Supplementary materials

Targeting the conserved binding pocket of cadmium transporters: essential oil-derived small molecules show promise in mitigating cadmium accumulation in peppers

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1. Table S1 Gene expression data related to cadmium accumulation in peppers

Sequence ID	Gene Name	Post-pollination （0-1cm）	Fruit (1-3cm)	Fruit (3-4cm)	Fruit (4-5cm)	Greening stage of fruit	Color change stage of fruit	Color change (3 days)	Color change (5 days)	Color change (7 days)
Capana00g003724	CAX1	91.35607931	76.88418309	134.7688369	72.70654693	50.17698375	62.23015847	308.6797526	88.26837493	71.43390873
Capana00g004611	CAX2	0	0	0	0	0	0	0	0	0
Capana02g001354	CAX3	8.089615995	9.625166248	6.802860977	6.07279911	8.064133598	6.1098999	8.923555217	9.354697561	11.5034851
Capana03g000052	CAX4	14.60200618	15.00305824	13.81459218	11.62079897	5.96372582	6.658162861	12.52903693	5.356475048	7.224027675
Capana03g003034	CAX5	0	0	0	0	0	0	0	0	0
Capana03g003405	CAX6	0.447251985	0.049552263	0	0	0.093647416	0	0	0	0
Capana06g002611	CAX7	5.022179996	0.900276627	1.886869883	1.550920848	66.03586958	20.50167957	3.07024117	7.498451117	1.745271739
Capana07g000719	CAX8	36.43792398	29.46372839	37.64241213	33.74401431	8.943847714	4.352016295	17.47942036	10.27673445	12.49110602
Capana07g001988	CAX9	4.784752365	11.86890926	13.89645347	21.7963461	9.91292891	9.106898964	6.678368685	2.376406574	5.1597508
Capana08g001424	CAX10	4.784752365	6.758975405	5.20983413	3.913880443	2.254163992	1.467378136	2.184685992	0.829500408	0.728994441
Capana09g000882	CAX11	14.84125479	15.39619069	14.68657501	14.17822151	15.80782688	14.8213303	12.57988192	5.747139754	7.078480378
Capana09g001388	CAX12	28.22091517	23.76621946	0.571719874	4.525107219	12.79731905	36.42968564	3.912445648	21.45265935	3.269042907
Capana10g001937	CAX13	5.58418663	2.923297081	3.020531591	1.77090473	2.49924926	1.116108225	2.116845897	1.397684213	2.233335572

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Capana11g001225	CAX14	177.3468381	111.9743697	96.74319727	97.8360232	50.82798975	36.01779909	76.57637772	65.78483162	69.94089736
Capana00g001039	PCR1									
Capana00g004761	PCR2	20.4260933	13.57837433	12.25520808	16.16029064	23.24049928	16.77526494	14.66690724	32.7387927	26.16883238
Capana01g003842	PCR3									
Capana02g002075	PCR4	24.25661416	32.66829881	15.69721318	22.97748888	4.947026567	4.757209117	2.622506784	4.01406067	1.679856756
Capana02g003109	PCR5	0	0	0	0	0.484177068	0	0	0	0
Capana03g000294	PCR6	41.68099948	28.03728066	33.71303001	23.17214991	17.71789896	16.98710173	44.97923241	17.92061438	22.28314387
Capana03g000374	PCR7	0	0	0.051974534	0.055865521	0.099590032	0	0	0	0.112725617
Capana04g002357	PCR8	15.28203432	10.51737558	1.178777273	4.307883219	2.315159331	0.319415588	0.106908288	0	0
Capana05g000937	PCR9	15.67957743	33.66492532	19.27547706	19.38182599	4.170006687	0.786275195	4.962559585	7.825967199	7.956599017
Capana05g001897	PCR10	9.620557214	17.88692762	20.00717634	18.43284032	15.20235633	17.27008956	21.54202002	28.64013649	35.37690038
Capana06g001270	PCR11	0.783295368	3.644903748	12.83911462	6.072129193	2.337135794	2.551296039	4.657734057	1.069382958	3.341552899
Capana11g002263	PCR12	0	0	0	0	0	0	0	0	0
Capana00g003933	Nramp1	0	0	0	0	0	0.091488615	0	0	0
Capana02g003020	Nramp2	19.24581197	17.26218889	13.36070366	21.44166714	17.91171455	14.58207022	11.57042091	7.427430899	13.53290853

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Capana03g000474	Nramp3	11.12602128	5.998050877	9.60769701	12.52622157	36.17999542	12.97690627	11.53748638	6.874445796	16.40009967
Capana04g000633	Nramp4	13.23436777	10.7526582	14.33029962	13.89577536	19.90128547	20.70200002	20.07143931	12.08591277	15.73031917
Capana04g000634	Nramp5	0.93429815	1.257688189	1.010738811	0.938259808	0.792289748	0.041497254	0.166669401	0.17007165	0.398573363
Capana04g001440	Nramp6	0	0	0	0	0	0	0	0	0
Capana04g001441	Nramp7	0	0	0	0	0	0	0	0	0
Capana09g002180	Nramp8	92.77548411	94.1151255	101.5436229	105.5262452	70.76257128	83.2023759	101.2227331	34.09278458	61.73977751
Capana01g001718	MTP1	8.820072228	5.253268575	4.890192188	7.446408433	11.4897117	8.886616607	6.652682652	8.943559545	7.575824587
Capana03g003585	MTP2	12.85994668	10.73803972	9.768287425	8.73122473	8.619819018	10.40197834	13.00914196	12.65616531	14.1612167
Capana05g002399	MTP3	12.85994668	10.73803972	9.768287425	8.73122473	8.619819018	10.40197834	13.00914196	12.65616531	14.1612167
Capana10g000225	MTP4	2.585573517	2.168001925	3.005165029	2.733196839	0.498313625	0.365397962	1.886892264	1.978893309	0.87739477
Capana12g000019	MTP5	0.115835046	0.115503116	0	0.061224324	0	0.154345902	0	0.052714055	0
Capana00g002565	ZIP1	0	0	0	0	0.13585864	0	0.385827224	0.131234393	0
Capana01g001761	ZIP2	0	0	0	0	0	0	0	0	0.474070005
Capana02g000402	ZIP3	23.58994189	4.760474371	3.452378205	4.45300172	5.159863756	0.623665126	1.001954419	0.958507012	1.647301393
Capana02g001289	ZIP4	0.095839711	0	0.18851081	0	0	0	0	0.261687629	0

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Capana02g001292	ZIP5	0.399200119	0.099514049	0	0.316494337	0.470171946	0	0.890166116	1.271672113	3.299553353
Capana02g001293	ZIP6	3.118916158	0.478458273	0	0	0.904224723	6.606720102	4.06587795	31.2985336	17.740474
Capana02g002321	ZIP7	3.756916671	7.157824373	12.07411738	4.255090533	3.223812313	0.655541343	1.256617834	0.488483574	0.286197818
Capana05g002214	ZIP8	2.803311547	5.662230896	8.34160334	9.497969939	25.05904529	18.26150885	10.45044423	9.02822319	12.64892141
Capana07g002361	ZIP9	108.5111869	41.00147948	15.0723204	39.70614225	19.66197811	19.75234025	11.89998273	7.721638358	2.262016746
Capana08g000152	ZIP10	108.5111869	41.00147948	15.0723204	39.70614225	19.66197811	19.75234025	11.89998273	7.721638358	2.262016746
Capana10g002221	ZIP11	10.66032478	5.072300316	0.739542408	0.888425496	7.377049507	8.448035295	3.55088242	2.375318476	4.481669124
Capana11g000528	ZIP12	1.429089182	0	0.281093042	1.661751332	0	0	0	0	0.762065195
Capana00g003079	ABCC1	44.05536339	41.71501624	142.102739	44.7167209	25.4701008	32.38837177	62.487645	106.8041183	71.52466715
Capana00g003600	ABCC2	0.094960448	0.441878895	2.770590069	1.137665097	0.984218392	0.337416729	0.197633211	0.144048236	0.067517178
Capana01g000154	ABCC3	0.207755761	0.328004011	1.651597935	2.049764042	3.703000101	9.10452728	3.1811155	18.73570868	4.837666339
Capana01g002483	ABCC4	8.26437808	6.02059994	4.676246279	4.228496217	3.20010781	1.94427603	3.197643596	2.919452608	3.581944563
Capana01g002484	ABCC5	7.547377242	6.294263574	4.72348109	2.756138186	2.068756564	3.778843695	3.304741707	3.746891047	3.951481234
Capana01g002893	ABCC6	0	0	0	0	0	0	0	0.368409399	0
Capana01g003068	ABCC7	49.64895769	39.25466945	65.2925257	35.18510968	24.88655742	31.36822444	40.0751992	21.94909846	25.98744226

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Capana01g003075	ABCC8	0	0.035970724	0	0	0.271920206	0.192269577	0.032176281	0	0
Capana01g003898	ABCC9	0.322021429	3.371535967	1.425141723	1.191425349	1.365379332	1.573299224	0.861680801	0.439635216	0.858593453
Capana01g003904	ABCC10	87.1258636	85.74073687	109.1775238	79.27905519	27.62198321	40.69688484	55.98090728	38.13064211	46.14939811
Capana03g000541	ABCC11	6.004787158	2.927750611	2.822492749	2.123655787	2.600128223	1.882624965	0.452894388	2.591999218	4.285119063
Capana03g002092	ABCC12	2.247805831	2.797615733	9.05236081	2.462864901	2.195243039	2.579736561	1.800046509	8.900223806	3.167229926
Capana03g002854	ABCC13	0	0	0	0	0	0	0	0	0
Capana03g002855	ABCC14	0	0.160549332	0	0	0	0	0	0	0
Capana03g003620	ABCC15	2.227821207	4.08946411	1.095496782	2.693998618	0.381657396	3.928000731	0.948390818	2.580667936	0.989992451
Capana04g001152	ABCC16	0.487911256	0.567598648	0.319897132	0.472787837	0.421413374	0.397297784	0.616522458	0.148025325	0.30354314
Capana06g002473	ABCC17	0.053256025	0.079655126	0.157126982	0.22518671	0.100358643	0	0	0.024235679	0.056797803
Capana07g002357	ABCC18	13.11087247	33.15530386	45.16894365	42.95238231	13.16993797	8.32503848	8.359162584	4.294111414	7.427831735
Capana09g000830	ABCC19	31.80791563	29.7926595	12.36592045	15.26568562	51.78822812	43.23992479	15.26818429	17.73270911	10.82093295
Capana09g000832	ABCC20	10.67814113	9.56048972	7.257666183	5.141567727	18.46317346	19.54208475	7.105874658	6.920183959	5.157523174
Capana10g000878	ABCC21	8.489655855	14.59539379	14.37937609	20.45881913	11.9528157	12.15008859	17.7558468	6.587126977	5.064834108
Capana11g001166	ABCC22	3.58957651	1.128254593	0.709884811	1.422946269	0.477919529	0.918470321	0.348013247	0.408384894	0.02080598

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Capana12g001861	ABCC23	0.647496171	0	0.445754784	0.547571972	0	0.287588208	0.11550681	0.589323346	0.207167321
Capana00g001964	ABCG1	5.432381556	13.00725603	1.667429428	4.864702357	0.619441435	0.184419029	0	0	0
Capana00g001964	ABCG2	5.432381556	13.00725603	1.667429428	4.864702357	0.619441435	0.184419029	0	0	0
Capana00g002920	ABCG3	5.069725121	12.42736081	14.00558375	5.377789347	9.221949816	10.21101637	9.7975368	28.10204698	8.711093928
Capana00g002921	ABCG4	14.82680026	17.81242586	14.00194716	5.740595512	9.341537592	3.475180172	1.449943655	1.333213304	0.704910306
Capana00g003546	ABCG5	0	0	0.547830426	1.303866292	0.112469467	0	0	0.579420384	0
Capana00g003935	ABCG6	0	0	0	0	0	0.071040001	0	0	0.08529074
Capana01g000966	ABCG7	11.17853026	13.60692866	20.99473488	44.81677397	7.573698567	4.649491093	7.002823844	3.811079274	1.953765288
Capana01g001697	ABCG8	37.37987334	28.31264149	2.201117922	3.8136911	0.377698294	0.118694774	0.1191813	0.121614168	0.178131422
Capana02g000694	ABCG9	0	0	0	0	0.150455023	0	0	0	0
Capana03g000253	ABCG10	8.077788723	8.233995856	16.86948395	17.47554446	7.842226136	8.729791658	8.94059463	4.598757001	3.540172058
Capana03g001034	ABCG11	0	0.072756495	0	0	0	0	0	0.398460921	0
Capana03g001458	ABCG12	16.61743234	13.48052698	10.97594573	6.14072832	5.075389647	5.785721372	4.553342423	0.736997811	1.201530197
Capana03g002125	ABCG13	6.633747365	5.8621631	0.31253108	2.729416625	2.245689691	0	0	0	0.084729617
Capana03g004013	ABCG14	2.866307312	11.71987573	42.1337546	63.59328421	8.533620828	1.431276427	1.452271012	2.871213139	0.705445464

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Capana03g004014	ABCG15	9.195029361	22.44573182	93.83994911	30.43481536	6.154622511	7.677049549	8.09693124	37.17996853	15.59401008
Capana05g000419	ABCG16	0.242208095	0.138008022	10.03860574	7.754262404	1.760517764	4.149428144	2.715899372	5.03879904	0.332120677
Capana05g001760	ABCG17	0.657421972	0.138008022	0.034029172	0	1.59750686	0.153682524	0	0.220447458	0.442827569
Capana05g002266	ABCG18	1.384487035	22.61666276	254.0981633	82.87940669	71.74764008	63.98265712	95.11724195	7.731730448	22.14842984
Capana05g002267	ABCG19	0.175138558	0.139709353	0.103346028	0.148110475	0.099012279	0.062230835	0.124971835	0.095642179	0.280179154
Capana05g002268	ABCG20	0.136546189	0.068077455	0.402866918	0.342812948	0.225150891	0.181942731	0.015224042	0.233022199	0.127423763
Capana05g002412	ABCG21	0.643185278	0.513073763	0.474414688	0.271963177	0.212109528	1.856877792	4.618196035	24.82094962	4.252952924
Capana06g000355	ABCG22	9.138938968	16.91588503	39.36003198	28.1722988	22.99694797	11.24556779	16.85614255	39.66346418	26.34143963
Capana06g002767	ABCG23	0.016610459	0	0.065343499	0.035117666	0.031301681	0	0	0	0.035430266
Capana07g002135	ABCG24	2.372380093	2.637042164	1.376948525	3.700078724	0.842826748	0.241833434	0.624406377	7.964406091	0.53921328
Capana07g002218	ABCG25	0	0	0	0	0.075227511	0	0	0	0
Capana08g000765	ABCG26	0	0	0	0	0	0	0	0	0
Capana08g000766	ABCG27	1.504134063	1.550954266	3.899892425	3.649801646	0.773038546	1.078018191	1.875207687	0.404476844	0.874999698
Capana08g002050	ABCG28	0	0	0.073650735	0.435404613	0	0	0	0	0
Capana08g002051	ABCG29	0	0	0	0.080537991	0	0.067678487	0.067955899	0	0

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Capana08g002054	ABCG30	11.88310459	1.505149985	1.295009101	1.731459712	0.211827467	0.513528519	0	0.05846213	0.034252398
Capana08g002055	ABCG31	35.819945	8.606133657	192.2046966	46.04895521	27.36343038	3.652458461	6.806221048	0	0
Capana09g000914	ABCG32	0.919680406	0.837301978	1.612329212	1.098996893	0.452112362	0.426240007	0.356655961	1.346564818	2.345495361
Capana09g002053	ABCG33	0.372135704	1.261635735	1.280944024	4.917284899	0.385700376	0.991714037	1.560053838	19.6785871	1.825668668
Capana11g000045	ABCG34	14.7086096	18.65685912	20.7833168	23.60090912	11.3781611	7.764630817	11.52247582	3.386724776	5.728116207
Capana11g002390	ABCG35	15.17908272	10.96489151	15.12720265	8.379438061	14.4292881	13.15410791	26.8974384	15.53459633	16.18856371
Capana12g000032	ABCG36	0.18962718	1.27201826	6.255975445	1.075162062	0.243643707	0.229701074	0.722680186	0.031380101	0.128697091
Capana12g000038	ABCG37	0	0	0	0	0	0	0	0	0
Capana12g000039	ABCG38	0.12502989	0.457129245	18.89532167	16.47700286	1.806368976	3.294932096	4.609509028	0	0.088896647
Capana12g000323	ABCG39	0	0	0	0.085672964	0.114545246	0	0.018072164	0.036882149	0
Capana12g000324	ABCG40	0	0.201948845	0.066393744	0.249774706	0.190828698	0.029984738	0	0	0.089999314
Capana12g002281	ABCG41	0.033016551	0.427985232	0.129883046	0.122155709	0	0	0.176694628	0.270452286	0.21127385
Capana12g002283	ABCG42	0	0.03276517	0	0.034735433	0	0	0	0	0
Capana12g002300	ABCG43	2.126739836	0.522898909	2.17753862	0.277171157	1.207814448	0.672866211	1.065407504	0.530319923	0.869986129
Capana12g002302	ABCG44	0.117648748	0.251382043	0.148762184	0.07106623	0.063343973	0.014929771	0.014990967	6.40943478	0.10754824

Sequence ID	Gene Name	Post-pollination （0-1cm）	Fruit (1-3cm)	Fruit (3-4cm)	Fruit (4-5cm)	Greening stage of fruit	Color change stage of fruit	Color change (3 days)	Color change (5 days)	Color change (7 days)
Capana00g001533	OPT1	0	0	0	0	0	0	0	0	0
Capana00g002777	OPT2	18.91324489	28.92087277	23.53544551	21.74176396	11.68989154	6.710522843	1.377115435	1.856906735	0.411654395
Capana00g002779	OPT3	10.54236821	2.357271934	0.502695493	0.540328957	0.120403821	0	0.113978942	0.174458419	1.362846751
Capana00g002781	OPT4	0.163850795	0.653525095	0.676797291	0.900670452	3.087696365	0.58220028	0.05845867	0.089477995	0
Capana01g000053	OPT5	3.126770572	8.529183249	59.09813892	10.02985626	4.74090046	4.34189721	4.327637949	0.163554768	0.268310454
Capana02g000094	OPT6	0	0.073534045	0.942841853	1.948896427	0.41690972	0.163771606	0.06577716	0.302039462	0
Capana02g002316	OPT7	0.420027951	0	0.137694852	0.074001574	0.263841417	0.839507491	0.187321913	0.50972199	0.597282402
Capana02g003664	OPT8	20.51370819	23.17553115	23.05668618	23.57213333	16.15476709	14.09326616	16.4344281	52.70104161	33.87672077
Capana03g001942	OPT9	56.91569945	26.49429412	15.02994685	25.84047392	19.64847851	15.65919976	15.39649685	12.10831438	2.501516586
Capana03g001955	OPT10	1.601450655	3.193723266	1.277008713	6.314005307	1.019548486	0.884307971	0.154423083	0.354544529	0.27696563
Capana03g001956	OPT11	0.355170694	2.479070564	0.523949163	4.317665394	0	0.473251772	0.633588824	0.161630594	0
Capana04g002379	OPT12	10.31398422	2.415559854	0.180489073	0.232801306	0.138336305	0.228234897	0	0.200441588	0.195727991
Capana04g002509	OPT13	70.80544347	50.43598519	33.52365896	20.71502611	15.98492877	33.80325828	38.63552533	26.91425348	34.1762077
Capana04g002514	OPT14	0	0	0	0	0	0	0	0	0
Capana05g002204	OPT15	4.180085857	8.209909009	2.366931184	3.035099541	9.62767478	12.93996104	3.54012217	1.460326767	0.315217876

Sequence ID	Gene Name	Post-pollination （0-1cm）	Fruit (1-3cm)	Fruit (3-4cm)	Fruit (4-5cm)	Greening stage of fruit	Color change stage of fruit	Color change (3 days)	Color change (5 days)	Color change (7 days)
Capana08g002170	OPT16		12.18715382	10.22071337	9.129103325	5.654601276	4.355828431	4.569519397	5.861802883	4.136859366
Capana11g002242	OPT17	0	0	0	0	0	0	0	0	0
Capana12g000844	OPT18	0	0	0	0	0	0	0	0	0
Capana12g000845	OPT19	0.69382182	0.95538932	0.389915656	0.733435577	0.280173598	0.146744735	0.176815486	0.300708082	0.246654754
Capana12g002883	OPT20	24.11944791	22.3187087	42.9503431	50.14321067	30.48316929	22.56820701	94.31446313	8.722456353	9.809230132
Capana00g000532	mate1	1.496117259	2.770541565	3.152968414	0.903736042	0.201383382	0.379718236	0	0.194528857	0.683835494
Capana00g000533	mate2	8.703281864	10.12473263	3.4237639	5.060107661	1.57175799	1.09525335	0.517526006	0.396067762	0.773507616
Capana00g000703	mate3	0	0.314802611	0.155244196	0	0.223101198	0.701113736	0	4.166477539	6.06065967
Capana00g000714	mate4	0	0.097895934	0.289662952	0.051891348	6.012849364	30.39328047	139.1912228	63.93475553	63.76626988
Capana00g000955	mate5	25.56192	18.63309763	62.06821617	28.51221248	9.634063416	3.758379036	7.468948545	0.561577831	2.068144814
Capana00g001227	mate6	7.08695809	7.345596838	5.777601581	8.181602646	4.568836891	6.295405811	1.330781159	7.214091385	2.983529374
Capana00g001228	mate7	4.324086874	6.309799064	3.422829466	6.577738204	2.881804996	5.340098597	1.693259215	3.263667544	2.02463085
Capana00g001649	mate8	10.04535874	12.85815444	20.94972346	18.82783422	6.779907206	10.12581962	12.8997937	14.45997835	13.0688561
Capana00g001650	mate9	15.01654332	13.97527862	22.52166972	18.51956501	11.90874893	9.004044076	17.97028613	19.36217273	26.42510421
Capana00g002741	mate10	0	0.243872403	0.240530249	0.646342866	1.325051673	0.434513019	0.218147038	3.394651669	2.804014062

Sequence ID	Gene Name	Post-pollination （0-1cm）	Fruit (1-3cm)	Fruit (3-4cm)	Fruit (4-5cm)	Greening stage of fruit	Color change stage of fruit	Color change (3 days)	Color change (5 days)	Color change (7 days)
Capana00g002897	mate11	1.162106621	6.650369808	3.080850308	3.097848338	0.952147373	2.423682715	1.712545524	5.242511992	3.017650631
Capana00g004326	mate12	0	0	0	0	0	0	0	0	0
Capana00g004514	mate13	1.915105415	3.12965107	23.75236205	8.660140203	5.964762869	17.29558018	76.25115895	88.84698477	99.22995262
Capana01g000327	mate14	0	0	0	0	0	0	0	0.622125306	0.242998147
Capana01g000428	mate15	3.371161835	3.110643302	8.659715332	5.531617693	15.64497152	13.49819221	8.347532756	13.92178185	0.321972545
Capana01g001565	mate16	5.342494457	4.842895747	18.28106842	8.634644409	4.992246188	15.68854137	15.71346615	27.08538718	19.44784805
Capana01g002459	mate17	1.606860961	1.796469337	0	0.463255824	0.412917137	0.302779359	0	0.088636132	0.103862111
Capana01g002604	mate18	0.177585347	1.328073516	3.231019838	2.346557279	6.274721197	3.076136518	0.356393713	0	0
Capana02g000386	mate19	10.33562228	6.730452335	6.845658932	6.243276939	6.012041456	3.747437612	5.785302318	5.183471981	4.499179668
Capana02g000588	mate20	5.872731228	5.27031241	3.104412062	3.957622198	1.660035663	0.260839882	0.785727174	2.739368368	3.757977424
Capana02g001370	mate21	0.085643997	0	0	0	0	0	0	0	0
Capana02g002187	mate22	1.412089936	3.350172547	27.43972471	15.2874422	4.817366596	4.195656839	10.55385255	1.063633588	1.350207447
Capana02g002188	mate23	7.677668807	6.945871089	7.350730993	4.837366079	1.341425309	1.716326426	1.995471328	0.601606085	0.488042594
Capana02g002829	mate24	0	0.103803447	3.583330482	1.59565895	1.37322634	0.832270358	3.342727244	3.695209791	0.721662601
Capana02g002835	mate25	0	0.160122339	0	0	0.030261067	0	0	0.087693195	0

Sequence ID	Gene Name	Post-pollination （0-1cm）	Fruit (1-3cm)	Fruit (3-4cm)	Fruit (4-5cm)	Greening stage of fruit	Color change stage of fruit	Color change (3 days)	Color change (5 days)	Color change (7 days)
Capana02g002836	mate26	0.4312787	0.752574993	0.265093326	0.227951279	0.152386086	0	0	0.098132861	0.057495097
Capana02g003108	mate27	1.910573387	3.810197122	2.119886268	11.96258718	24.37188261	8.137754608	0.524349372	0.178351	0.208988264
Capana03g000390	mate28	90.05518302	78.7309223	40.96561229	47.39171683	16.30716207	8.772721107	6.323062555	1.957889627	3.962739015
Capana03g001217	mate29	0	0	0	0	0	0.093890942	0.047137899	0.769602129	0.169088426
Capana03g002183	mate30	0.862557399	0.286695235	0.282766215	0.658525916	0.270908598	0.255405718	0	0	0
Capana03g002184	mate31	34.03604872	34.17097263	40.62662699	28.24131516	9.357329402	8.946102995	10.31355398	9.929984613	9.050039102
Capana03g002186	mate32	3.472275792	2.84680125	0.910633689	1.141941229	1.017854667	1.43941114	0.481770416	0.210687803	0.246879907
Capana03g002381	mate33	11.88310459	1.505149985	1.295009101	1.731459712	0.211827467	0.513528519	0	0.05846213	0.034252398
Capana03g003047	mate34	0.407049559	0.405883142	0.133440236	0.430290054	0	0.120528541	0.121022584	0.123493038	0
Capana03g003048	mate35									
Capana04g000793	mate36	1.214084382	0.302651343	1.748378535	2.108447014	1.879337202	1.001447197	0.077350162	0	0
Capana04g000926	mate37	2.719775583	2.38654412	3.637749143	1.150024468	0.820047647	0	0.582216757	0.099016941	0
Capana04g000929	mate38	5.399749571	5.237432468	6.276030624	5.811830972	9.620558982	3.183227366	6.304981468	5.629475329	6.491804159
Capana04g001715	mate39	0.680326963	0.096911065	0.430123257	0.821908835	1.648345271	3.755543237	0.130032314	0.79612011	0.881051632
Capana04g002410	mate40	0.102772796	0.204956594	0	0.108640609	9.731959071	5.477637531	0.366672681	1.309551708	1.150880586

Sequence ID	Gene Name	Post-pollination （0-1cm）	Fruit (1-3cm)	Fruit (3-4cm)	Fruit (4-5cm)	Greening stage of fruit	Color change stage of fruit	Color change (3 days)	Color change (5 days)	Color change (7 days)
Capana05g001133	mate41	4.035615595	4.39550227	6.594486123	8.335164489	6.434949724	6.011554643	16.5580051	13.39248666	35.55768774
Capana06g001278	mate42	6.558410569	3.529317206	5.733328772	3.411408789	3.040715467	1.479591747	2.971313106	2.747720101	2.553575357
Capana06g001678	mate43	1.031192216	1.840003577	0.747265323	1.204812151	0.306826816	0.096422833	0.145227101	0	0.115765409
Capana07g000036	mate44	0.696011734	0.485812099	0.410703667	0.662175472	0.131160359	0	0	0	0
Capana07g000037	mate45	0.405228308	0.080813422	0.079705913	0	0	0	0	0	0
Capana07g000038	mate46	10.84357873	6.716859797	2.208269488	2.663049857	0.206406551	0	0.097696236	0	0
Capana07g000039	mate47									
Capana07g000040	mate48									
Capana07g000042	mate49	0	0.491477546	0.242371041	0.846676177	0.116103685	0	0.219816531	0.112151841	0.394252096
Capana07g001450	mate50	13.5554475	6.996270286	16.0070266	9.78839008	7.42053985	15.05177573	65.64781594	68.03050875	123.2404002
Capana08g000946	mate51	1.004324259	0.333815442	0.705515705	0.353888718	0.360496193	0	0	0.087056478	0.102011103
Capana08g002509	mate52	0	0.591497538	0.66673297	0	0	0	0	0.308515941	0
Capana08g002510	mate53	0	0	0.212074661	0	0	0	0.384678929	0.392531443	0
Capana08g002616	mate54	8.613207576	9.27906084	12.98292191	7.549354171	6.769801947	7.305152801	12.08360621	3.860595985	4.939220403
Capana08g002813	mate55	1.108222481	1.257467076	3.495205176	2.464182176	2.196417175	2.240457756	2.079213957	3.930283183	6.887767101

Sequence ID	Gene Name	Post-pollination （0-1cm）	Fruit (1-3cm)	Fruit (3-4cm)	Fruit (4-5cm)	Greening stage of fruit	Color change stage of fruit	Color change (3 days)	Color change (5 days)	Color change (7 days)
Capana09g000845	mate56	0	0	0	0	0	0	0	0	0
Capana10g000081	mate57	4.417976922	3.671097525	0.72415738	0.155674044	0	0.130817563	0.06567689	0.067017563	0
Capana10g000082	mate58	0	0.09156806	0	0	0	0	0	0	0
Capana10g000109	mate59	0.548900163	0	0	0.082891374	0	0	0	0	0
Capana10g000110	mate60	120.5064566	39.73595961	7.422613142	30.31752005	6.921714671	3.843856059	0.673188125	0.54954402	1.234228089
Capana10g000111	mate61	7.846489888	5.93736584	6.786389158	6.647353413	3.093601406	2.273934782	6.70085876	3.140251544	5.697578676
Capana10g000116	mate62	0	0	0	0	0	0	0	0.087056478	0
Capana10g001586	mate63	38.32219302	26.33500518	29.93282361	23.0556436	15.67399744	10.7635267	20.77266216	17.79475875	18.66126587
Capana10g001728	mate64	0.219560065	0.109465453	0.971687539	0.464191694	15.30879858	1.950370939	0.391673091	0.399668378	0
Capana10g002115	mate65	46.97550819	37.51054413	26.30169934	21.92151353	7.208154416	3.257425809	4.342239637	5.639299894	1.955435352
Capana11g002353	mate66	0	0	0	0	0	1.344700192	0	0	3.228898457
Capana11g002358	mate67	7.415846186	7.944194112	5.667057336	2.065749346	1.794066896	2.893185107	3.620131994	0.364842503	2.778850181
Capana12g001229	mate68									
Capana12g002622	mate69	4.207054153	2.175184495	8.275016457	2.251080153	0.73407491	0.6459293	1.899403915	5.436349448	3.600553191
Capana12g002690	mate70	0	0	0	0	0	0	0	0	0

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Capana00g001046	HMA1	0	0	0	0	0	0	0	0	0
Capana00g001047	HMA2	0.33699917	0.112011162	0.44190441	0.237493425	0.635060155	0.19957284	0.100195442	9.815111803	6.349598096
Capana00g001203	HMA3	1.868874365	3.153647588	4.382876331	6.078700761	10.29452671	3.192571478	1.410489406	4.841221131	0.613281038
Capana00g001483	HMA4	97.09931864	395.1479471	702.6336489	987.4415194	447.6958083	425.1410612	630.0674494	392.3071394	623.6192041
Capana00g001990	HMA5	4.033724307	4.022165506	4.466042865	5.980368837	4.183147465	4.417016539	3.529994876	2.863170526	2.651538606
Capana00g002248	HMA6	20.63282997	30.78081559	0	0.845382225	0	0	0	0	0
Capana00g002501	HMA7	111.6940123	53.14144745	14.95101174	22.37712694	109.6735814	35.11130961	0.818699098	0.522132086	0
Capana00g003064	HMA8	0	0	0	0	0	0	0	1.582686778	0
Capana00g003535	HMA9	0	0	0	0	0	0	0	0	0
Capana00g003763	HMA10	0.934900923	0.077685161	0.229861568	0.905922501	1.541557311	0.761273818	0.833884646	0.141817812	0.332358756
Capana01g000222	HMA11	3.337806385	3.030594127	0.934081654	2.409624302	0.511378027	0.578536998	0.193636135	0.074095823	0
Capana01g000223	HMA12	1.036549664	3.049059197	1.605578122	4.191172864	2.783498639	3.867259115	5.200594961	9.953114873	12.07742508
Capana01g000460	HMA13	64.55910379	46.31230723	34.33434387	46.56050987	13.20158436	22.27923727	39.07943375	54.88394766	44.74592804
Capana01g000570	HMA14	0.664723133	2.209394473	9.806021031	8.43210601	4.384245563	0.39365285	1.7786989	1.815007773	5.907753119
Capana01g000929	HMA15	37.32521109	37.55507096	9.966026036	37.31387083	10.1846477	9.901883229	3.163513429	0.307437214	0.180124501

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Capana01g002356	HMA16	11.90475821	19.85262983	20.99358912	36.81316285	15.47172048	24.00669045	35.57789708	35.93052688	47.13751027
Capana01g002986	HMA17	344.0589249	450.53313	73.95168186	160.1558865	145.3823022	68.19332676	6.924220719	4.202395449	3.084442868
Capana01g003201	HMA18	23.90089845	14.16611751	2.46564312	9.717507791	4.488271162	1.410475869	3.577913359	3.422765524	4.723749449
Capana02g001144	HMA19	51.6776904	43.81458559	46.84098545	51.57067808	32.77182929	45.75585795	44.61047059	44.2925899	22.98151339
Capana02g001777	HMA20	0	0.346509349	0	0	0	0	0	0	0
Capana02g002550	HMA21	0	0	0	0	2.417859234	21.99043234	14.40622589	386.8789903	173.3822155
Capana02g002730	HMA22	0.355170694	0.177076469	1.047898326	2.064970406	6.358384146	1.104254135	0.950383236	4.848917826	0.757582459
Capana02g002855	HMA23	5.349013669	7.111581137	0.797059129	3.598264477	0	0.287974233	0	0.590114384	0.34574233
Capana02g002856	HMA24	0	0	0	0	0.127844507	0	0	0	0
Capana03g001692	HMA25	294.4801226	443.1161556	79.67458991	277.9693879	303.5773229	278.1502695	224.7172825	463.6994596	1178.080596
Capana03g001778	HMA26	27.12680516	18.49807518	4.30296414	9.250196811	2.96821594	1.399179152	1.873219132	0	0.373301501
Capana03g001779	HMA27	19.46428868	42.223418	68.99123583	135.0431364	181.3768707	230.7019362	34.7931968	2.747720101	11.52322792
Capana03g002158	HMA28	107.8673008	171.9749284	175.5926152	207.6901858	46.07108177	54.62235176	164.8030611	149.9614602	217.4401089
Capana03g002299	HMA29	1.552603318	1.032102847	0.508979187	0	1.787996745	0.459730293	0	0	0
Capana03g004598	HMA30	0.163186535	0.488156752	0	0	0	0	0	0	0

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Capana03g004599	HMA31	0	0	0	0	0	0	0	0	0
Capana04g001132	HMA32	3.198888367	0.797430456	5.190913561	1.69076445	12.05632965	8.524800131	2.7105853	0.29114915	0.852907404
Capana04g002139	HMA33	2.774171094	3.417097263	0.481466798	6.55513947	0.922553603	0.144960002	1.892204461	4.901338559	1.392313708
Capana05g000183	HMA34	13.1604566	22.78454588	18.7743221	24.00176816	35.70153544	26.8497173	73.13967275	15.00551337	59.53600113
Capana05g001880	HMA35	0.623267282	0	0	0	0	0.276826843	0	0	0
Capana06g000522	HMA36	0	0	0	0	0.494702657	0	0	0	0
Capana06g000750	HMA37	0	0.234950242	0	0.124539235	0	0	0	1.072281015	1.382126047
Capana06g000782	HMA38	445.5122155	456.4608982	194.5224024	487.1883473	180.0324329	114.1593265	44.2698393	86.44814802	65.9305248
Capana08g000329	HMA39	35.03310052	19.64965035	36.21582676	18.58679656	10.06529636	11.2574982	17.93195622	16.72787842	19.74293188
Capana08g001514	HMA40	51.1445799	87.50797132	36.00959702	72.56408401	15.33313689	9.579763142	2.937548184	0.411423331	4.545494752
Capana08g002005	HMA41	6.900459192	22.36222835	0.706915537	5.470830685	0.135454299	0	0	0	0
Capana08g002025	HMA42	11.57577031	10.44567857	9.835346606	7.981598391	6.148447304	8.817049577	13.91534212	4.414556519	6.772755811
Capana08g002740	HMA43	253.2782181	372.9644379	374.3310565	317.805528	86.44447072	73.55684685	127.5735211	35.68467664	70.41581373
Capana09g001056	HMA44	0	0	0	0	0	0	0	0	0
Capana10g001451	HMA45	24.15160717	44.62976836	3.123399291	5.777554118	2.574874378	3.018005184	0.724655108	1.747785263	1.024010541

Sequence ID	Gene Name	Post-pollination （0-1cm）	Fruit (1-3cm)	Fruit (3-4cm)	Fruit (4-5cm)	Greening stage of fruit	Color change stage of fruit	Color change (3 days)	Color change (5 days)	Color change (7 days)
Capana10g001516	HMA46	18.47358032	15.94860911	19.19065014	19.86648229	10.92604874	10.94016017	27.46250896	3.566577085	5.117444423
Capana10g001864	HMA47	0.374029315	0.266398227	0.578044209	0.338901016	1.208300294	0.94929559	0.524252699	0.486322142	16.0701341
Capana11g000051	HMA48	13.10830724	47.00096608	46.09194421	24.48654329	4.06060768	7.975494546	10.97121465	7.354492464	11.87348567
Capana12g001024	HMA49	1.081415247	1.258035808	0.5317693	0.762105767	1.698233001	0.960630463	0	1.968515893	0.38444483
Capana12g002257	HMA50	1189.137313	880.3211767	445.4647538	991.5134594	295.2115617	331.3680226	611.7933684	335.921272	203.9549721
Capana12g002882	HMA51	1.478669827	3.56321221	1.938968331	4.689283444	1.044933163	0.875676748	0.219816531	0	0.131417365

2. Candidate proteins

>Capana02g001144 (HMA19)

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DPTLVKDEEITNAIEDAGFEAELLSEPNASRTNPHGTVVGQFMIGGMTCAACVSSVEGILKNLPGVRKAVVALATSLGEVEYDPSIISKDDIANAIED
AGFEASFVQSSEQDKIVLGVVGISGEMDAQLLQGILSKLHGVKQFYFDHVSSELEVVFDPEVIGSRSLVDGIEGGSCGKFKLLVKNPYTRMASRDLE
ESSRMFRLFTASLSLSLPVILMRVLCPRIPLLYALLLWQCGPFQMGDWLKWALVTVIQFGIGKRFYIAAGRALRNGSTNMDVLVALGTTASYVYSV
CALLYGAISGFWSPTYFETSAMLITFVLLGKYLETLAKGKTSGAIKKLVELAPATATLLVKDKGGKVIGEREIDALLIQPGDILKVLPGNKVPVDGVV
IWGSSHVNESMVTGESAPVLKEINSVVIGGTINLHGSLHIQGTKVGSNTVLSQIISLVETAQMSKAPIQKFADYIASIFVPVVVTLSLLTFFGWYVTGV
FGCYPEEWLPENGNYFVFSLMFAISVVVIACPCALGLATPTAVMVATGVGANNGVLIKGGDALERAQKISHVIFDKTGTLTQGKAKVTTVKIFNEM
DRGEFLTLVASAEASSEHPLAKAILEYARHFHFFDEPSNTSEFQTYSEQAKFSGWLHDVSDFSVLPGKGIQCSIDGKWVLVGNRKLLTEHGITIPSNV
ENFVVELEESARTGILVVRDNSVIGALGIADPLKREAAVVVEGLIKMGVKPIMVTGDNWRTARAVAKEVGIQDVRAEVLPAGKAEVVRSFQKGGS
VVAMVGDGINDSPALAAADVGMAIGAGTDIAIEAAEYVLMRSNLEDVIIAIDLSRKTFARIRWNYIFAMAYNVIAIPVAAGVFFPLLKLGLPPWVAG
ACMAMSSVSVVCSSLYLKRYKKPRLTTILEITIE

>Capana09g002180 (Nramp8)

MESKTLTINYRQPSMLQRVLSASVPMLLIAVGYVDPGKWAAMVDGGARFGFDLIMIVLLFNFAAILCQYLSACIALVTDRDLAQYLSRVDLSEVEH
AWMLVFLLGGEYDKVTCIFLGIQAEVSMIALDLTMVLGTAHGLNVVFGIDLFSCVFLTATGAILFPLLASLFDNGSAKFLCIGWASSVLLSYVFGVVI
SQPETPFSIGGMLNKFSGESAFALMSLLGASIMPHNFYLHSSIQGKESTKLSKGALCQDHFFAIVFIFSGIFLVNYAMMNLAANVSYSTGLLLLTFQDT

LSLLDQVFRSSVAPFTIMLVTFISNQVTPLTWDLGRQSVVHDLFGMDIPGWLHHVTIRVVVALAIPSSVIPLFRVASSRSIMGIHKISQLMEFLSLGTFI
GLLGLKMMFVIEMMFGNSDWVSNLKWSIGSGISAPFVFLLIAASLSLCLMLWLAITPLKSASSRFNSEEFLETPMPQSYPERNELDASDTTFGLERSS
QNQEGVFHVEKSLVRRTDLSTSEPDQILPESLDFEKVHHMATIDESKSETTFSAPAVSDSVVSVSAGETSAVKSICNEVSDVESVDTSVLNTESADVV
EKTVRIEGDGANDRDDGDSWEEPEEAIKGVSDNTQSFISDGPGSYRSLSGKPEDTGSGTGSLSRLAGLGRAARRQLTEVLNEFWGQFFDYHGMATP
EAKSKKLDIILGLDSKLSPKPAPASLKAESSAYIPSGTARVPEPLINSNMYSPKQQFASGILDAGSRVPKEPSSTSSLWSSSQMKLFDAYMQNSKSNIL
DSGERRYSSMRIPAASAGYDHQPATVHGYQITAYLNQLAKERGSDYLNGQLESPSPRSVSSLTSNYAEPVARAVGQKPQSGVSSRAPPGFGNVPAA
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RLQGIIDLAFSKPRTPTSHCFCLQIPVGRQPKSSPPPISNGSLPPQSKQGRGKCTTAALLLDMIKDVETAISCRKGRTGTAAGDVAFPKGKENLASVLK
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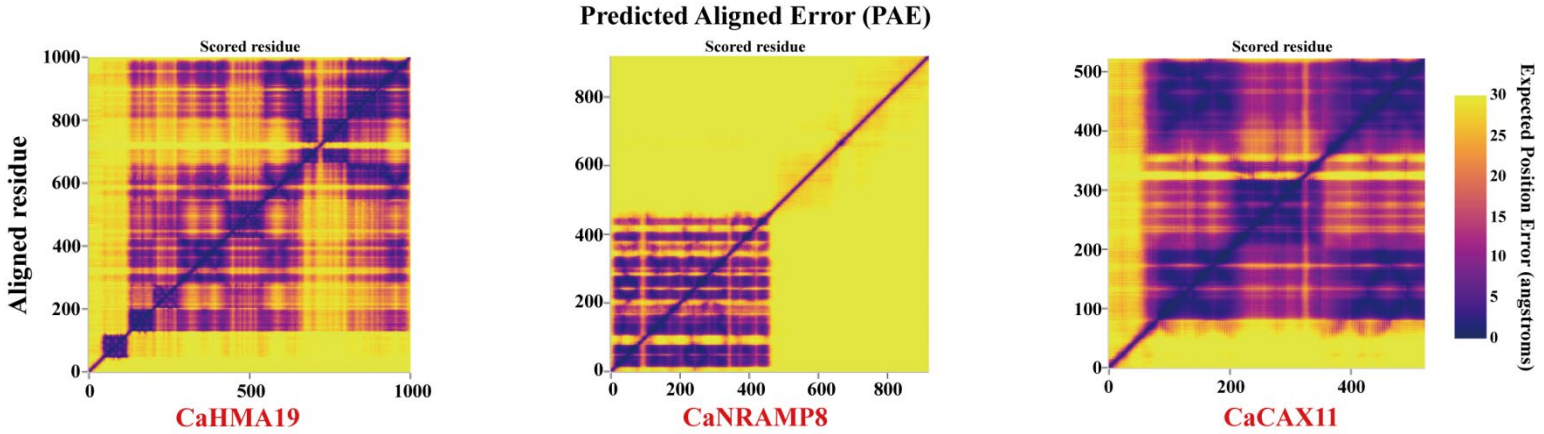
>Capana09g000882 (CAX11)

MACPYRSRLLVFTSGCVMPPLHALIANPYCFGVPEWPKTRSKNSKTRSNGRRFDPGIITVAESGFEAFWFGILVHLISGISGSTAAAQSQVSVGMGLL
AGSTVMLITVIWGTCCIVGKCDIQDSVAVDLKDTKGFSLTGSGVSTDVWTRYAATIMAVSVTPFVVVQLPQLLHSTSGRHLAVLIALIISLTLLVSYC
LYQVFQPWIQRRRLAYVKHKHFISGVLKHLRMRALGRLCTDQGAPNIEVLEKLFKAIDENEDGYLSRSELRALVVGLRLEEVNLNENDAVEKLMK
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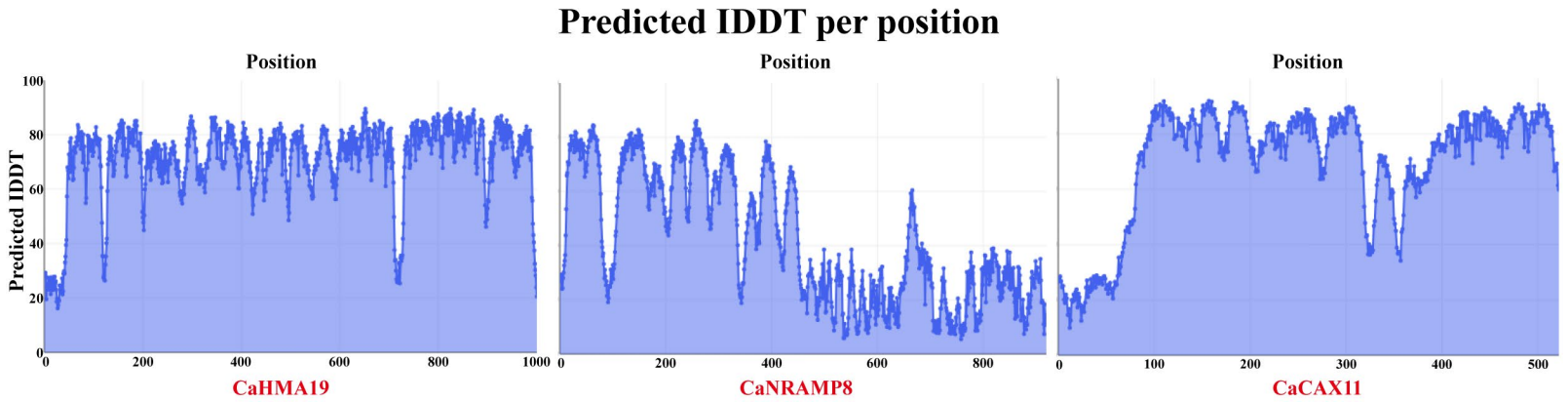
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ASVRITFPLWTSLLAFLLYPFSLALVYVLDYKFGWS

3. Evaluation indexes for predicting protein structures and confidence evaluation of structural models



FigureS1 Evaluation indexes for predicting protein structures of structural models.



FigureS2 Evaluation indexes for predicting protein structures of structural models.