

‘红阳’猕猴桃 AcSUS2 互作蛋白的筛选及 AcSTK1 在果实发育中的功能分析

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Screening of AcSUS2-interacting Proteins in Actinidia chinensis var. Hongyang and Functional Analysis of AcSTK1 in Fruit Development

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附表 1 引物序列
Schedule 1 Primer sequences

引物名称 Primer name	引物序列 Primer sequence (5'-3')	引物用途 Primer usage
pBT3STE-AcSUS2-F	AATCTATTTTATGTAATGGCCATTACGGCCGCAGG	pBT3STE-AcSUS2 载体构建 pBT3STE-AcSUS2 vector construction
	ACAAGTCATGACTCG	
pBT3STE-AcSUS2-R	ATCGAATTCCTGCAGATGGCCGAGGCGGCCCT	
	GATCAACAGCCAAAGGAACTG	
pPR3N-AcSTK1-F	CTGTATTTTCAGAGCGGATCCATGGCTGATGCCTC	pPR3N-AcSTK1 载体构建 pPR3N-AcSTK1 vector construction
	TGCTCTTGCG	
pPR3N-AcSTK1-R	GGTACCCCGGAATTCGGATCCTGTTGGGTTCAAAT	
	CTCGAGAAGCTTGGC	
AcSUS2-nLUC -F	AGGGCCCGGCGCGCCACTAGTATGGCAGGACAAG	AcSUS2-nLUC 载体构建 AcSUS2-nLUC vector construction
	TCATGACTCG	
AcSUS2-nLUC -R	CGAGATCTGGTCGACACTAGTCTACTGATCAACA	
	GCCAAAGGAAC	
AcSTK1-cLUC -F	CTCGTACGCGTCCCGGGGCGGTACCATGGCTGAT	AcSTK1-cLUC 载体构建 AcSTK1-cLUC vector construction
	GCCTCTGC	
AcSTK1-cLUC -R	GATGATACGAACGAAAGCTCTGCAGTTATGTTGGG	
	TTCAAATCTCG	
rAcSTK1-F	GAGTGCCAGAATTGCTGCGGCTTCAT	
rAcSTK1-R	CTTGTCAGGAGTTGACTTGCCCTTGGC	
rAcSUS2-F	GGGTTGACGGTGGTGGAGT	RT-qPCR
rAcSUS2-R	AAATTGACAAGGAGTTCAGCCACT	
r18S-F	TTTGATGGTATTGCTACTCGGA	
r18S-R	GAATCATCAGAGCAACGGGC	
rGAPDH-F	CGTCCTTCCCTCCCTCAAA	
rGAPDH-R	TCTTCTGGTGACCTGGACGA	

pTRV2-AcSTK1-F	GGAATTCGCGGAGTGTGTAAGACC	pTRV2-AcSTK1 载体构建
pTRV2-AcSTK1-R	CGGGATCCACAAGAAGTATATGTGCGGCT	pTRV2-AcSTK1 vector construction

附表 2 酵母双杂筛选获得的 AcSUS2 互作蛋白的功能注释

Schedule 2 Functional annotation of AcSUS2-interacting proteins screened by yeast two-hybrid system

编号 No.	序列号 Accession	功能注释 Function annotation	Function annotation
1	Acc15442	类 ATP 合酶 b'亚基 (叶绿体)	ATP synthase subunit b', chloroplastic-like
2	Acc02417	线粒体甲酸脱氢酶	formate dehydrogenase, mitochondrial
3	Acc10848	丙氨酸-tRNA 连接酶 (叶绿体/线粒体)	alanine--tRNA ligase, chloroplastic/mitochondrial
4	Acc26951	类 ESCRT 相关蛋白 CHMP1B	ESCRT-related protein CHMP1B-like
5	Acc09117	类 GL2-互作抑制因子 1	protein GL2-INTERACTING REPRESSOR 1-like
6	Acc19651	类硫胺素焦磷酸激酶 1	thiamine pyrophosphokinase 1-like
7	Acc03313	类环核苷酸门控离子通道 1	cyclic nucleotide-gated ion channel 1-like
8	Acc14891	类热休克同源蛋白 80	heat shock cognate protein 80-like
9	Acc21182	类 14-3-3 蛋白 6	14-3-3 protein 6-like
10	Acc11775	类猕猴桃蛋白酶 (胞质)	actinidain-like, cytosolic-like
11	Acc26271	胞质类磷酸甘油酸激酶	phosphoglycerate kinase, cytosolic-like
12	Acc16876	叶绿体类 SLOW GREEN 1 蛋白	protein SLOW GREEN 1, chloroplastic-like
13	Acc31259	功能未知蛋白	uncharacterized
14	Acc16162	类真核翻译起始因子 3 亚基 B	eukaryotic translation initiation factor 3 subunit B-like
15	Acc24572	类主要过敏原 Pru ar 1	major allergen Pru ar 1-like
16	Acc07272	类肽基-脯氨酸顺反异构酶	peptidyl-prolyl cis-trans isomerase-like
17	Acc32812	ATP-柠檬酸合酶 α 链蛋白 2	ATP-citrate synthase alpha chain protein 2
18	Acc30718	类微型锌指蛋白 2	mini zinc finger protein 2-like
19	Acc04493	类 1,4- α -葡聚糖分支酶 1 (叶绿体/淀粉体)	1,4-alpha-glucan-branching enzyme 1, chloroplastic/amyloplastic-like
20	Acc25048	叶绿体类放氧增强蛋白 3-2	oxygen-evolving enhancer protein 3-2, chloroplastic-like
21	Acc11747	类拟南芥 At2g23090 蛋白	uncharacterized protein At2g23090-like
22	Acc25913	胞质类 L-抗坏血酸过氧化物酶 2	L-ascorbate peroxidase 2, cytosolic-like
23	Acc26271	类主要过敏原 Pru ar 1	major allergen Pru ar 1-like
24	Acc03750	类热休克同源 70kDa 蛋白 2	heat shock cognate 70 kDa protein 2-like
25	Acc12151	类 14-3-3 蛋白 GF14 kappa	14-3-3-like protein GF14 kappa
26	Acc23055	类 GrpE 蛋白	protein GrpE-like
27	Acc23606	类转录起始因子 IIF β 亚基	transcription initiation factor IIF subunit beta-like
28	Acc06862	类网格蛋白轻链	clathrin light chain like
29	Acc11906	柚皮素/2-酮戊二酸 3-双加氧酶	naringenin,2-oxoglutarate 3-dioxygenase
30	Acc30823	类 FLX 蛋白 2	protein FLX-like 2
31	Acc28506	叶绿体类核酮糖-1,5-二磷酸羧化酶小亚基 3	ribulose biphosphate carboxylase small subunit, chloroplastic 3-like
32	Acc13666	丝氨酸/苏氨酸蛋白激酶	Serine/threonine-protein kinase
33	Acc31483	结瘤素相关蛋白 1	nodulin-related protein 1
34	Acc23552	内质网蛋白同源物	endoplasmin homolog
35	Acc29345	钙调蛋白	calmodulin

36	Acc16273	肽基-脯氨酰顺反异构酶	peptidyl-prolyl cis-trans isomerase
37	Acc21414	类 E3 泛素连接酶 RFI2	E3 ubiquitin-protein ligase RFI2-like
38	Acc02297	类 SPIRAL1 蛋白 2	protein SPIRAL1-like 2
39	Acc33100	翻译控制肿瘤蛋白同源物	translationally-controlled tumor protein homolog
40	Acc21491	S-腺苷甲硫氨酸合成酶 3	S-adenosylmethionine synthase 3
41	Acc13486	类多蛋白桥连因子 1b	multi-protein-bridging factor 1b-like
42	Acc25867	类金属硫蛋白	metallothionein-like protein
43	Acc18329	LEO1 蛋白同源物	protein LEO1 homolog
44	Acc27750	类真核翻译起始因子 3 亚基 G	eukaryotic translation initiation factor 3 subunit G-like
45	Acc29437	类转录因子 MYC2	transcription factor MYC2-like
46	Acc20523	半胱氨酸蛋白酶抑制剂 1	cysteine proteinase inhibitor 1
47	Acc23896	14-3-3 蛋白 10	14-3-3 protein 10
48	Acc06790	类 2-酮戊二酸依赖双加氧酶 19	2-oxoglutarate-dependent dioxygenase 19-like
49	Acc23030	脱水蛋白 HIRD11	dehydrin HIRD11
50	Acc05383	甘露醇脱氢酶	mannitol dehydrogenase
51	Acc30970	类 U-box 结构域蛋白 4	U-box domain-containing protein 4-like
52	Acc13537	含卷曲螺旋结构域蛋白	coiled-coil domain-containing protein
53	Acc23562	类赤霉素调节蛋白 1	gibberellin-regulated protein 1-like
54	Acc07908	叶绿体类 NifU 蛋白 2	nifU-like protein 2, chloroplastic
55	Acc14490	类 36.4 kDa 富脯氨酸蛋白	36.4 kDa proline-rich protein-like
56	Acc01061	类肽基-脯氨酰顺反异构酶 Pin1	peptidyl-prolyl cis-trans isomerase Pin1-like
57	Acc28008	山梨醇脱氢酶	sorbitol dehydrogenase
58	Acc25319	DnaJ 蛋白同源物	dnaJ protein homolog
59	Acc25066	囊泡相关蛋白 4-2	vesicle-associated protein 4-2
60	Acc01173	甘露醇脱氢酶	mannitol dehydrogenase
61	Acc18798	类胚蛋白 5-1	germin-like protein 5-1
62	Acc10964	类延伸因子 1-γ	elongation factor 1-gamma-like
63	Acc24869	类热休克同源 70kDa 蛋白 2	heat shock cognate 70 kDa protein 2-like
64	Acc01080	蛋白酶体 α 型亚基 7	proteasome subunit alpha type-7
65	Acc25400	类 V 型质子 ATP 酶亚基 d2	V-type proton ATPase subunit d2-like
66	Acc20442	类丙氨酸-tRNA 连接酶	alanine--tRNA ligase-like
67	Acc30614	类谷氧还蛋白	glutaredoxin-like
68	Acc08224	叶绿体类 HHL1 蛋白	protein HHL1, chloroplastic-like
69	Acc24425	类 SKP1 蛋白 1B	SKP1-like protein 1B
70	Acc30301	类钙调蛋白 7	calmodulin-7-like
71	Acc13249	类钙调蛋白 7	calmodulin-7-like
72	Acc09768	胞质类亮氨酸-tRNA 连接酶	leucine--tRNA ligase, cytoplasmic-like
73	Acc30041	类卵巢肿瘤结构域去泛素化酶 6	OVARIAN TUMOR DOMAIN-containing deubiquitinating enzyme 6-like
74	Acc20680	类病原相关基因转录激活因子 PTI5	pathogenesis-related genes transcriptional activator PTI5- like
75	Acc10461	类高迁移率族蛋白 B3	high mobility group B protein 3-like
76	Acc23928	类 14-3-3 蛋白	14-3-3-like protein
77	Acc02415	叶绿体光系统 I 组装因子 PSA3	photosystem I assembly factor PSA3, chloroplastic

78	Acc15532	未表征蛋白 UPF0160	UPF0160 protein
79	Acc19833	线粒体类五肽重复序列蛋白 At3g61520	pentatricopeptide repeat-containing protein At3g61520, mitochondrial-like
80	Acc22068	延伸因子 1- δ	elongation factor 1-delta
81	Acc20571	多聚泛素	polyubiquitin
82	Acc11774	类猕猴桃蛋白酶	actinidain-like
83	Acc11687	类 14-3-3 蛋白 GF14 kappa	14-3-3-like protein GF14 kappa
84	Acc12057	类猕猴桃蛋白酶	actinidain-like
85	Acc31539	富脯氨酸受体样蛋白激酶 PERK3	proline-rich receptor-like protein kinase PERK3
86	Acc02577	类新生多肽相关复合体亚基 α 蛋白 2	nascent polypeptide-associated complex subunit alpha- like protein 2
87	Acc05279	类高迁移率族蛋白 B3	high mobility group B protein 3-like
88	Acc14731	类肽基-脯氨酰顺反异构酶 FKBP62	peptidyl-prolyl cis-trans isomerase FKBP62-like
89	Acc24460	GDP-甘露糖 4,6 脱水酶 1	GDP-mannose 4,6 dehydratase 1
90	Acc11520	叶绿体类长链酰基辅酶 A 合成酶 9	long chain acyl-CoA synthetase 9, chloroplastic-like
91	Acc32419	类半胱氨酸蛋白酶抑制剂	cysteine proteinase inhibitor-like
92	Acc17771	类高尔基体蛋白候选 5	golgin candidate 5-like
93	Acc21452	钙网蛋白	calreticulin
94	Acc27877	无活性丝氨酸/苏氨酸蛋白激酶 scyl	Inactive serine/threonine-protein kinase scyl
95	Acc04052	类 SPIRAL1 蛋白 2	protein SPIRAL1-like 2
96	Acc19256	类蛋白二硫键异构酶 2-3	protein disulfide isomerase-like 2-3
97	Acc25412	类 U-box 结构域蛋白 14	U-box domain-containing protein 14-like
98	Acc01971	延伸因子 1- α	elongation factor 1-alpha
99	Acc27440	类五肽重复序列蛋白 At2g37230	pentatricopeptide repeat-containing protein At2g37230- like
100	Acc03418	类热休克蛋白 83	heat shock protein 83-like
101	Acc25741	类 60S 核糖体蛋白 L5	60S ribosomal protein L5-like
102	Acc00978	植物特异性 TFIIB 相关蛋白 1	plant-specific TFIIB-related protein 1
103	Acc26649	类 SPIRAL1 蛋白 1	protein SPIRAL1-like 1
104	Acc25120	受体样蛋白激酶 HSL1	receptor-like protein kinase HSL1
105	Acc23917	叶绿体 RNA 结合蛋白 CP33	RNA-binding protein CP33, chloroplastic
106	Acc04530	类 SKP1 蛋白 1B	SKP1-like protein 1B
107	Acc25834	类 17.5 kDa I 类热休克蛋白	17.5 kDa class I heat shock protein-like
108	Acc08579	类热休克同源 70kDa 蛋白 2	heat shock cognate 70 kDa protein 2-like
109	Acc15558	叶绿体类 30S 核糖体蛋白 S6 α	30S ribosomal protein S6 alpha, chloroplastic-like
110	Acc07864	类半胱氨酸合酶	cysteine synthase-like
111	Acc04977	类脱落酸应激成熟蛋白 2	abscisic stress-ripening protein 2-like
112	Acc14728	叶绿体类 UV-B 诱导蛋白 At3g17800	UV-B-induced protein At3g17800, chloroplastic-like
113	Acc26817	类 60S 核糖体蛋白 L17-2	60S ribosomal protein L17-2-like
114	Acc28459	类光敏色素依赖性晚花蛋白	protein PHYTOCHROME-DEPENDENT LATE- FLOWERING-like
115	Acc24147	类免疫相关核苷酸结合蛋白 9	immune-associated nucleotide-binding protein 9-like
116	Acc00145	丝氨酸羟甲基转移酶 4	serine hydroxymethyltransferase 4

附表 3 AcSTK1 的理化性质分析
Schedule3 Analysis of physical and chemical properties of AcSTK1

Gene ID	命名 Name	染色体 Chromo some	CDS 长 度 CDS length (bp)	蛋白质 大小 Protein size (aa)	分子量 Molecular weight (Da)	等电点 Isoelectron ic point(pI)	不稳定系 数 Instability index	脂肪族系 数 Aliphatic index	亚细胞定位 Predicting subcelluar
Acc13666	AcSTK1	Chr12	2106	702	77297.76	6.61	47.59	76.72	细胞核 Nucleus