Supplementary Materials and Methods

Supplementary Table 1. Composition of the Murashige & Skoog medium used for the growth of plant cell cultures.

Ingredients	Amount
Carbon source	**g/L**
Sucrose	30
Micro Elements	**mg/l**
CoCl2.6H2O	0.025
CuSO4.5H2O	0.025
FeNaEDTA	36.70
H3BO3	6.20
KI	0.83
MnSO4.H2O	16.90
Na2MoO4.2H2O	0.25
ZnSO4.7H2O	8.60
Macro Elements	**mg/l**
CaCl2	332.02
KH2PO4	170.00
KNO3	1900.00
MgSO4	180.54
NH4NO3	1650.00
Vitamins	**mg/l**
Glycine	2.00*
myo-Inositol	100.00
Nicotinic acid	0.50*
Pyridoxine HCl	0.50*
Thiamine HCl	0.10* or 1**
Phytohormones	**mg/L**
Kinetin	0.1*
Naphtalene acetic acid (NAA)	1*
2,4-Dichlorophenoxyacetic acid	0.2**

*only added for the culture of rowan PCCs

**only added for the culture of scurvy grass PCCs

Supplementary Table 2. Histopathology grading parameters of tissue specimens.

Brain								
Parameters	**Score**							
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Necrosis (area)	None	≤10%	~20%	~30%	~45%	~60%	~75%	90-100%
Haemorrhage	Absent	Mild	Moderate	Severe				

Heart								
Parameters	**Score**							
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Necrosis (area)	None	≤10%	~20%	~30%	~45%	~60%	~75%	90-100%
Lesions	None	Focal lesions at apex and middle of ventricles	Focal lesions over both ventricles	Confluent lesions at apex, middle of both of ventricles				
Haemorrhage	Minimal	None	Mild & moderate	Diffuse				

Lungs				
Parameters	**Score**			
	0	**1**	**2**	**3**

Vascular features	**Obstruction**	None	Mild RBC obstruction	Mild RBC and vascular obstruction	Moderate RBC and vascular obstruction
	Haemorrhage		Blood leaking into interstitium	Areas of mild and moderate haemorrhage	Diffuse haemorrhage
Extravascular and alveolar features	**Inflammatory exudate**	Minimal	Mild inflammatory exudate; areas of patchy oedema with some disordered structure	Moderate	Moderate-severe
	Alveolar thickening			~25-50%	>50%, loss of structure with amorphous material
	Alveolar obstruction	Minimal	Mild	Moderate	Moderate-severe
Bronchiole features		Mild infiltration of inflammatory cells	Moderate infiltration of inflammatory cells, detachment of lining in some bronchioles	Complete loss of structure, detachment of lining, cellular debris, inflammatory cell exudate	

Liver

Parameters	**Score**				
	0	**1**	**2**	**3**	**4**
Steatosis	<5%	5-33%	33-66%	>66%	
Fibrosis	None	Perisinusoidal / periportal	Perisinusoidal & portal/periportal	Bridging fibrosis	Cirrhosis
Lobular inflammation (/200x field)	None	<2 foci	2-4 foci	>4 foci	
Ballooning	None	Few	Many/prominent		

Kidneys

Parameters	**score**			
	0	**1**	**2**	**3**
Glomerular cell proliferation (of glomeruli)	None	<25%	25-50%	>50%
Leukocyte exudation (polymorphonuclear leukocyte per glomerulus)	0-2	Mild	Moderate	Extensive
Cellular crescents	None	<25%	25-50%	>50%
Hyaline deposits	None	Few	Moderate	Extensive
Glomerular sclerosis	None	Mild	Moderate	Extensive
Tubular atrophy	None	Mild	Moderate	Extensive

Spleen & Thymus

Parameters	**Score**			
	0	**1**	**2**	**3**
Lymphoid depletion	0-10%	10-30%	30-70%	>70%

Ovaries

Parameters	**Score**		
	0	**1**	**2**
Haemorrhage	Normal	Moderate	Severe
Congestion	Normal	Moderate	Severe
Folicular degeneration	Normal	Moderate	Severe
Inflammation	Normal	Moderate	Severe

Testes

Score	**Criteria**
0	Complete spermatogenesis with many spermatozoa. Germinal epithelium of regular thickness leaving an open lumen.
1	Many spermatozoa but germinal epithelium disorganized with marked sloughing or obliteration of lumen.
2	Only a few spermatozoa are present in the section.
3	No spermatozoa but many spermatids present.
4	No spermatozoa, only a few spermatids are present.
5	No spermatozoa, spermatids but several or many spermatocytes present.
6	Only few spermatocytes and no spermatids or spermatozoa are present.
7	Spermatogonia are the only germ cells present.
8	No germ cells but Sertoli cells present.
9	No cells in the tubular section

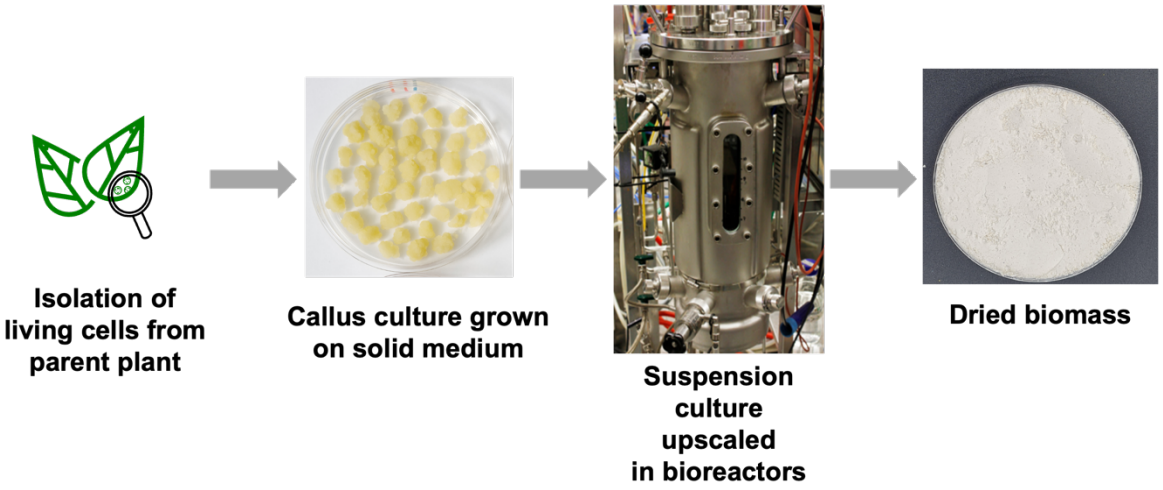
Supplementary Results

Supplementary Table 3. Probable allergens identified in plant cell cultures Scurvy Grass (*Cochlearia danica*). The Protein abundance has been reported as sum of unique peptide reporter ion intensities.

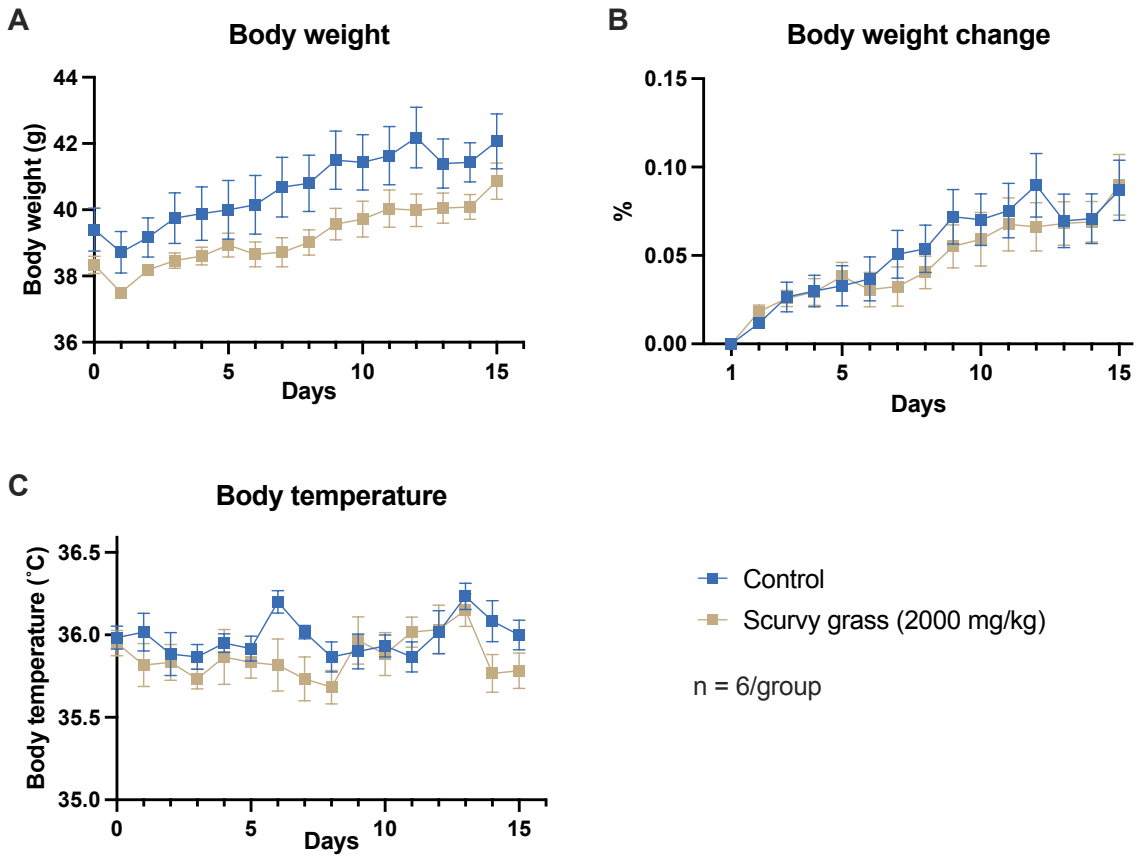
Accession UniProt	Protein	Organism	Coverage [96	Abundance	Reference
Q42418	Profilin-2 (AtPROF2) (AthPRF2)	Arabidopsis thaliana (Mouse-ear cress)	36	1577.8	*89% similarity with Q42449,*
Q9FUB8	Profilin	Brassica napus (Rape)	24	216	*75% similarity with Q42449,*
Q38905	Profilin-5 (AtPROF4) (AthPRF4)	Arabidopsis thaliana (Mouse-ear cress)	14	87	*75% similarity with Q42449,*
P22953	Heat shock 70 kDa protein 1	Arabidopsis thaliana (Mouse-ear cress)	48	12213.8	*Reviewed in Shevchenko, Marina et al. Journal of asthma and allergy vol. 13 757-772.5 Jan. 2021, doi:10.2147/JAAS288886*
Q9LKR3	Heat shock 70 kDa protein BIPl	Arabidopsis thaliana (Mouse-ear cress)	42	18977.1	
P22954	Heat shock 70 kDa protein 2	Arabidopsis thaliana (Mouse-ear cress)	41	1618.3	
O65719	Heat shock 70 kDa protein 3	Arabidopsis thaliana (Mouse-ear cress)	40	1393.1	
Q9LHA8	Heat shock 70 kDa protein 4	Arabidopsis thaliana (Mouse-ear cress)	34	224.1	
Q9LTX9	Heat shock 70 kDa protein 7	Arabidopsis thaliana (Mouse-ear cress)	24	1892.1	
Q9LDZO	Heat shock 70 kDa protein 10	Arabidopsis thaliana (Mouse-ear cress)	23	6071.8	
Q8HIB3	Heat shock 70 kDa protein BIP3	Arabidopsis thaliana (Mouse-ear cress)	10	406.3	
Q9S9N1	Heat shock 70 kDa protein 5	Arabidopsis thaliana (Mouse-ear cress)	19	571.7	
Q8GUM2	Heat shock 70 kDa protein 9	Arabidopsis thaliana (Mouse-ear cress)	16	1425.2	
Q9S7CO	Heat shock 70 kDa protein 14	Arabidopsis thaliana (Mouse-ear cress)	13	4638.3	
F4JMJ1	Heat shock 70 kDa protein 17	Arabidopsis thaliana (Mouse-ear cress)	10	4530.6	
P93819	Malate dehydrogenase 1	Arabidopsis thaliana (Mouse-ear cress)	28	992.1	*Pastor, Coriosetaf. International archives of allergy and immunology vol. 149,4 (2009):291-8. doi:10.1159/000205574*
Q9SN86	Malate dehydrogenase	Arabidopsis thaliana (Mouse-ear cress)	16	2938	
Q9ZP06	Malate dehydrogenase 1	Arabidopsis thaliana (Mouse-ear cress)	16	3309.5	
O82399	Malate dehydrogenase 1	Arabidopsis thaliana (Mouse-ear cress)	16	192.1	
Q9SKP6	Triosephosphate isomerase	Arabidopsis thaliana (Mouse-ear cress)	31	2009.6	*Pastor, Coriosetaf. International archives of allergy and immunology vol. 149,4 (2009):291-8. doi:10.1159/000205574; Yang, Yang et al. Molecular immunology vol. 85 (2017): 35-46. doi:10.1016/j.molimm.2017.02.004*
P48491	Triosephosphate isomerase	Arabidopsis thaliana (Mouse-ear cress)	29	8963.3	
O65570	V.Ilin4	Arabidopsis thaliana (Mouse-ear cress)	11	2046.3	*Mittermann, Irene et al. FEBS letters vol. 579,17 (2005):3807-13. doi:10.1016/j.febslet.2005.05.066*
O81644	V.Ilin.2	Arabidopsis thaliana (Mouse-ear cress)	18	3650.2	
Q9ZU52	Fructose-bisphosphate aldolase 3	Arabidopsis thaliana (Mouse-ear cress)	22	2181.1	*Ventura, Anne K R et al. The World Allergy Organization journal vol. 16,12 100845.22 Nov. 2023, doi:10.1016/j.woojou.2023.100845*
Q9SR37	Beta-glucosidase 23 (AtBGLU23)	Arabidopsis thaliana (Mouse-ear cress)	15	1442.4	*Ogino, Ryohei et al. Allergology International official journal of the Japanese Society of Allergology vol. 70,2 (2021):215-222. doi:10.1016/j.alit.2020.09.005*
Q9FGY1	Beta-D-xylosidase 1 (AtBXL1)	Arabidopsis thaliana (Mouse-ear cress)	11	119.4	*Sander, I et al. The journal of allergy and clinical immunology vol. 102,2 (1998):256-64. doi:10.1016/s0091-6749(98)70109-5*
P04796	Glyceraldehyde-3-phosphate dehydrogenase	Sinapis alba (White mustard) (Brassica hirta)	48	587.7	*Annals of allergy, asthma & immunology: official publication of the American College of Allergy, Asthma, & Immunology vol. 106,6 (2011):545-7. doi:10,1016/j.anai.2011.03.008*
PODH95	Calmodulin-l (CaM-l)	Arabidopsis thaliana (Mouse-ear cress)	54	6696.3	*Gómez-Esquivel, Mónica Luz et al. Molecular immunology vol. 132 (2021):150-156, doi:10.1016/j.molimm.2021.01.031*
Q96528	Catalase-l (EC 1.11.1.6)	Arabidopsis thaliana (Mouse-ear cress)	17	624.4	*Nikolić, Jasna et al. Journal of proteomics vol. 175 (2018):87-94. doi:10.0016/j.jprot.2018.01.007*
Q42592	L-ascorbate peroxidase S	Arabidopsis thaliana (Mouse-ear cress)	15	385.4	*Experimental allergy journal of the British Societyfor Allergy and Clinical Immunology vol. 34,11*

Supplementary table 4. Putative and probable allergens identified in plant cell cultures Rowan (*Sorbus aucuparia*). The protein abundance has been reported as sum of unique peptide reporter ion intensities.

Accession UniProt	Protein	Organism	Coverage [%]	Abundance	Reference
Q8GSL5	Profilin	Pyrus communis	28	283.9	UniProt
Q9XF38	Profilin	Prunus armeniaca	23	2420	
Q8GT39	Profilin	Prunus persica	18	1438.5	
Q38905	Major strawberry allergen Fra a 1.06	Fragaria ananassa	54	2629.7	UniProt
P22953	Major strawberry allergen Fra a 1-3	Fragaria ananassa	52	11020.8	
Q9LKR3	Major strawberry allergen Fra a 1.07	Fragaria ananassa	51	2883.4	
Q38906	Major strawberry allergen Fra a 1.06	Fragaria ananassa	49.33	5765	
O50001	Major allergen Pru ar 1	Prunus armeniaca	15	2026.6	UniProt
O81355	Phenylcoumaran benzylic ether reductase Pyrc5	Pyrus communis	10	2286.9	UniProt
P48976	Calmodulin	Malus domestica	50	2288	*Gómez-Esquivel, Mónica Luz et al. Molecular immunology vol. 132 (2021): 150-156. doi:10.1016/j.molimm.2021.01.031*
Q9M4S8	Triosephosphate isomerase, chloroplastic	Fragaria ananassa	31	1809.5	*Yang, Yang et al. Molecular immunology vol. 85 (2017): 35-46. doi:10.1016/j.molimm.2017.02.004*
P83373	Malate dehydrogenase, mitochondrial	Fragaria ananassa	13	2439.9	*Pastor, Carlos et al. International archives of allergy and immunology vol. 149,4 (2009): 291-8. doi:10.1159/000205574*



Supplementary Figure 1. Workflow of Plant Cell Culture Production from Parent Plant to Dried Biomass



Supplementary Figure 2. Results of the scurvy grass 14-day acute toxicity study. (**A)** Body weight of mice. (**B)** Relative change in body weight from the start of study. (**C)** Body temperature of mice. No statistical differences were noted between the two groups.

Supplementary Table 5. Haematological parameters of male ICR-CD1 mice in the 14-days acute toxicity study of Scurvy Grass (SG). Values are expressed as mean ± SD

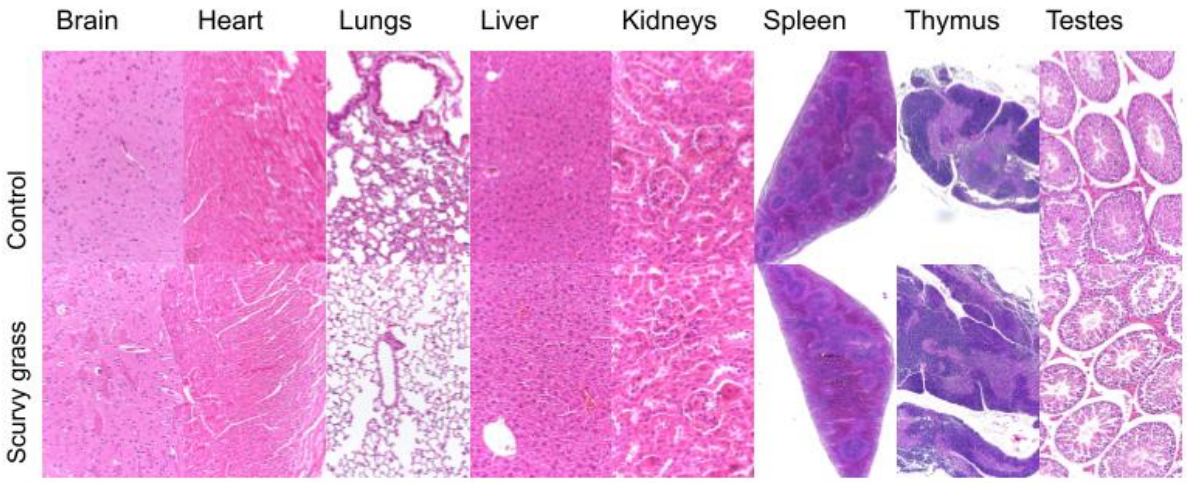
	Control (n = 6)	SG (2000 mg/kg) (n = 6)
WBCs (10^9 g/L)	2.14 ± 0.56	2.71 ± 0.86
LYM (10^9 g/L)	1.12 ± 0.34	1.17 ± 0.31
MID (10^9 g/L)	0.16 ± 0.08	0.14 ± 0.06
GRA (10^9 g/L)	0.86 ± 0.22	1.40 ± 0.63
RBCs (10^{12} g/L)	7.60 ± 0.28	7.40 ± 0.78
HGB (g/L)	127.17 ± 6.68	127.25 ± 12.51
HCT (%)	36.40 ± 11.85	39.97 ± 3.48
MCH (pg)	16.73 ± 0.36	17.24 ± 0.56
MCHC (gL)	307.83 ± 8.93	318.42 ± 14.57*
MCV (fL)	54.35 ± 1.66	54.14 ± 2.09
Platelets (10^9 g/L)	868.83 ± 47.66	863.67 ± 145.89

*$p < 0.05$ Control vs SG

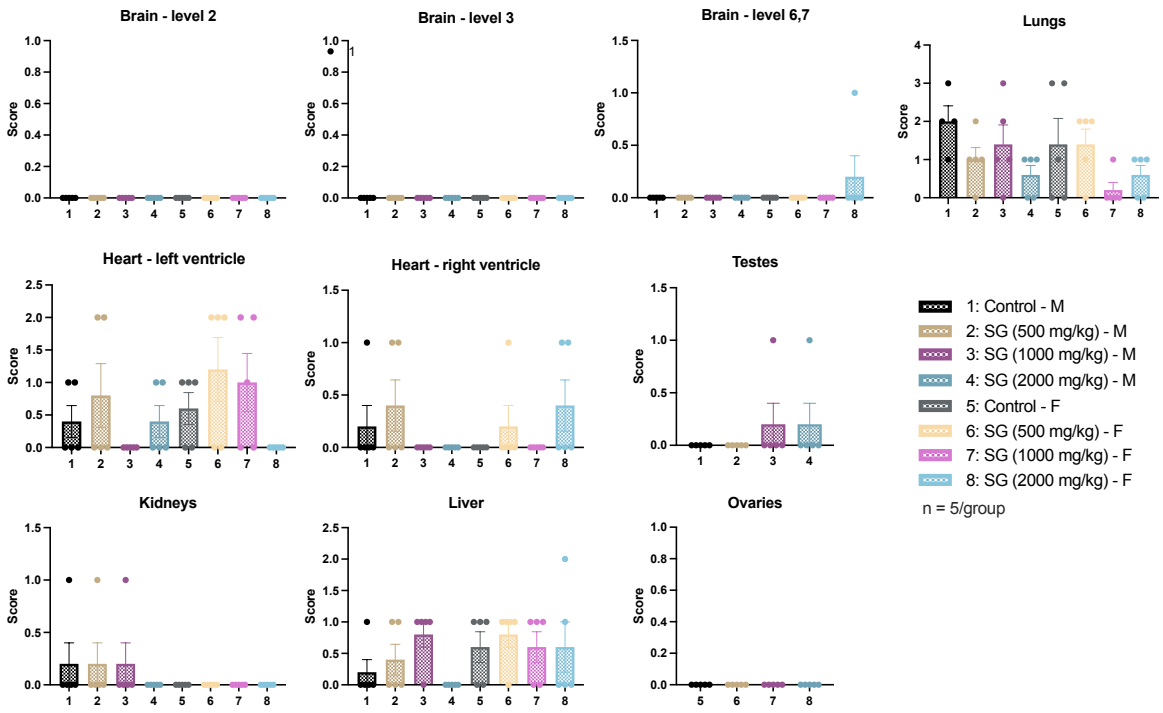
Supplementary Table 6. Organ-body weight ratio for male ICR-CD1 mice in the acute toxicity study of Scurvy Grass (SG). Values are expressed as mean ± SD

	Control (n = 6)	**SG (2000 mg/kg)** (n = 6)
Brain	1.13 ± 0.11	1.15 ± 0.12
Heart	0.44 ± 0.03	0.49 ± 0.05
Lungs	0.52 ± 0.06	0.59 ± 0.04*
Liver	6.04 ± 0.19	6.29 ± 0.35
Kidneys	1.60 ± 0.14	1.55 ± 0.11
Spleen	0.31 ± 0.04	0.34 ± 0.08
Thymus	0.10 ± 0.03	0.09 ± 0.02
Testes	0.67 ± 0.12	0.71 ± 0.06

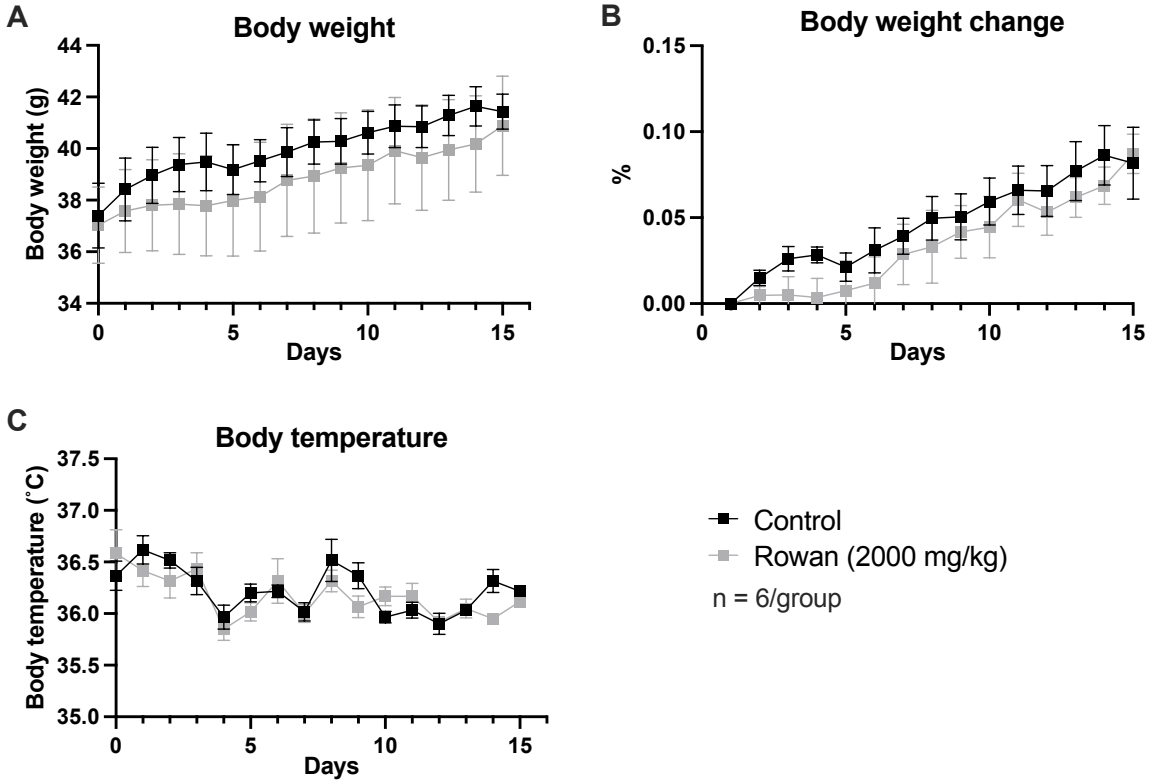
*$p < 0.05$ Control vs SG



Supplementary Figure 3. H&E-stained sections of brain (2000X), heart (2000X), lungs (200X), liver (2000X), kidneys (2000X), spleen (400X), thymus (400X) and testes (2000X) of control and SG-treated mice in the 14-day acute oral toxicity study at 2000 mg/kg.



Supplementary Figure 4. Histopathological analysis scoring of organs and tissues for the 28-day subacute oral toxicity study of Scurvy Grass (SG) cell cultures.



Supplementary Figure 5. Results of the rowanberry 14-day acute toxicity study. (**A)** Body weight of mice. (**B)** Relative change in body weight from the start of study. (**C)** Body temperature of mice. No statistical differences were noted between the two groups.

Supplementary Table 7. Organ-body weight ratio for male ICR-CD1 mice in the acute toxicity study of Rowan (RW). Values are expressed as mean ± SD

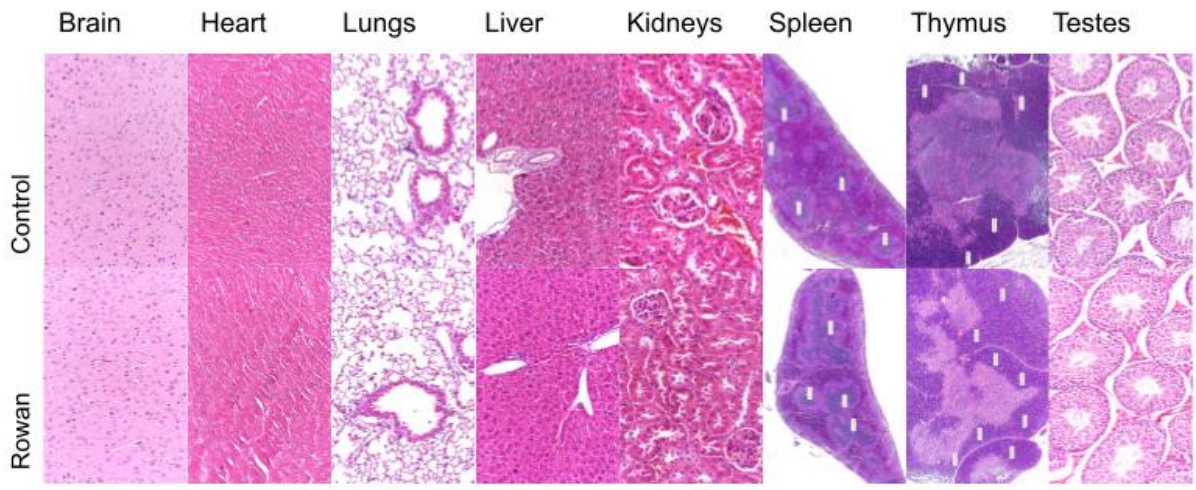
	Control (n = 6)	**RW (2000 mg/kg)** (n = 6)
Brain	1.09 ± 0.19	1.12 ± 0.14
Heart	0.44 ± 0.01	0.47 ± 0.05
Lungs	0.64 ± 0.04	0.68 ± 0.08
Liver	5.99 ± 0.22	5.03 ± 2.48
Kidneys	1.63 ± 0.07	1.61 ± 0.12
Spleen	0.27 ± 0.04	0.38 ± 0.17
Thymus	0.14 ± 0.03	0.12 ± 0.04
Testes	0.66 ± 0.04	0.74 ± 0.10

No statistical significance between the control group and treatment group was observed

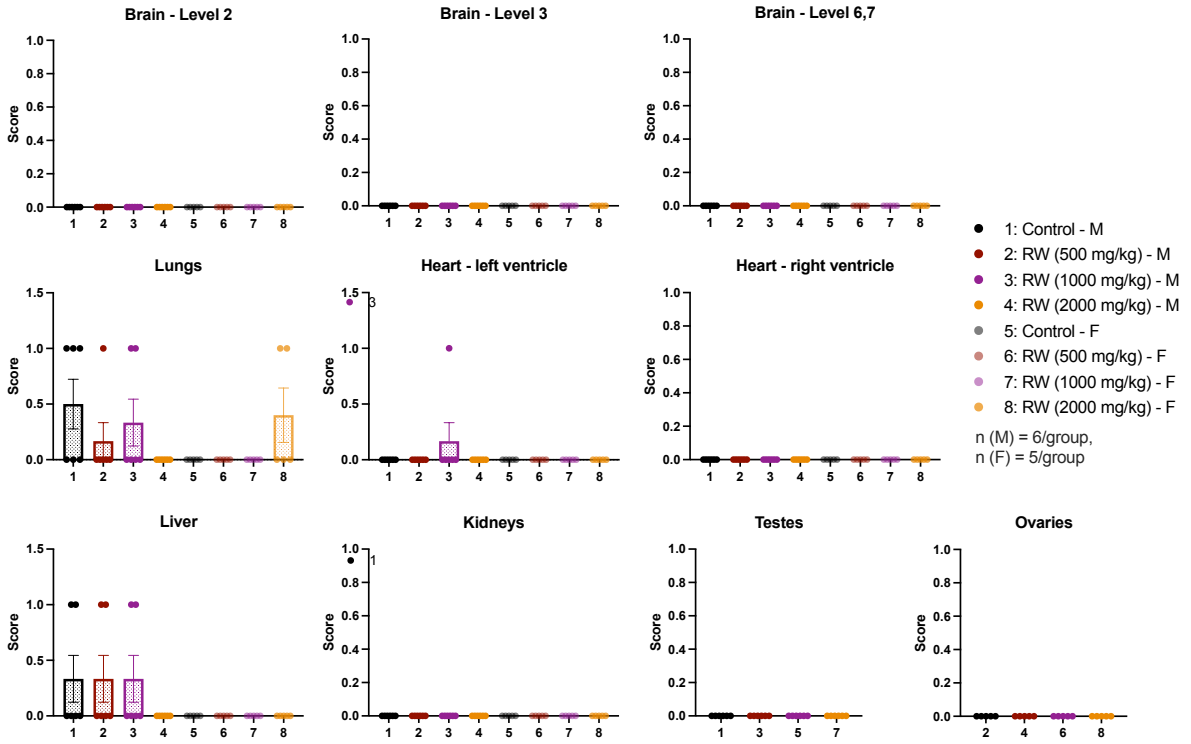
Supplementary Table 8. Haematological parameters of male ICR-CD1 mice in the 14-days acute toxicity study of Rowan (RW). Values are expressed as mean ± SD

	Control (n = 6)	**RW (2000 mg/kg) (n = 6)**
WBCs (10^9 g/L)	2.63 ± 0.94	3.03 ± 0.71
LYM (10^9 g/L)	1.40 ± 0.60	1.20 ± 0.40
MID (10^9 g/L)	0.18 ± 0.09	0.18 ± 0.06
GRA (10^9 g/L)	1.06 ± 0.44	1.65 ± 0.53
RBCs (10^{12} g/L)	7.59 ± 0.28	7.69 ± 0.26
HGB (g/L)	128.50 ± 5.39	127.50 ± 5.13
HCT (%)	301.17 ± 4.45	305.50 ± 4.55
MCH (pg)	16.95 ± 0.23	16.62 ± 0.57
MCHC (gL)	56.20 ± 0.93	54.43 ± 2.15
MCV (fL)	42.67 ± 1.77	41.82 ± 1.64
Platelets (10^9 g/L)	802.33 ± 44.57	765.50 ± 87.24

No statistical significance between the control group and treatment group was observed



Supplementary Figure 6. Haematoxylin and eosin-stained sections of brain (200X), heart (200X), lungs (200X), liver (200X), kidneys (200X), spleen (40X), thymus (40X) and testes (200X) of control and Rowan-treated mice in 14-day acute oral toxicity study.



Supplementary Figure 7. Histopathological analysis scoring of organs and tissues for the 28-day subacute oral toxicity study of rowan (RW) cell cultures.