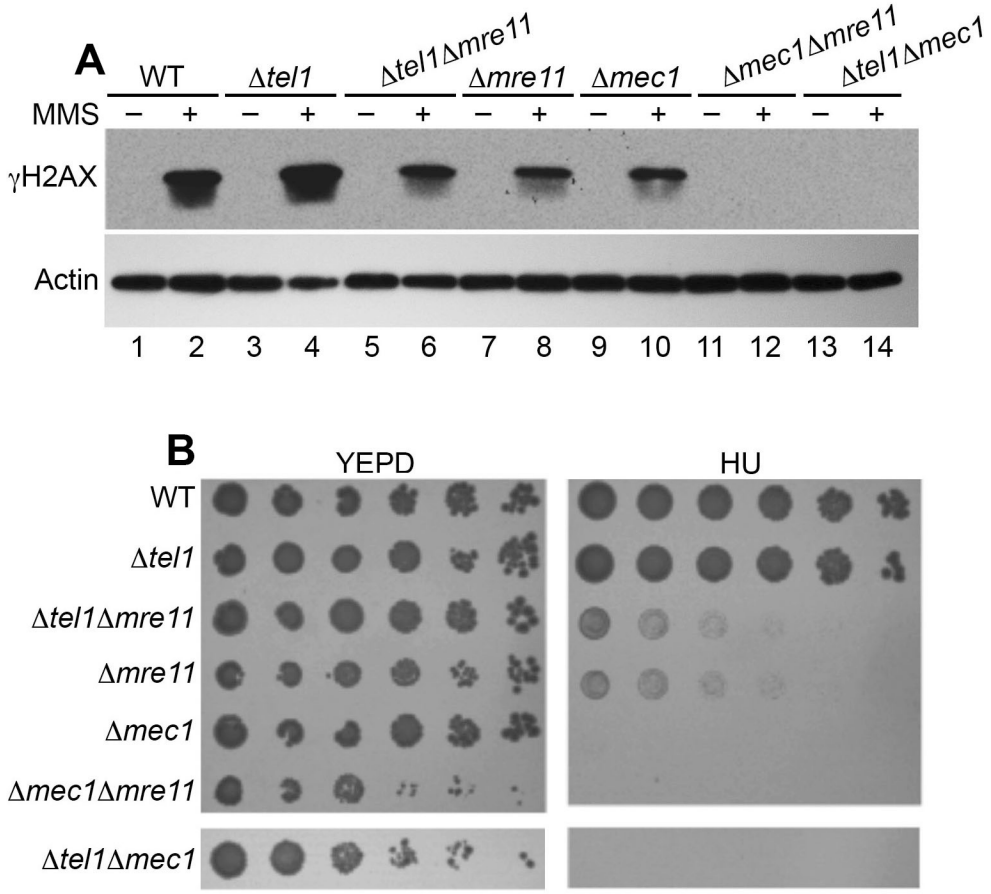
Regulation of Mec1 Kinase activity by SWI/SNF Chromatin Remodeling Complex

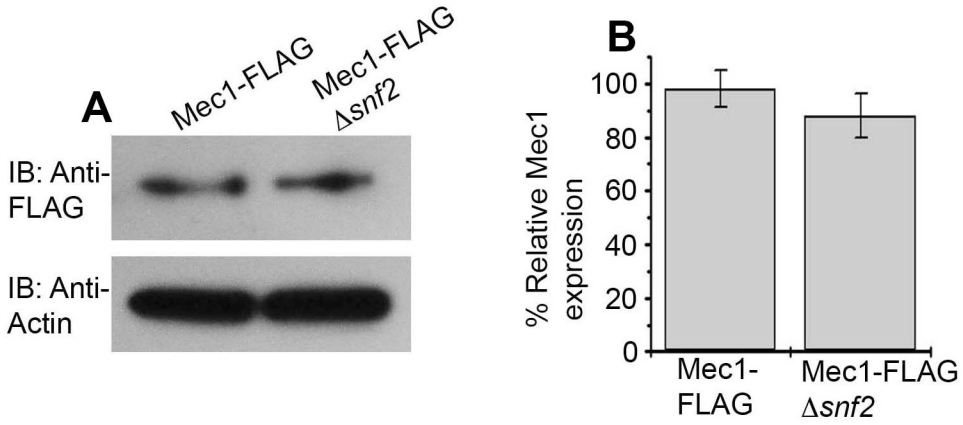
Supplemental Material

Supplemental Figure 1



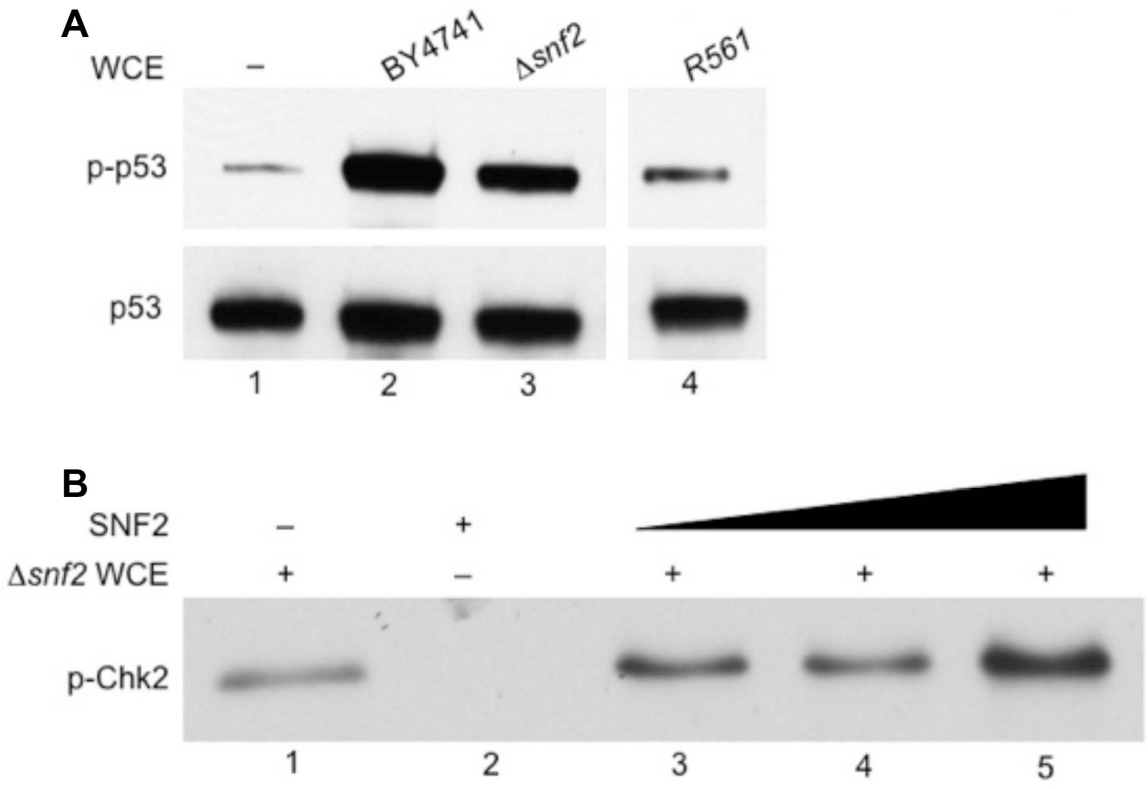
Supplemental Figure 1: Genetic screening of Mec1/Tel1 pathways. (**A**) Western blot analysis of γ-H2AX induction after MMS treatment in different mutants using whole-cell extracts (top panel). Actin was used as a loading control (bottom panel). (**B**) Serial dilutions (5-fold) of wild-type cells and the indicated mutants were tested for sensitivity to HU (50 mM). Plates were incubated at 30°C for 2 days and photographed.

Supplemental Figure 2



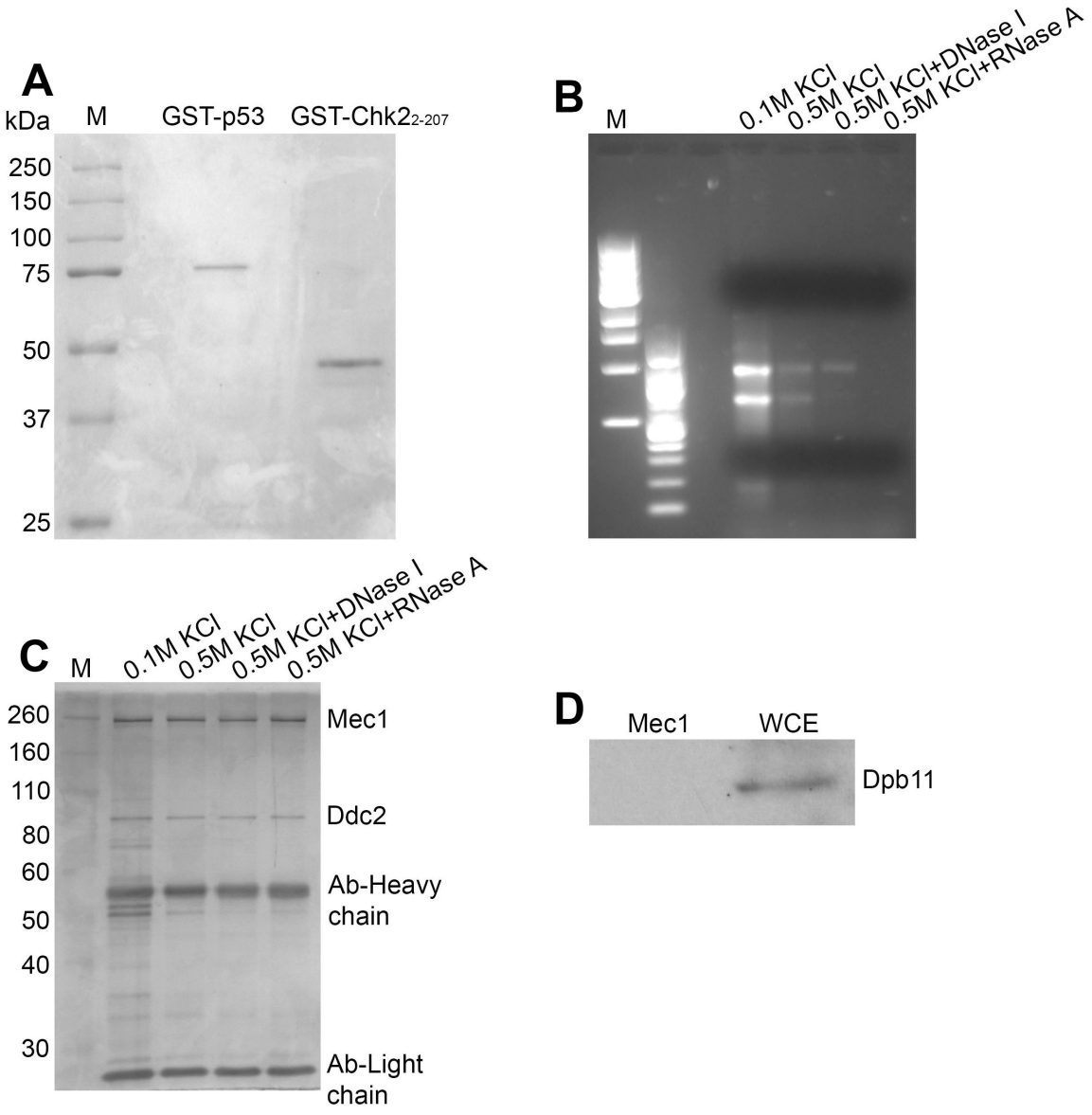
Supplemental Figure 2: Mec1 protein level was not substantially reduced in Δ*snf2*. (**A**) Western blot analysis of Mec1-FLAG in wild type (MEC1-FLAG) and mutant (Mec1-FLAG Δ*snf2*) strains using whole-cell extracts (top panel). Actin was used as a loading control (bottom panel). (**B**) Graph showing percentage relative expression of Mec1-FLAG in wild type (MEC1-FLAG) and mutant (Mec1-FLAG Δ*snf2*) strains as observed by protein levels using Western blot analysis in (**A**), results presented are the mean of five independent experiments ± S.D.

Supplemental Figure 3



Supplemental Figure 3: Cell-free extract to address Mec1/Tel1 activity. (**A**) Mec1/Tel1 Kinase Activity within whole cell extracts. In vitro Kinase assays contained ATP, GST-p53, and 5 μg whole cell extracts of different strains as indicated. The phosphorylated p53 was detected by Phospho-p53 (Ser15) antibody (top panel, over-exposed to reveal background level of signal). Western analysis of p53 used in the reactions (bottom panel). (**B**) Kinase assays contained 0.1 μg whole cell extract of Δ*snf2*, 100 nM GST-hChk2$_{2\text{-}107}$, and SWI/SNF complex as indicated. Concentrations of SWI/SNF are 5, 10, 20 nM in lanes 3 to 5, respectively.

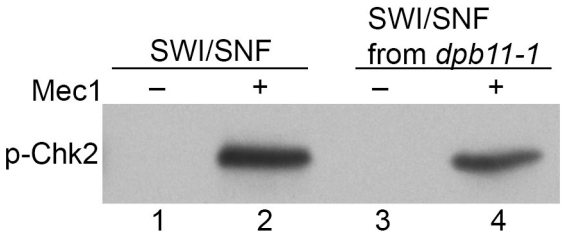
Supplemental Figure 4



Supplemental Figure 4: Purified components in Mec1 activation assay. (**A**) SDS PAGE analysis of purified GST-p53, GST-Chk2$_{2\text{-}207}$. Migration of molecular weight markers are indicated. Gel was stained with Coomassie blue. (**B, C**) Mec1-Lcd1 complexes were purified with low salt (0.1M KCl) buffer or high salt (0.5M KCl) buffer,

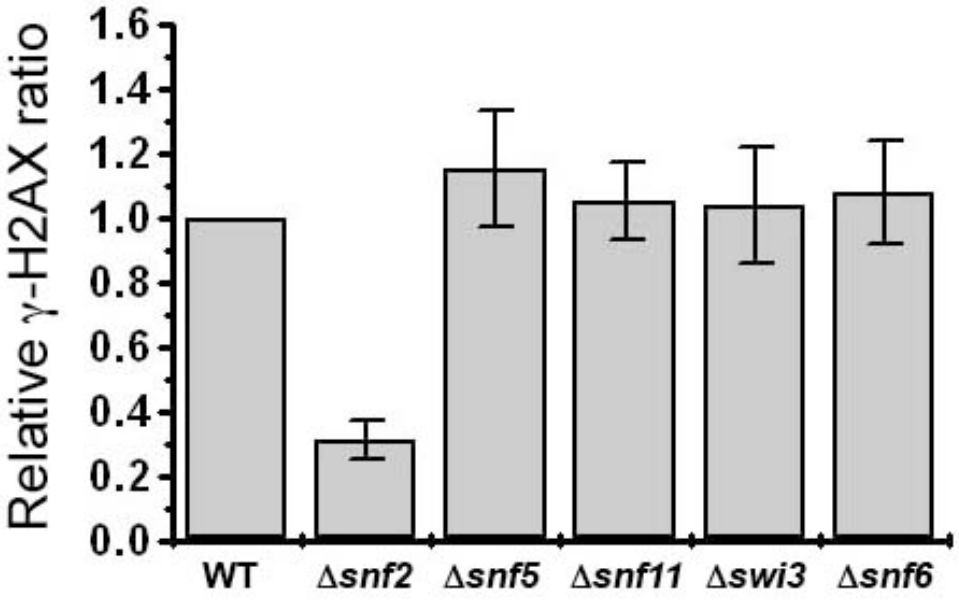
and were treated with DNase I or RNase A as indicated. Complexes were separated by 1% agarose gel and stained by Ethidium Bromide (**B**), or separated by 10% SDS PAGE gel followed by silver staining (**C**). (**D**) Western blot analysis of Dpb11, indicating there is no Dpb11 contamination in purified Mec1-Ddc2 complex.

Supplemental Figure 5



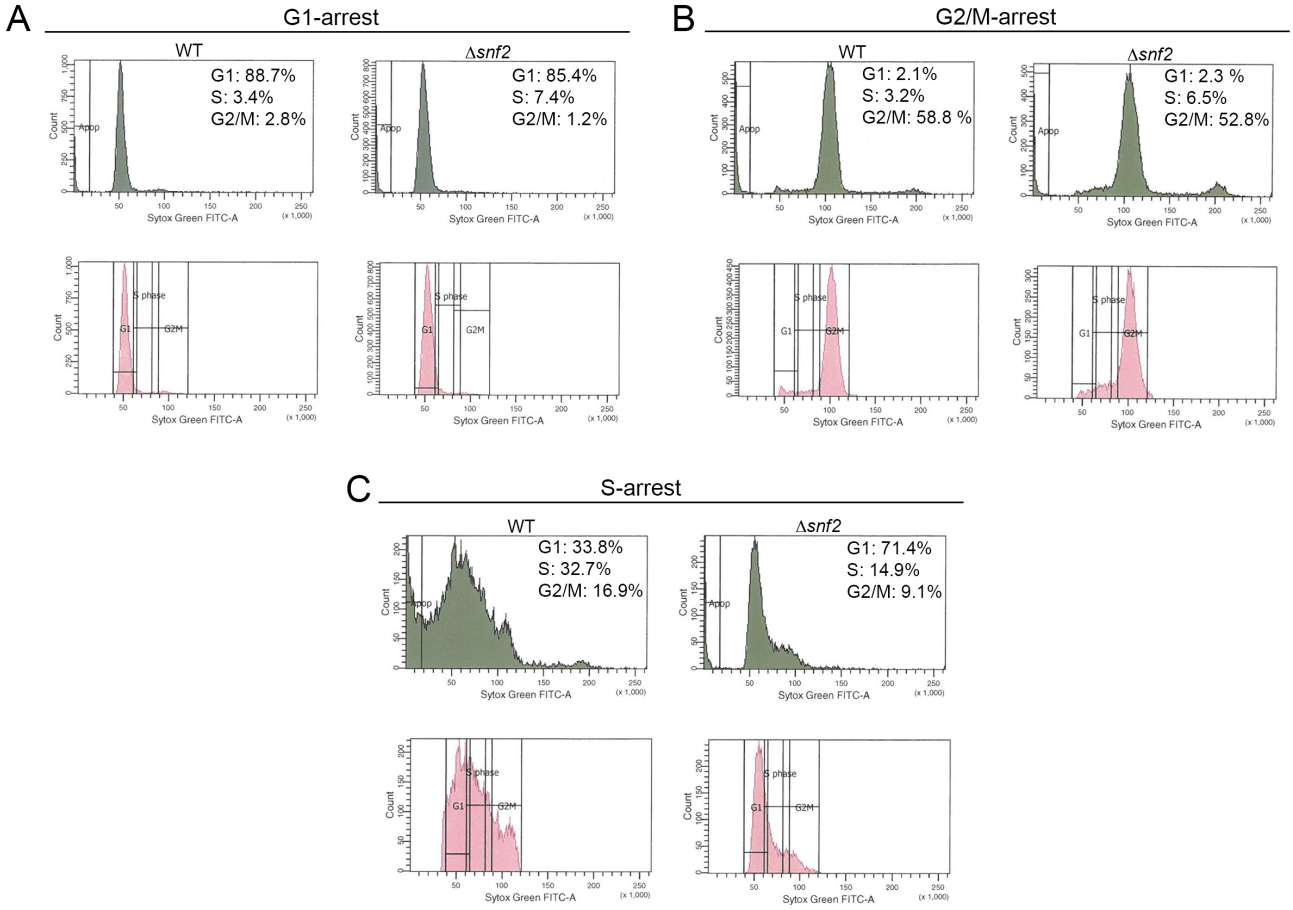
Supplemental Figure 5: Activation of Mec1 by SWI/SNF complex in absence of known activator Dpb11. SWI/SNF complex purified from Δ*dpb11-1* mutant activates Mec1 kinase activity. Equimolar amounts of SWI/SNF (10nM) purified from wild type (Y300) and *dpb11-1* (Y1185) mutant strains were used in the standard kinase assay. SWI/SNF purified from slow-growing mutants such as *dpb11-1* frequently shows slightly reduced activities. The phosphorylated GST-hChk2$_{2\text{-}107}$ was detected by Western blot using Phospho-Chk2 (Thr68) antibodies.

Supplemental Figure 6



Supplemental Figure 6: Snf2 subunit of the SWI/SNF complex is required for Mec1 activation. Graph showing quantitative analysis of γ-H2AX level in various mutants described in Fig. 3a, and 3b. Results presented are the mean of five independent experiments ± S.D.

Supplemental Figure 7



Supplemental Figure 7: FACS analyses of DNA content of WT and Δ*snf2* cells. (A-C) WT and Δ*snf2* cells were arrested at G1, G2/M, and S phase of the cell cycle separately as described in the experimental procedure, and their DNA content was measured by FACS analyses after 60 min. of arrest. G1, S, and G2/M phases are labeled in the respective lower panel.

Supplemental Table 1

Strain	Genotype	Reference
BY4741(WT)	*MATa his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*tel1*	*MATa tel1Δ::KanMX his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*mec1*	*MATa sml1Δ::KanMX mec1Δ::URA3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*mre11*	*MATa mre11Δ::KanMX his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*mre11*Δ*tel1*	*MATa tel1Δ::KanMX mre11Δ::HIS3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
Δ*mre11*Δ*mec1*	*MATa sml1Δ::KanMX mec1Δ::URA3 mre11Δ::HIS3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
R561 (Δ*tel1*Δ*mec1*)	*MATα tel1Δ::HIS3 sml1Δ::TRP1 mec1Δ::LEU2 rif1Δ::TRP1 rif2Δ:: KanMX ade2::hisG his3Δ200 leu2Δ0 met15Δ0 lys2Δ0 trp1Δ63 ura3Δ0*	(Chan et al. 2001)
Δ*snf2*	*MATa snf2Δ::HIS3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
Δ*tel1*Δ*snf2*	*MATa snf2Δ::HIS3 tel1Δ::URA3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
Δ*mre11*Δ*snf2*	*MATa snf2Δ::HIS3 mre11Δ::URA3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
Δ*mre11*Δ*ino80*	*MATa mre11Δ::KanMX ino80Δ::HIS3 his3Δ1 leu2Δ0 met15Δ0*	This study

	ura3Δ0	
Δ*mre11*Δ*swr1*	*MATa mre11Δ::KanMX swr1Δ::HIS3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
Δ*exo1*	*MATa exo1Δ::KanMX his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*snf2*Δ*exo1*	*MATa snf2Δ::HIS3 exo1Δ::URA3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
Δ*sgs1*	*MATa sgs1Δ::KanMX his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*sgs1*Δ*snf2*	*MATa sgs1Δ::KanMX snf2Δ::LEU2 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
Δ*rad17*	*MATa rad17Δ::KanMX his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*rad17*Δ*snf2*	*MATa rad17Δ::KanMX snf2Δ::URA3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
Δ*ddc1*	*MATa ddc1Δ::KanMX his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*ddc1*Δ*snf2*	*MATa ddc1Δ::KanMX snf2Δ::URA3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
Y300 (WT)	*MATa ade2-1 trp1-1 ura3-1 leu2-3 his3-11*	(Wang and Elledge 2002)
Y1185 (*dbp11-*	*MATa dpb11-1 ade2-1 trp1-1 ura3-1 leu2-3 his3-11*	(Wang and

1)		Elledge 2002)
Y1185-Δ*snf2*	*MATa dpb11-1 snf2Δ::URA3 ade2-1 trp1-1 ura3-1 leu2-3 his3-11*	Deletion library
Δ*snf5*	*MATa snf5Δ::KanMX his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*snf6*	*MATa snf6Δ::KanMX his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*snf11*	*MATa snf11Δ::KanMX his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
Δ*swi3*	*MATa swi3Δ::KanMX his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	Deletion library
MEC1-FLAG	*MATa MEC1-FLAG his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	(Morrison et al. 2007)
TEL1-FLAG	*MATa TEL1-FLAG his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
R561-*DPB11-FLAG*	As R561, [pDPB11-FLAG]	This study
MEC1-FLAG-SNF2-HA	*MATa MEC1-FLAG his3Δ1 leu2Δ0 met15Δ0 ura3Δ0* [pSNF2-HA]	This study
TEL1-FLAG-SNF2-HA	*MATa TEL1-FLAG his3Δ1 leu2Δ0 met15Δ0 ura3Δ0* [pSNF2-HA]	This study
R561-*SNF2-FLAG*	As R561, [pSNF2-FLAG]	This study

R561-*SNF2(K798A)-FLAG*	As R561, [pSNF2(K798A)-FLAG]	This study
R561-*INO80-FLAG*	As R561, *INO80-FLAG*	(Morrison et al. 2007)
R561-*IPK2-FLAG*	As R561, [pIPK2-FLAG]	This study
Δ*snf2-SNF2-FLAG*	*MATa snf2Δ::HIS3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0* [pSNF2-FLAG]	This study
Δ*snf2-SNF2(K798A)-FLAG*	*MATa snf2Δ::HIS3 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0* [pSNF2(K798A)-FLAG]	This study
Δ*snf2-MEC1-FLAG*	*MATa MEC1-FLAG snf2Δ::LEU2 his3Δ1 leu2Δ0 met15Δ0 ura3Δ0*	This study
Y300-*SNF2-FLAG*	As Y300, [pSNF2-FLAG]	This study
Y1185-*SNF2-FLAG*	As Y1185, [pSNF2-FLAG]	This study
BY4741-*MEC1-FLAG*	As BY4741, [pMEC1-FLAG]	This study
BY4741-*MEC1kd-FLAG*	As BY4741, [pMEC1kd-FLAG]	This study

RAD53-HA	As BY4711, *RAD53-HA*	This study
Δ*snf2 RAD53-HA*	As *snf2Δ*, *RAD53-HA*	This study

Supplemental Table 2

Protein	Protein probability	% Coverage	Num unique preps	Total Indep. Spectra	Protein ID
YNR023W	1	80.4	44	456	SNF12
YJL176C	1	77.7	133	711	SWI3
YGR275W	1	73.9	7	11	RTT102
YHL025W	1	66.9	13	52	SNF6
YPL129W	1	64.8	20	121	TAF14
YOR290C	1	56.4	112	824	SNF2
YDR073W	1	49.1	4	262	SNF11
YPL016W	1	48.6	32	231	SWI1
YMR033W	1	43.7	35	170	ARP9
YNL064C	1	42.8	5	23	YDJ1
YLL024C	1	40.2	14	30	SSA2
YBR289W	1	39.6	36	443	SNF5
YPR034W	1	37.9	17	38	ARP7
YDR499W	1	37.5	7	29	LCD1
YBR136W	1	32.1	33	93	MEC1

Supplemental Table 3

Protein-protein	Crosslinking sites	Peptide 1	Peptide 2
LCD1---SNF5			
1	LCD1:120---SNF5:174		
		R.QIEQQK[1808.98]GQQTAQTQLEQQR.Q	K.QELQK[2535.3]LEDEK[284.17]K.F
LCD1---SNF2			
2	LCD1:712---SNF2:1279		
		K.RESGVEEEEELK[2353.17]DSEINEILAR.N	R.IMQVK[2839.41]YDEK[284.17]FQEM[147.04]AR.T
LCD1---MEC1			
1	LCD1:676---MEC1:406		
		R.HLVDSLHDLTIK[1059.57]DQASYYEDAFEDLPEYIEEELK.M	K.FNK[4333.08]TER.G
2	LCD1:676---MEC1:395		
		R.HLVDSLHDLTIK[1051.64]DQASYYEDAFEDLPEYIEEELK.M	K.QLEK[4333.08]LR.L
MEC1---SNF5			
1	MEC1:1072---SNF5:174		
		R.QIEQQK[926.52]GQQTAQTQLEQQR.Q	R.K[2535.3]QTER.S
4	MEC1:674---SNF5:447		
		K.LK[284.17]VYK[1098.65]QAM[147.04]NETSEQLVPIR.L	K.NM[147.04]AK[2684.45]ILK.K
MEC1---SNF2			
5	MEC1:1072---SNF2:1138		
		R.LDGHTK[926.52]SDER.S	R.K[1422.71]QTER.S
		R.LDGHTK[926.52]SDER.S	R.K[1422.71]QTER.S
6	MEC1:1072---SNF2:675		
		K.LLDQTK[926.52]DTR.I	R.K[1354.75]QTER.S
9	MEC1:56---SNF2:1138		
		R.LDGHTK[1038.58]SDER.S	R.NLK[1422.71]DQR.R
15	MEC1:1577---SNF2:1355		
		R.EVLLQYNIAK[2536.2]ALIAISNEDPLR.T	R.ERK[2748.54]TATYNDNMSEEQWLR.Q
		R.EVLLQYNIAK[2552.2]ALIAISNEDPLR.T	R.ERK[2748.54]TATYNDNM[147.04]SEEQWLR.Q
		R.EVLLQYNIAK[2536.2]ALIAISNEDPLR.T	R.ERK[2748.54]TATYNDNMSEEQWLR.Q
18	MEC1:2318---SNF2:1306		
		R.NMDHSIQK[1411.79]ALK.V	R.SK[1549.83]KEEELGVK.S
19	MEC1:674---SNF2:1441		
		R.ADTDLAMNDDDFLSK[1082.65]K.R	K.NMAK[2063.97]ILK.K
		R.ADTDLAMNDDDFLSK[1082.65]K.R	K.NMAK[2063.97]ILK.K
		R.ADTDLAMNDDDFLSK[1082.65]K.R	K.NMAK[2063.97]ILK.K
		R.ADTDLAMNDDDFLSK[1082.65]K.R	K.NMAK[2063.97]ILK.K
		R.ADTDLAMNDDDFLSK[1082.65]K.R	K.NMAK[2063.97]ILK.K
		R.ADTDLAMNDDDFLSK[1082.65]K.R	K.NMAK[2063.97]ILK.K
LCD1			
1	LCD1:120---LCD1:125		
		K.QELQK[1026.56]LEDEK.K	K.LEDEK[1524.8]K.F
2	LCD1:113---LCD1:115		
		K.HLQELAK[1151.69]LK[284.17]QELQK.L	K.LK[2127.23]QELQK.L
		K.HLQELAK[1151.69]LK.Q	K.LK[1344.81]QELQK.L
		K.HLQELAK[1151.69]LK.Q	K.LK[1344.81]QELQK.L
3	LCD1:93---LCD1:99		
		K.NIQAVK[1194.7]VNELQVK.H	K.EK[1748.02]NIQAVK.V
5	LCD1:91---LCD1:99		
		K.NIQAVK[1451.83]VNELQVK.H	R.EK[1748.02]EKNIQAVK.V
7	LCD1:126---LCD1:145		
		R.EVITNVK[1287.7]PPSTTLSTNTNTITPDSSSVAIEAK.P	K.K[3580.87]FLQMEAR.G
8	LCD1:81---LCD1:91		
		R.DK[798.45]INFLNIER.E	R.EK[1526.85]EK.N
9	LCD1:506---LCD1:531		
		R.NIGDNELGGLISK[2265.12]LIYTDR.L	K.EDIGMDSDK[2356.26]FTAPIIGYK.M
10	LCD1:106---LCD1:115		
		K.VNELQVK[1151.69]HLQELAK.L	K.LK[1914.09]QELQK.L
		K.VNELQVK[1151.69]HLQELAK.L	K.LK[1914.09]QELQK.L
11	LCD1:70---LCD1:81		
		K.NDNQLVNQLNK[1526.85]AQGEASMLR.D	R.DK[2508.28]INFLNIER.E
		K.NDNQLVNQLNK[1526.85]AQGEASMLR.D	R.DK[2508.28]INFLNIER.E
		K.NDNQLVNQLNK[1526.85]AQGEASMLR.D	R.DK[2508.28]INFLNIER.E
		K.NDNQLVNQLNK[1526.85]AQGEASMLR.D	R.DK[2508.28]INFLNIER.E
12	LCD1:180---LCD1:188		
		K.K[1195.72]NM[147.04]VPLNPNR.I	R.K[1463.79]ISDNLLK.K
		K.K[1195.72]NMVPLNPNR.I	R.K[1447.8]ISDNLLK.K
		K.K[1195.72]NM[147.04]VPLNPNR.I	R.K[1463.79]ISDNLLK.K

MEC1			
1	MEC1:1979---MEC1:2005		
		R.QHSQNPHDLVSSALDLTK[2288.17]ALTR.V	K.DFK[2696.42]FDMNVAPSAMVVPVR.K
2	MEC1:406---MEC1:515		
		R.INPNRPEAAGK[1059.57]SEIFR.I	K.FNK[2064.11]TER.G
3	MEC1:406---MEC1:414		
		R.GTLLK[1059.57]YR.V	K.FNK[1115.67]TER.G
		R.GTLLK[1059.57]YR.V	K.FNK[1115.67]TER.G
4	MEC1:1990---MEC1:2081		
		R.VC[160.03]LQDVK[911.51]SITSR.S	K.K[1670.9]EDVR.Q
		R.VC[160.03]LQDVK[911.51]SITSR.S	K.K[1670.9]EDVR.Q
		R.VC[160.03]LQDVK[911.51]SITSR.S	K.K[1670.9]EDVR.Q
		R.VC[160.03]LQDVK[911.51]SITSR.S	K.K[1670.9]EDVR.Q
5	MEC1:1990---MEC1:2005		
		K.DFK[1670.9]FDMNVAPSAMVVPVR.K	R.VC[160.03]LQDVK[2288.17]SITSR.S
		K.DFK[1670.9]FDMNVAPSAMVVPVR.K	R.VC[160.03]LQDVK[2288.17]SITSR.S
		K.DFK[1670.9]FDMNVAPSAMVVPVR.K	R.VC[160.03]LQDVK[2288.17]SITSR.S
6	MEC1:1990---MEC1:1998		
		R.VC[160.03]LQDVK[1013.58]SITSR.S	R.SGK[1670.9]SLEK.D
		R.VC[160.03]LQDVK[1013.58]SITSR.S	R.SGK[1670.9]SLEK.D
7	MEC1:1055---MEC1:1072		
		R.STTDLIPIFANNLKSSNK[1082.62]YVINQNLDDIEVYLR.R	R.RK[4076.15]QTER.S
		R.STTDLIPIFANNLKSSNK[1082.62]YVINQNLDDIEVYLR.R	R.RK[4076.15]QTER.S
8	MEC1:1083---MEC1:1134		
		R.SIDFTPK[981.54]K.V	K.HEFK[1200.68]R.T
9	MEC1:414---MEC1:515		
		R.INPNRPEAAGK[1115.67]SEIFR.I	R.GTLLK[2064.11]YR.V
10	MEC1:2283---MEC1:2294		
		R.K[1499.84]NEVALMNVIETIMYDR.N	K.K[2304.19]SSEVTLALMR.K
		R.K[1499.84]NEVALMNVIETIMYDR.N	K.K[2304.19]SSEVTLALMR.K
		R.K[1499.84]NEVALMNVIETIMYDR.N	K.K[2304.19]SSEVTLALMR.K
		R.K[1499.84]NEVALMNVIETIMYDR.N	K.K[2304.19]SSEVTLALMR.K
		R.K[1499.84]NEVALMNVIETIMYDR.N	K.K[2304.19]SSEVTLALMR.K
		R.K[1515.83]NEVALMNVIETIMYDR.N	K.K[2304.19]SSEVTLALM[147.04]R.K
		R.K[1515.83]NEVALMNVIETIMYDR.N	K.K[2304.19]SSEVTLALM[147.04]R.K
		R.K[1515.83]NEVALMNVIETIMYDR.N	K.K[2304.19]SSEVTLALM[147.04]R.K
		R.K[1515.83]NEVALMNVIETIMYDR.N	K.K[2304.19]SSEVTLALM[147.04]R.K
		R.K[1515.83]NEVALMNVIETIMYDR.N	K.K[2304.19]SSEVTLALM[147.04]R.K
11	MEC1:395---MEC1:406		
		K.FNK[1051.64]TER.G	K.QLEK[1059.57]LR.L
12	MEC1:395---MEC1:402		
		K.QLEK[978.68]LR.L	R.LLVLK[1051.64]K.F
		K.QLEK[978.68]LR.L	R.LLVLK[1051.64]K.F
13	MEC1:1552---MEC1:1577		
		K.EWYSIGLEAANLEGNVQTLK[2748.54]NWVEQIESLR.N	R.EVLLQYNIAK[3754.92]ALIAISNEDPLR.T
14	MEC1:1954---MEC1:1979		
		R.Q[111.03]HSQNPHDLVSSALDLTK[1564.9]ALTR.V	R.GK[2679.4]HILEK[284.17]YR.Q
		R.Q[111.03]HSQNPHDLVSSALDLTK[1089.65]ALTR.V	R.GK[2679.4]HILEK.Y
		R.Q[111.03]HSQNPHDLVSSALDLTK[1564.9]ALTR.V	R.GK[2679.4]HILEK[284.17]YR.Q
		R.QHSQNPHDLVSSALDLTK[1564.9]ALTR.V	R.GK[2696.42]HILEK[284.17]YR.Q
		R.QHSQNPHDLVSSALDLTK[1089.65]ALTR.V	R.GK[2696.42]HILEK.Y
		R.QHSQNPHDLVSSALDLTK[1089.65]ALTR.V	R.GK[2696.42]HILEK.Y
		R.QHSQNPHDLVSSALDLTK[1089.65]ALTR.V	R.GK[2696.42]HILEK.Y
15	MEC1:1072---MEC1:1592		
		R.TQK[926.52]YIHNSFR.L	R.K[1558.83]QTER.S
		R.TQK[926.52]YIHNSFR.L	R.K[1558.83]QTER.S
16	MEC1:1072---MEC1:1494		
		K.FSDDPK[926.52]TTTR.M	R.K[1432.72]QTER.S
17	MEC1:1072---MEC1:515		
		R.INPNRPEAAGK[926.52]SEIFR.I	R.K[2064.11]QTER.S
		R.INPNRPEAAGK[926.52]SEIFR.I	R.K[2064.11]QTER.S
19	MEC1:1072---MEC1:1083		
		R.SIDFTPK[926.52]K.V	R.K[1200.68]QTER.S
		R.SIDFTPK[926.52]K.V	R.K[1200.68]QTER.S
		R.SIDFTPK[1082.62]K.V	R.RK[1200.68]QTER.S
		R.SIDFTPK[1082.62]K.V	R.RK[1200.68]QTER.S
20	MEC1:1072---MEC1:697		
		R.QLGK[926.52]NLVER.K	R.K[1321.77]QTER.S
21	MEC1:361---MEC1:380		
		K.FNIWVYQSEPDSSLK[1641.9]NVTSPFDDR.Y	R.SLPVEALK[3109.5]YDNK.F

		K.FNIWVYQSEPDSSLK[1641.9]NVTSPFDDR.Y	R.SLPVEALK[3109.5]YDNK.F
22	MEC1:2103---MEC1:2294		
		R.QDNQYMQFATTMDFLLSK[2304.19]DIASR.K	R.K[2988.44]NEVALMNVIETIMYDR.N
		R.QDNQYMQFATTMDFLLSK[2304.19]DIASR.K	R.K[2988.44]NEVALMNVIETIMYDR.N
23	MEC1:1731---MEC1:2294		
		R.LPQAELEFAEILWK[2304.19]QGENDR.A	R.K[2651.36]NEVALMNVIETIMYDR.N
24	MEC1:1494---MEC1:1592		
		R.TQK[1432.72]YIHNSFR.L	K.FSDDPK[1558.83]TTTR.M
25	MEC1:472---MEC1:515		
		R.LAC[160.03]LESEK[2064.11]FSGTLPNSTK.D	R.INPNRPEAAGK[2247.15]SEIFR.I
		R.LAC[160.03]LESEK[2064.11]FSGTLPNSTK.D	R.INPNRPEAAGK[2247.15]SEIFR.I
		R.LAC[160.03]LESEK[2064.11]FSGTLPNSTK.D	R.INPNRPEAAGK[2247.15]SEIFR.I
		R.LAC[160.03]LESEK[2064.11]FSGTLPNSTK.D	R.INPNRPEAAGK[2247.15]SEIFR.I
		R.LAC[160.03]LESEK[2064.11]FSGTLPNSTK.D	R.INPNRPEAAGK[2247.15]SEIFR.I
		R.LAC[160.03]LESEK[2064.11]FSGTLPNSTK.D	R.INPNRPEAAGK[2247.15]SEIFR.I
26	MEC1:697---MEC1:703		
		R.K[1321.77]VGFQNLIELLGYSSK.T	R.QLGK[2061.15]NLVER.K
		R.K[1321.77]VGFQNLIELLGYSSK.T	R.QLGK[2061.15]NLVER.K
		R.K[1321.77]VGFQNLIELLGYSSK.T	R.QLGK[2061.15]NLVER.K
		R.K[1321.77]VGFQNLIELLGYSSK.T	R.QLGK[2061.15]NLVER.K
27	MEC1:1577---MEC1:1592		
		R.EVLLQYNIAK[1558.83]ALIAISNEDPLR.T	R.TQK[2748.54]YIHNSFR.L
		R.EVLLQYNIAK[1558.83]ALIAISNEDPLR.T	R.TQK[2748.54]YIHNSFR.L
		R.EVLLQYNIAK[1558.83]ALIAISNEDPLR.T	R.TQK[2748.54]YIHNSFR.L
		R.EVLLQYNIAK[1558.83]ALIAISNEDPLR.T	R.TQK[2748.54]YIHNSFR.L
		R.EVLLQYNIAK[1558.83]ALIAISNEDPLR.T	R.TQK[2748.54]YIHNSFR.L
		R.EVLLQYNIAK[1558.83]ALIAISNEDPLR.T	R.TQK[2748.54]YIHNSFR.L
28	MEC1:402---MEC1:406		
		K.FNK[978.68]TER.G	R.LLVLK[1059.57]K.F
		K.FNK[978.68]TER.G	R.LLVLK[1059.57]K.F
		K.FNK[978.68]TER.G	R.LLVLK[1059.57]K.F
		K.FNK[978.68]TER.G	R.LLVLK[1059.57]K.F
		K.FNK[978.68]TER.G	R.LLVLK[1059.57]K.F
29	MEC1:402---MEC1:414		
		R.GTLLK[978.68]YR.V	R.LLVLK[1115.67]K.F
		R.GTLLK[978.68]YR.V	R.LLVLK[1115.67]K.F
30	MEC1:1998---MEC1:2054		
		R.FGSSYK[1013.58]VFSSLK.K	R.SGK[1614.87]SLEK.D
31	MEC1:1843---MEC1:2294		
		R.K[953.57]NEVALMNVIETIMYDR.N	K.NTAK[2304.19]VR.E
		R.K[953.57]NEVALMNVIETIMYDR.N	K.NTAK[2304.19]VR.E
*** N for Nexus, P for pLink, NP for Nexus and Plink			

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