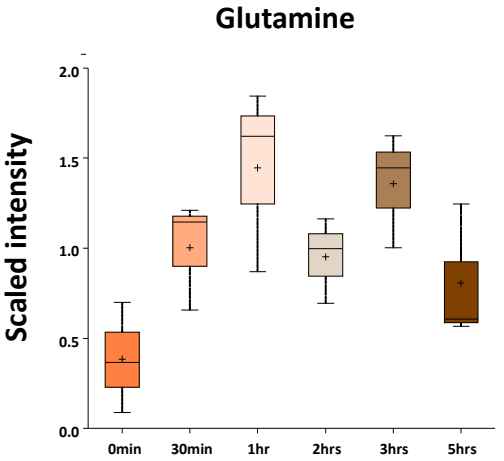

Asparagine
Scaled intensity
2.0
1.5
1.0
0.5
0.0
0min
30min
1hr
2hrs
3hrs
5hrs

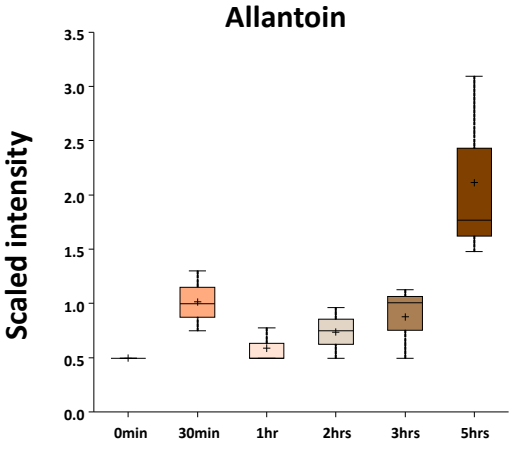

Glutamine
Scaled intensity
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0min
30min
1hr
2hrs
3hrs
5hrs


Allantoin
Scaled intensity
4
3
2
1
0
0min
30min
1hr
2hrs
3hrs
5hrs

c.


Asparagine
Scaled intensity
2.5
2.0
1.5
1.0
0.5
0.0
0min
30min
1hr
2hrs
3hrs
5hrs


Glutamine
Scaled intensity
2.0
1.5
1.0
0.5
0.0
0min
30min
1hr
2hrs
3hrs
5hrs


Allantoin
Scaled intensity
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0min
30min
1hr
2hrs
3hrs
5hrs

d.

Biochemical Name	Fold Change T30/T0	T60/T0	T120/T0	T180/T0	T300/T0
Root					
allantoin	2.05	1.19	1.49	1.77	4.27
allantoic acid	2.99	1.62	1.23	1.76	2.29
asparagine	2.94	3.29	2.06	1.68	1.07
glutamine	2.6	3.75	2.47	3.52	2.09
Leaf					
allantoin	2.69	3.07	2.51	2.59	7.97
asparagine	2.03	2.44	2.05	1.76	3.17
glutamine	1.97	1.86	0.97	1.59	1.25

Figure S2. Metabolite analysis of the ammonia detoxification processes. (a) Biosynthetic pathways associated with ammonia detoxification. (b) Box plot of asparagine, glutamine, and allantoin levels in leaf (b) and root (c). Crosses indicate the mean value, horizontal lines the median value, shaded boxes indicate the upper and lower quartiles, and the top and bottom of the bars indicate the maximum and minimum of the distribution. (d) Heat map of statistically significant changes in asparagine, glutamine, and allantoin levels. Red cells indicate $p \leq 0.05$ with the mean values significantly higher than the control. Light red cells indicate $0.05 < p < 0.10$.