

**Online Supporting Information S1.** This benchmark dataset  $\mathcal{S}$  includes 1,055 plant protein sequences (978 different proteins), classified into 12 plant subcellular locations. Among the 978 different proteins, 904 belong to one subcellular location, 71 to two locations, and 3 to three locations. Both the accession numbers and sequences are given. None of the proteins has  $\geq 25\%$  sequence identity to any other in the same subset (subcellular location). See the text of the paper for further explanation.

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(1)  $\mathcal{S}_1$ : 56 cell membrane proteins

>P25848

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>Q38890

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>P52418

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>Q5NE24

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>Q8LDP4

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>O80458

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FAFSTENWGRDKIEIDNLMSLIQHYNKSNIKFFHRSEVRVSVIGNKTKIPESLLKEIHE  
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CRV

>P92939

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LILIVNAIVGIWQETNAEKALEALKEIQSQQATVMRDGTVSSLPKELVPGDIVE LRVG  
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NCICLVTD TGMNTEIGRVHSQIQEAAQHEEDT PLKKKLNEFGEVLTMIIGLICALVW LIN  
VKYFLSWEYVDGWPRNFKFSFEKCTYYFEIAVALAVAAIPEGLPAVITTTCLALGTRKMAQ  
KNALVRKLP SVETLGCTTVICSDKTGTLTTNQMAVSKLVAMGSRIGTLRSFNVEGTSFDP  
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EAI CREIGVFEADEDISSRSLTGIEFMDVQDQKNHLRQTGGLLFSRAEPKHKQEIVRLLK  
EDGEVVAMTGDGVNDAPALKLADIGVAMGISGTEVAKEASDMVLADDNFSTIVA AVGEGR  
SIYNNMKAFIRYMISSNIGEVASIFLTAALGIP EGMIPVQLLWVNLVTDGPPATALGFNP  
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SLVSYSQLAHWGQCSSWEGFKVSPFTAGSQTFSFDSNPCDYFQQGKIKASTLSLSVLVAI  
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>Q94CC0

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>Q8L586

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## (6) $S_6$ : 22 extracellular proteins

>Q40966

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YPTIKDDMHYLKTVIKMYITQKQNVSAILSKATI QPNGNNRSLVDIENAIRSGNNNTKPK  
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>P00693

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GWWPAKAATFVDNHDTGSTQAMWPFPSDKVMQGYAYILTHPGIPCIFYD HFFNWGFKDQI  
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>Q9T0N8

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AVEPAPARARWVRFVYTDFAAFSADQERLTAPRPGGGGASFGPMSYVEGSVFNQSLATD  
LANTGFFTDADVARIVALAGERNATTVYSIEATLNYDNATAAAA AVDQELASVLGTL SYV  
EGFAFQRDVAYAAFLDRVHGEEVALNKLGLWRVPHWLNMFVPRSRIADFD RGVFKGILQ  
GTDIVGPLIVYPLNKSMWDDGMSAATPSEDV FYAVSLLFSSVAPNDLARLQEQRRI LRF  
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>Q40161

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SECERAPSAGETKRCVNSAEDMIDFATSVLGRNVVVRTTEDTKGSNGNIMIGSVKGINGG  
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>P28493

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>P33154

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>P93164

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GWA VSGPYLDTLGNIFKKALERN DAGDHPVIAFN LGGNLVIRIVSEQTDILEPFTASSL  
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ATSGDRD GKT FVSTARGRKY PVTVNLWQPEKNAFEWATSLKAPHTEDAIRVTQSTANFFI  
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>P80691

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KTNR

>Q05091

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>P33432

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>Q9S7Y7

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>Q8GW72

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>Q38716

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>P93349

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>Q94EG3

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>Q9FXE5

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>P81131

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TRFAALPTLTQEPGRPSNRNTSTLYCFTLQVVAPLNPNGLCGNTTLLKAEWLNNDIPTQ  
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>P42820

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>P19172

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SV

>P05117

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>Q9M099

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>P52399

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### (7) $S_7$ : 21 Golgi apparatus proteins

>Q9M2Y6

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>Q9SA77

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>Q9SWH4

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>Q8W486

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VDPSEELSATSQGLIGSAVDYMVCLLSDIFMPTYDGP SNFANLLGHRLYYGFRTTIRPD  
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>Q941R4

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>P46269

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>P23472

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>P15478

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