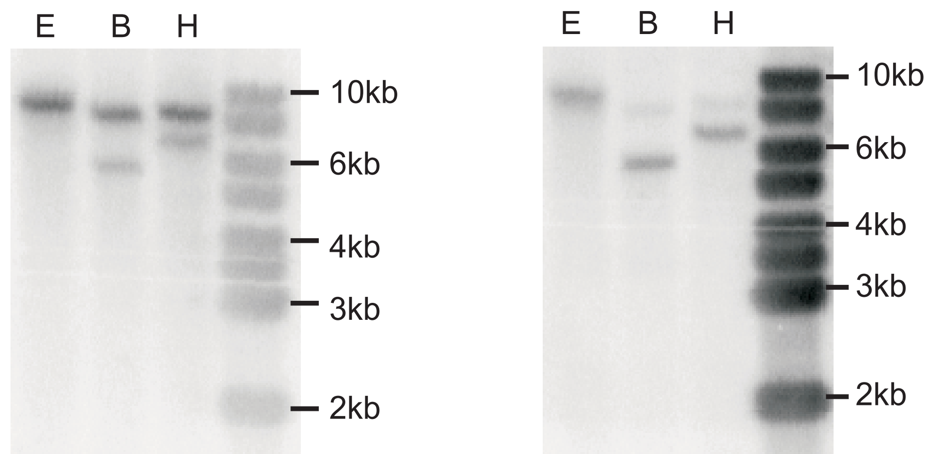
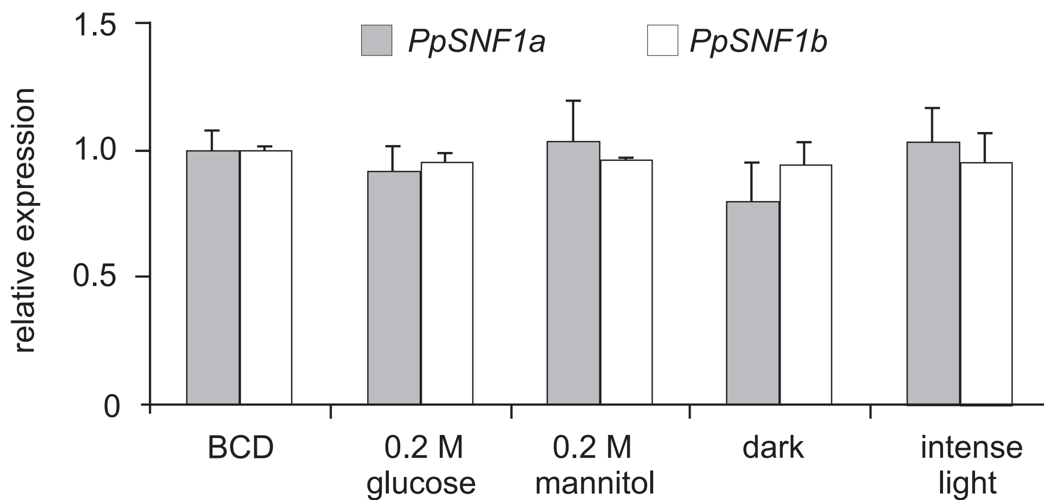


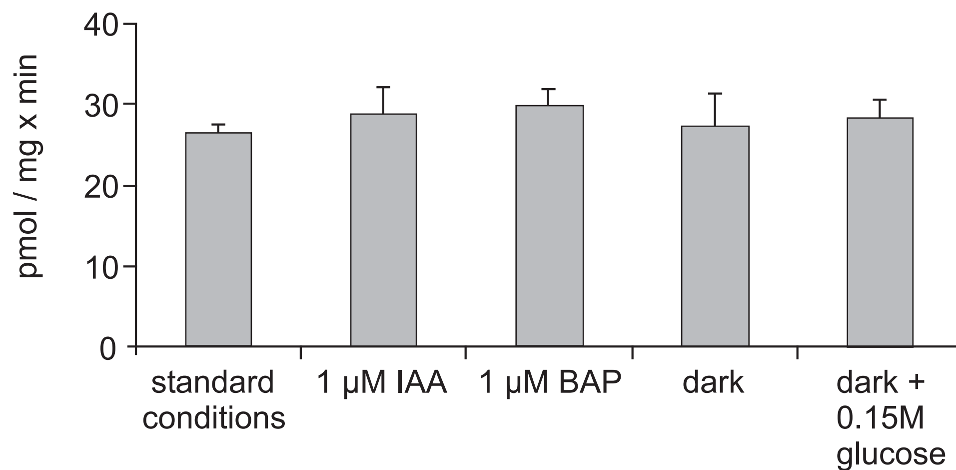
Supplementary Figure 1. Low stringency Southern blots. Genomic *Physcomitrella* DNA was digested with either *Eco*RI (E), *Bgl*II (B) or *Hin*dIII (H), none of which cut within the probes, blotted to nylon filters and hybridized to *PpSNF1a* (left) or *PpSNF1b* (right) specific probes. In each case, the most strongly hybridizing bands correspond to the gene from which the probe was derived, and the weaker band to the other gene.

```
Rape\BSK1                    ------------------------------------------------------------------------------MEKYELVKDIGAGNFGV 17
Arabidopsis\ASK1             ------------------------------------------------------------------------------MDKYELVKDIGAGNFGV 17
Iceplant\MCPK9               ------------------------------------------------------------------------------MELYEIVKDIGSGNFGQ 17
Wheat\TaPK4                  ------------------------------------------------------------------------------MDNYTGIP--GSD---- 11
S.cerevisiae\SNF1            -------------------------------MSSNNNTNTAPANANSSHHHHHHHHHHHHHGHGGSNSTLNNPKSSLADGAHIGNYQIVKTLGEGSFGK 68
S.pombe\SNF1                 -------------------------------MQPQE----VDLMENSTMR---------------NGARVLPPEAISK-RHIGPYIIRETLGEGSFGK 47
P.patens\PpSNF1a             ----------------------------------------------------------------MEAGGRPMGPATAEYYLPNYKLGKTLGIGSFGK 33
P.patens\PpSNF1b             ----------------------------------------------------------------MDSGGRPVAPVAVEYYLPNYKMGKTLGIGSFGK 33
Tobacco\NPK5                 ----------------------------------------------------------------MD-GSTVQGGSSVESFLRNYKLGKTLGIGSFGK 32
Arabidopsis\AKIN10           ----------------------------------------------------------------MD-GSGTGSRSGVESILPNYKLGKTLGIGSFGR 32
Rye\RKIN1                    ----------------------------------------------------------------MDG---GGEHS---EALKNYYLGKILGVGTFAK 27
Barley\BKIN12                ----------------------------------------------------------------MDGNNRGGGHS---EVLKNYNLGKTLGLGTFGD 30
Human\AAD43027               --------------------------------------------------------------MATAEKQKHDGR-----VKIGHYILGDTLGVGTFGK 31
D.melanogaster\NP_477313     -------------------------------------------------------MPQMRAAAAEAVAAGSANGQPLVKIGHYLLGATLGTGTFGK 41
C.elegans\NP_510710          MFSHQDRDRDRKEDGGGDGTEMKSKSRSQPSGLNRVKNLSRKLSAKSRKERKDRDSTDNSSKMSSPGGETSTKQQQELKAQIKIGHYILKETLGVGTFGK 100
Arabidopsis\AtPK4            --------------------------------------------------------------------------MVIKGMRVGKYELGRTLGEGNSAK 24
Wheat\WPK4                   ----------------------------------------MSAIKPPPPDRPPQAARLPSPSSSSSAAAAAKQGGTGSRGLLMGRYELGRVLGKGTFAK 59
                                                                                                          :  *      * .

Rape\BSK1                    ARLMKVDKSKELVAMKYIER----GPKIDENVAREIYNHRSLR---HPNIIRFKE-----VVLTPTHLAIAMEYAAGGELFER---------------- 88
Arabidopsis\ASK1             ARLMKVKNSKELVAMKYIER----GPKIDENVAREIINHRSLR---HPNIIRFKE-----VVLTPTHLAIAMEYAAGGELFER---------------- 88
Iceplant\MCPK9               AKLVRDKWTNEFVAVKFIER----GSKDDEHVQRKLMNHSSLK---HPNIIRFKE-----VLLTPTHLAIVMEYAAGGELFER---------------- 88
Wheat\TaPK4                  --VLRSRADSQLVAVTYIPR----GEQVDEAVRREILRHRSLR---HPSVVRLRE-----LVLTPTHLAVVSEHAP--DLHRR---------------- 78
S.cerevisiae\SNF1            VKLAYHTTTGQKVALKIINKKVLAKSDMQGRIEREISYLRLLR---HPHIIKLYD-----VIKSKDEIIMVIEYAG-NELFDY---------------- 142
S.pombe\SNF1                 VKLATHYKTQQKVALKFISRQLLKKSDMHMRVEREISYLKLLR---HPHIIKLYD-----VITTPTDIVMVIEYAG-GELFDY---------------- 121
P.patens\PpSNF1a             VKVAEHSPTGHKVAIKILNRRKVKMMDMEEKVRREIKILRLFM---HPHIIRLYE-----VIETPADIFVVMEYVKSGELFDY---------------- 108
P.patens\PpSNF1b             VKVAEHTPTGHKVAIKILNRRKVKSMDMEEKVRREIKILRLFM---HPHIIRLYE-----VIETPTDIFVVMEYVKSGELFDY---------------- 108
Tobacco\NPK5                 VKIAEHTLTGHKVAVKILNRRKIKNMEMEEKVRREIKILRLFM---HPHIIRLYE-----VVETPSDIYVVMEYVKSGELFDY---------------- 107
Arabidopsis\AKIN10           VKIAEHALTGHKVAIKILNRRKIKNMEMEEKVRREIKILRLFM---HPHIIRLYE-----VIETPTDIYLVMEYVNSGELFDY---------------- 107
Rye\RKIN1                    VIIAEHKHTRHKVAIKVLNRRQMRAPEMEEKAKREIKILRLFIDLIHPHIIRVYE-----VIVTPKDIFVVMEYCQNGDLLDY---------------- 105
Barley\BKIN12                VKVAEHKLTGQRVAIKILNRRKMETMEMEEKANREIKIMRLFIDFIHPHIIRVYQ-----VIETPKDIFIVMEYCNNGELLDY---------------- 108
Human\AAD43027               VKVGKHELTGHKVAVKILNRQKIRSLDVVGKIRREIQNLKLFR---HPHIIKLYQ-----VISTPSDIFMVMEYVSGGELFDY---------------- 106
D.melanogaster\NP_477313     VKIGEHQITRVKVAVKILNRQKIKSLDVVGKIRREIQNLKLFR---HPHIIKLYQ-----VISTPSDIFMIMEYVSGGELFDY---------------- 116
C.elegans\NP_510710          VKVGIHETTQYKVAVKILNRQKIKSLDVVGKIRREIQNLSLFR---HPHIIRLYQ-----VISTPSDIFMIMEHVSGGELFDY---------------- 175
Arabidopsis\AtPK4            VKFAIDTLTGESFAIKIIEKSCITRLNVSFQIKREIRTLKVLK---HPNIVRLHEVIILLVLASKTKIYMVLECVTGGDLFDRIVRFLLAPVTVLLVSKR 121
Wheat\WPK4                   VYHARHVQTGESVAIKVLDREKAVRSGLVSHIKREIAVLRRVR---HPNIVHLFE-----VMATKTKIYFVMELV---------------VAALLR--- 132
                                    .*:. : :                  *::      .     ** :::. :      :: :   .: .  *

Rape\BSK1                    ICGAGRFSEDEARYFFQQLISGVSYCHAMQICHRDLKLENTLLDGSPA--PRLKICDFGYSKSSL---LHSRPKSTVGTPAYIAPEVLSRREYDGKMADV 183
Arabidopsis\ASK1             ICSAGRFSEDEARYFFQQLISGVSYCHAMQICHRDLKLENTLLDGSPA--PRLKICDFGYSKSSL---LHSRPKSTVGTPAYIAPEVLSRREYDGKMADV 183
Iceplant\MCPK9               ICNAGRFREDEARFFFQQLISGVSYCHSMQICHRDLKLENTLLDGSPA--PRVKICDFGYSKSSV---LHSQPKSAVGTPAYIAPEVLSKREYDGKIADV 183
Wheat\TaPK4                  VRDAGRFSEDEARLLFRQLVSGVSYCHSMQVCHRDLKLENILLDGSCAGPPRLKICGPGVSKRQS---QPGAPRASDQTRVYIAPEVFQQREYDGKIADV 175
S.cerevisiae\SNF1            IVQRDKMSEQEARRFFQQIISAVEYCHRHKIVHRDLKPENLLLDEHLN----VKIADFGLSNIMT---DGNFLKTSCGSPNYAAPEVISGKLYAGPEVDV 235
S.pombe\SNF1                 IVEKKRMTEDEGRRFFQQIICAIEYCHRHKIVHRDLKPENLLLDDNLN----VKIADFGLSNIMT---DGNFLKTSCGSPNYAAPEVINGKLYAGPEVDV 214
P.patens\PpSNF1a             IVEKGRLGEHEARRFFQQIVSGVEYCHRNMVVHRDLKPENLLLDSKSN----VKIADFGLSNVMR---DGHFLKTSCGSPNYAAPEVISGKLYAGPEVDV 201
P.patens\PpSNF1b             IVEKQRLGEDEARRFFQQIVSGVEYCHRNMVVHRDLKPENLLLDSKWN----VKIADFGLSNIMR---DGHFLKTSCGSPNYAAPEVISGKLYAGPEVDV 201
Tobacco\NPK5                 IVEKGRLQEDEARKFFQQIISGVEYCHRNMVVHRDLKPENLLLDSKWN----VKIADFGLSNIMR---DGHFLKTSCGSPNYAAPEVISGKLYAGPEVDV 200
Arabidopsis\AKIN10           IVEKGRLQEDEARNFFQQIISGVEYCHRNMVVHRDLKPENLLLDSKCN----VKIADFGLSNIMR---DGHFLKTSCGSPNYAAPEVISGKLYAGPEVDV 200
Rye\RKIN1                    ILEKRRLQEDEARRTFQQIISAVEYCHRNKVVHRDLKPENLLLDSKYN----VKLADFGLSNVMH---DGHFLKTSCGSLNYAAPEVISGKLYAGPEIDV 198
Barley\BKIN12                IIENGRLQEDEARRIFQQILAGVEYCHRIMVVHRDLKPENLLLDSKYN----VKLADFGLSNVMR---DGHFLKTSCGSLNYAAPEIISSKLYAGPEVDV 201
Human\AAD43027               ICKNGRLDEKESRRLFQQILSGVDYCHRHMVVHRDLKPENVLLDAHMN----AKIADFGLSNMMS---DGEFLRTSCGSPNYAAPEVISGRLYAGPEVDI 199
D.melanogaster\NP_477313     IVKHGKLQEHQARRFFQQIISGVDYCHRHMIVHRDLKPENLLLDHNMH----VKIADFGLSNMML---DGEFLRTSCGSPNYAAPEVISGKLYAGPEVDI 209
C.elegans\NP_510710          IVKHGRLKTAEARRFFQQIISGVDYCHRHMVVHRDLKPENLLLDEQNN----VKIADFGLSNIMT---DGDFLRTSCGSPNYAAPEVISGKLYAGPEVDV 268
Arabidopsis\AtPK4            LVSKGKLSETQGRKMFQQLIDGVSYCHNKGVFHRDLKLENVLLDAKGH----IKITDFGLSALSQHYREDGLLHTTCGSPNYVAPEVLANEGYDGAASDI 217
Wheat\WPK4                   -FSKGRLKEDIARRYFQHLISAVGFCHTRGVFHRDLKPENLLVDEAGN----LKVSDFGLSAVAEPFQPEGLLHTFCGTRAYVAPEVLARRGYEGAKADI 227
                                 ::    .*  *:::: .: :**   : ***** ** *:*          *: . * *                ::   :  * ***::  . * *   *:

Rape\BSK1                    WSCGVTLYVMLVGAYPFEDQED-PKNFRKTIQKIMAVQYKIPDYVHISQDCKHLLSRIFVANSLKRITIAE----------------IKKHPWFTKN-- 263
Arabidopsis\ASK1             WSCGVTLYVMLVGAYPFEDQED-PKNFRKTIQKIMAVQYKIPDYVHISQDCKNLLSRIFVANSLKRITIAE----------------IKKHSWFLKN-- 263
Iceplant\MCPK9               WSCGVTLYVMLFGAYPFEDPDD-PKNFRKSLVRILSVQYCIPDNIPISMECRHLLSRIFVANPEKRITIPE----------------IKNHPWFQKN-- 263
Wheat\TaPK4                  WSCGMTLYAMLVGAYPFQCPDDEPINFRKIIQRIQSVEYSVPDDLHISAECRDLISKIFVADPAARITVPE----------------IRNHPWFLMN-- 256
S.cerevisiae\SNF1            WSCGVILYVMLCRRLPFD-----DESIPVLFKNISNGVYTLPK--FLSPGAAGLIKRMLIVNPLNRISIHE----------------IMQDDWFKVD-- 309
S.pombe\SNF1                 WSCGIVLYVMLVGRLPFD-----DEFIPNLFKKVNSCVYVMPD--FLSPGAQSLIRRMIVADPMQRITIQE----------------IRRDPWFNVN-- 288
P.patens\PpSNF1a             WSCGVILYALLCGSLPFD-----DENIPNLFKKIKGGIYTLPS--HLSPGARDLIPRMLLVDPMKRVTIPE----------------IRQHPWFLNH-- 275
P.patens\PpSNF1b             WSCGVILYALLCGSLPFD-----DENIPNLFRKIKGGIYTLPS--HLSPGARDLIPRMLLVDPMKRVTIPE----------------IRQHPWFLNH-- 275
Tobacco\NPK5                 WSCGVILYALLCGTLPFD-----DENIPNLFKKIKGGMISLPS--HLSAGARDLIPRMLIVDPMKRMTIPE----------------IRMHPWFQAH-- 274
Arabidopsis\AKIN10           WSCGVILYALLCGTLPFD-----DENIPNLFKKIKGGIYTLPS--HLSPGARDLIPRMLVVDPMKRVTIPE----------------IRQHPWFQAH-- 274
Rye\RKIN1                    WSCGVILYALLCGAVPFD-----DDNIPNLFKKIKGGTYILPI--YLSDLVRDLISRMLIVDPMKRITIGE----------------IRKHSWFQNR-- 272
Barley\BKIN12                WSCGVILYALLCGSVPFD-----DDNIPSLFRKIKGGTYILPS--YLSDSARDLIPKLLNIDPMKRITIHE----------------IRVHPWFKNH-- 275
Human\AAD43027               WSSGVILYALLCGTLPFD-----DDHVPTLFKKICDGIFYTPQ--YLNPSVISLLKHMLQVDPMKRATIKD----------------IREHEWFKQD-- 273
D.melanogaster\NP_477313     WSCGVILYALLCGTLPFD-----DEHVPTLFRKIKSGIFPIPE--YLNKQVVNLVCQMLQVDPLKRANIEE----------------IKKHEWFQKD-- 283
C.elegans\NP_510710          WSCGVILYALLCGTLPFD-----DEHVPSLFRKIKSGVFPTPD--FLERPIVNLLHHMLCVDPMKRATIKD----------------VIAHEWFQKD-- 342
Arabidopsis\AtPK4            WSCGVILYVILTGCLPFD-----DANLAVICRKIFKGDPPIPR--WISLGAKTMIKRMLDPNPVTRVTIAG----------------IKAHDWF----- 288
Wheat\WPK4                   WSCGVILFVLMAGYLPFH-----DQNLMAMYRKFTR-ESSMSR--WFSKDLTSLIMRFLDTNPSTRITLPESWRAGGSRKVSGQSSSILKTNQLYNVIDA 319
                             **.*: *:.::    **.      .      ..       .    :.    :: :::  :.  * .:                 :  .  :

Rape\BSK1                    --------LPRELTETAQAAYFKKENPTFSAQ-------TAEEIMKIVDDAKTP---------------------------------------------- 302
Arabidopsis\ASK1             --------LPRELTETAQAAYFKKENPTFSLQ-------TVEEIMKIVADAKTP---------------------------------------------- 302
Iceplant\MCPK9               --------LPMELME---GGSWQSHDINHPSQ-------NIGEILSIIQEARQP---------------------------------------------- 299
Wheat\TaPK4                  --------LPADDST------MSTEEAEQPVQ-------SMDEIMQILALAEAP---------------------------------------------- 289
S.cerevisiae\SNF1            --------LPEYLLPPDLKPHPEEENENNDSKKDGSSPDNDEIDDNLVNILSS--TMGYEKDEIYESLESSEDTPAFNEIRDAYMLIKENKSLIKDMKAN 399
S.pombe\SNF1                 --------LPDYLR-----PMEEVQGSYADSR--------------IVSKLGE--AMGFSEDYIVEALRSDEN----NEVKEAYNLLHEN--QVIQEKSH 353
P.patens\PpSNF1a             --------LPRYLAVP--PPDTTQQAKRIDEE--------------ILERVVA---LNFDRDLLIDSLLNR-VQ---NKATVAYYLMLDN----RRRLSN 340
P.patens\PpSNF1b             --------LPRYLAVP--PPDTLQQAKRIDEE--------------ILERVVA---LNFDRVHLIESLLNR-VQ---NKATVAYYLMLDN----RRRLSN 340
Tobacco\NPK5                 --------LPRYLAVP--PPDTMQQAKKIDED--------------ILQEVVK---RGFDRNSLVASLCNR-VQ---NEGTVAYYLLLEN----QFRASS 339
Arabidopsis\AKIN10           --------LPRYLAVP--PPDTVQQAKKIDEE--------------ILQEVIN---MGFDRNHLIESLRNR-TQ---NDGTVTYYLILDN----RFRASS 339
Rye\RKIN1                    --------LPRYLAVP--PPDMMQQAKMIDED--------------TLRDVVK---LGYDKDHVCESLCNR-LQ---NEETVAYYLLLDN----RFRATS 337
Barley\BKIN12                --------LPCYLAVP--PPYKAPKAKMIDED--------------ILRDVVN---LGYDKDHVCESLWNR-LQ---NEETVAYYLLLDN----RFRSTS 340
Human\AAD43027               --------LPKYLFP----EDPSYSSTMIDDE--------------ALKEVCE--KFECSEEEVLSCLYNRNHQ---DPLAVAYHLIIDNR---RIMNEA 339
D.melanogaster\NP_477313     --------LPAYLFP----SSIEQDSNVIDTY--------------AVAEVCT--KFGVKETEVHNSLLSGDPH---DQLAIAYHLIIDNK---RFADDA 349
C.elegans\NP_510710          --------LPNYLFP----PINESEASIVDIE--------------AVREVTEFQRYHVAEEEVTSALLGDDPH---HHLSIAYNLIVDNK---RIADET 410
Arabidopsis\AtPK4            -------------------KHDYTPSNYDDD-------------DDVYLIQEDVF---MMKEYEEEKSPD---------------------------- 323
Wheat\WPK4                   ENDMLDLGLPDPLPQPLPPPPPSPSPQQVDGD-------------DSGSESDASVVSCPATSSFEERHRLRGPL-------------------------- 380

Rape\BSK1                    ----------------------------------------------------------------------PPVSRSIGGFGWGGEGDLEGKEE------ 325
Arabidopsis\ASK1             ----------------------------------------------------------------------PPVSRSIGGFGWGGNGDADGKEED----- 326
Iceplant\MCPK9               ----------------------------------------------------------------------AELP-STGGLQIGGTLDFD---------- 317
Wheat\TaPK4                  ----------------------------------------------------------------------GDTG-------------------------- 293
S.cerevisiae\SNF1            KSVSDELDTFLSQSPPTFQQQSKSHQKSQVDHE-----TAKQHARRMASAITQQRTYHQSPFMDQYKEEDSTVSILPTSLPQIHRANMLAQGSPAASKIS 494
S.pombe\SNF1                 LSKSKRVDSFLSVSPPAFSEYTSELQK-KSKQE-----LIDPTLEGPRWTVSDPPTYAKQ------TIDSNICVLVPTAEKNKLEMRTLADAASAVDTSQ 441
P.patens\PpSNF1a             GYLCSEFNEGKEHLMSPMD-----------------------------------------------AFNGTPRSGYPRTLTHMSSMDRRSASP----SG 388
P.patens\PpSNF1b             GYLGSEFDEGKEQSLSPMSP-------------------------------------------YGAHGGTPRSTYPRSLIRTPSMDRRGSSS----SV 391
Tobacco\NPK5                 GYMGAEFQETMEYGYHQIN---------------------------------------------------SSEVLLPCWQHLPGIMDFQQ-------VG 380
Arabidopsis\AKIN10           GYLGAEFQETMEGTPRMHP---------------------------------------------------AESVASPVSHRLPGLMEYQG-------VG 380
Rye\RKIN1                    GYLGAHYQQPM------------------------------------------------------------ESASPSTRSYLPGSNDSQG-------SG 369
Barley\BKIN12                GYLGADHQHLMDRSFNEFT---------------------------------------------------LSESASPSTRNYLPGINDSQG-------GG 382
Human\AAD43027               K-------DFYLATSPP--------DSFLDDHH---------------------------------LTRPHPERVPFLVAETP--RARHTLDELNPQKSK 389
D.melanogaster\NP_477313     ANQINEINNFFVAGSPPPPPPPPVPQSSMDHQAPLATVTVGGGTSASSGTATPVPPVAGGTPSSTIPIRPHPERIAPMRDRQLAMSVQTSGGGAFPEKTA 449
C.elegans\NP_510710          AKLS--IEEFYQVTPNKGPG----------------------------------------------PVHRHPERIAASVSSKITPTLDNTEASGANRN-- 460
Arabidopsis\AtPK4            ----------------------------------------------------------------------SPTIINAFQLIGMSSFLDLSGFFET----- 348
Wheat\WPK4                   ---------------------------------------------------------------------PRPASLNAFDIISFSRGFNLSGLFE------ 405

Rape\BSK1                    ---EEVDEEE--VEEEEDEEDEYDKTVKEVHASGEVRIS------------------------------------------------------------- 359
Arabidopsis\ASK1             --AEDVEEEEEEVEEEEDDEDEYDKTVKEVHASGEVRIS------------------------------------------------------------- 363
Iceplant\MCPK9               --------------DLDVDLDVDVDLDDIESSGEFVCPM------------------------------------------------------------- 342
Wheat\TaPK4                  --------------DDMEEFVDSDPCIDITTC-------------------------------------------------------------------- 311
S.cerevisiae\SNF1            PLVTKKSKTRWHFGIRSR-SYPLDVMGEIYIALKNLGAEWAKPS------EEDLWTIKLRWKYDIGNKTNTNEKI-------------------PDLMK 567
S.pombe\SNF1                 STRKKSRRNKWHFGVRCR-GDAPEILLAVYRALQRAGAQFTVPKPVNGKYRSDMYTIKSRWEIPHCKREGKNT-----------------------YAY 516
P.patens\PpSNF1a             LQHRVVAERKWVLGLQLR-SHPKEIMNDVLKTLRDLGINWKKTG---------AYNLKCRWVAPGQNSNDTTAENHSLPDSPMAGSMPRASSCRWSSEQH 478
P.patens\PpSNF1b             LQHRVVAERKWALGVQLR-SHPKEIMSDVLDTLRKCDINWKKTG---------AYNLKCRWVAPNQHLNDRASEHRGIPDSPMAGTTPRVSSGRWSSEQQ 481
Tobacco\NPK5                 AR-QFVVERKWALGLQSR-AHPREIMTEVLKALQGLNVRWKKIG---------PYNMKCQWVPGVPGHHEGMSNN-------------------SIHIQ 449
Arabidopsis\AKIN10           LRSQYFVERKWALGLQSR-AHPREIMTEVLKALQDLNVCWKKIG---------HYNMKCRWVPNSS--ADGMLSN-------------------SMHDN 448
Rye\RKIN1                    LRPYYFVERKWALGLQSPAPPRAIMIEVLKALKELNVCWKKNGD---------CYNMKCRWCPGFPRVSDMLLDA-----------------------NH 438
Barley\BKIN12                LRPYPFVQRKWAIGLQSG-AHPRDIMIEVLKALKELNVCWKKNG---------LYNMKCRWCPGFPQPVSAMLLDS----------------------NH 449
Human\AAD43027               HQG--VRKAKWHLGIRSQ-SRPNDIMAEVCRAIKQLDYEWKVVN---------PYYLRVRRK-NPVTSTYSKMSLQLY------------------QVDSR 459
D.melanogaster\NP_477313     RGGTPIKRAKWHLGIRSQ-SKPNDIMLEVYRAMKALSYEWKIIN---------PYHVRVRRQ-NVKTGKFSKMSLQLY-----------------QVDAK 521
C.elegans\NP_510710          ------KRAKWHLGIRSQ-SRPEDIMFEVFRAMKQLDMEWKVLN---------PYHVIVRRKPDAPAADPPKMSLQLY-----------------QVDQR 527
Arabidopsis\AtPK4            -----EKLSERQIRFTSN-SLAKDLLENIETIFTEMGFCLQKKH-------------AKLKAIKEESTQKRQCG-----------------------LS 405
Wheat\WPK4                   -----EKGDE--VRFISG-EPMPDIITKLEEIANVKSFACEEG----------------LAGDLEGTREGVKGP-----------------------LT 457

Rape\BSK1                    ---------------------------------------------------------------------------------------------------------
Arabidopsis\ASK1             ---------------------------------------------------------------------------------------------------------
Iceplant\MCPK9               ---------------------------------------------------------------------------------------------------------
Wheat\TaPK4                  ---------------------------------------------------------------------------------------------------------
S.cerevisiae\SNF1            MVIQLFQIETNNYLVDFK---------------------FDGWESSYGDDTTVSNISEDEMSTF---------------SAYPFLHLTTKLIMELAVNSQSN 633
S.pombe\SNF1                 IELQLYEVMPGCFMLDVK---------------------SNGYKDIYSHPERTADHGMDDLK-----------------SSFPFLDLCAMLVCKLFSA---- 576
P.patens\PpSNF1a             GVSGSVAAGNRDNESGVE---------------------SNVLKFELQLFKLREEKYLLDLQRVV-------------GPTYLFLDLCAAFLAELRVL---- 542
P.patens\PpSNF1b             GISGSVASGNKDDESGVE---------------------SNVLKFELQLFKMREEKYLLDLQRVE-------------GPTYLFLDLFSAFLIELRVA---- 545
Tobacco\NPK5                 -FFGDDSTVIE-NGGVTI---------------------PNAVKFEVQLYKTREDKYLLDLQRVQ-------------GPQFLFLDLCAAFLAQLRVL---- 511
Arabidopsis\AKIN10           NYFGDESSIIENEAAVKS---------------------PNVVKFEIQLYKTRDDKYLLDLQRVQ-------------GPQFLFLDLCAAFLAQLRVL---- 512
Rye\RKIN1                    SFVDDCAIKDNGDANSRL---------------------PAVIKFEIQLYKTRDDKYLLDMQRVT-------------GPQLLFLEFCAAFLTNLRVL---- 502
Barley\BKIN12                NFVDDSTIMDNGNADGRL---------------------PAVVKFEIQLYKTKDNKYLLDIQRVT-------------GPQLLFLEFCGAFFTNLRVL---- 513
Human\AAD43027               TYLLDFRSIDDEITEAKSGTATPQRSGSVSNYRSCQRSDSDAEAQGKSSEVSLTSSVTSLDSSPVDLTPRP--------GSHTIEFFEMCANLIKILAQ----- 550
D.melanogaster\NP_477313     SYLLDFKSLTNDEVEQGD---------------------DVIMESLTPPPLSVSGVMPLQPT-----------------GHHTMEFFEMCAALIIQLAR----- 582
C.elegans\NP_510710          SYLLDFKSLADEESGSASASSSRHASMSMPQKPAGIRGTRTSSMPQAMSMEASIEKMEVHDFSDMSCDVTPPPSPGGAKLSQTMQFFEICAALIGTLAR----- 626
Arabidopsis\AtPK4            VTAEVFEISPSLNVVELR---------------------KSHGDSSLYKQLYERLLN-----------------ELGSSSQVQELLA-------------- 454
Wheat\WPK4                   ICAEIFELTPSLVVVEVK---------------------KKAGDKEEYDDFCNKELKPGMQHLVHQMV-------PVPNTPTISELAETVQGNRRHRP--- 527
```

Supplementary Figure 2. Amino acid sequence alignment of yeast SNF1 related kinases from different species. The alignment was produced using the ClustalW software (http://www.ebi.ac.uk/clustalw) with default settings. "*" indicates that the residues in that column are identical in all sequences while ":" indicates conserved substitutions and "." semi-conserved substitutions.



Supplementary Figure 3. Expression of the *PpSNF1a* and *PpSNF1b* mRNAs under different conditions. Young protonemal tissue was exposed to various treatments for 24 hours, after which the cells were harvested and RNA was isolated. Relative expression levels are shown as the ratio between the transcript dependent RT-PCR product and an internal standard product (Siebert and Larrick, 1992). Untreated tissue grown under standard conditions (BCD) was assigned a value of 1. The error bars show standard deviations of three independent samples.



Supplementary Figure 4. Comparison of SAMS phosphorylating activities in extracts from wild type colonies subjected to different treatments. Tissue was pregrown on BCD media under standard conditions and was then exposed for 20 hours to different conditions as shown in the figure. The enzyme activity is expressed as pmol phosphate incorporated into SAMS peptide per minute and mg of protein. The numbers shown are averages ± standard deviations for three samples. For each sample, the activity without added peptide was subtracted from the activity with added peptide.