Supplementary Information:

GPS 2.0: Prediction of Kinase-Specific Phosphorylation Sites in Hierarchy

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Running Title: Prediction of Phosphorylation Sites

Keywords: Phosphorylation, kinase-specific, hierarchy, GPS, false positive rate, Aurora-B

Abbreviations: protein kinases (PKs), false positive rate (FPR), Group-based Prediction System (GPS), post-translational modifications (PTMs), human phosphorylation network (HPN), accuracy (*Ac*), sensitivity (*Sn*), specificity (*Sp*), Mathew correlation coefficient (*MCC*), Markov Cluster Algorithm (MCL for short), leave-one-out validation (LOO), phosphorylation site peptide (PSP)

LEGENDS

Supplementary Figures

Supplementary Figure S1 - The performance of *n*-fold cross-validation is very similar with leave-one-out validation. 10FCV, 10-fold cross-validation; 8FCV, 8-fold cross-validation; 6FCV, 6-fold cross-validation; 4FCV, 4-fold cross-validation; LOO, leave-one-out validation; Self, self-consistency.

Supplementary Figure S2 - The ROC curves for 70 PK clusters with ⩾ 30 sites. loo, leave-one-out validation; Self, self-consistency.

Supplementary Tables

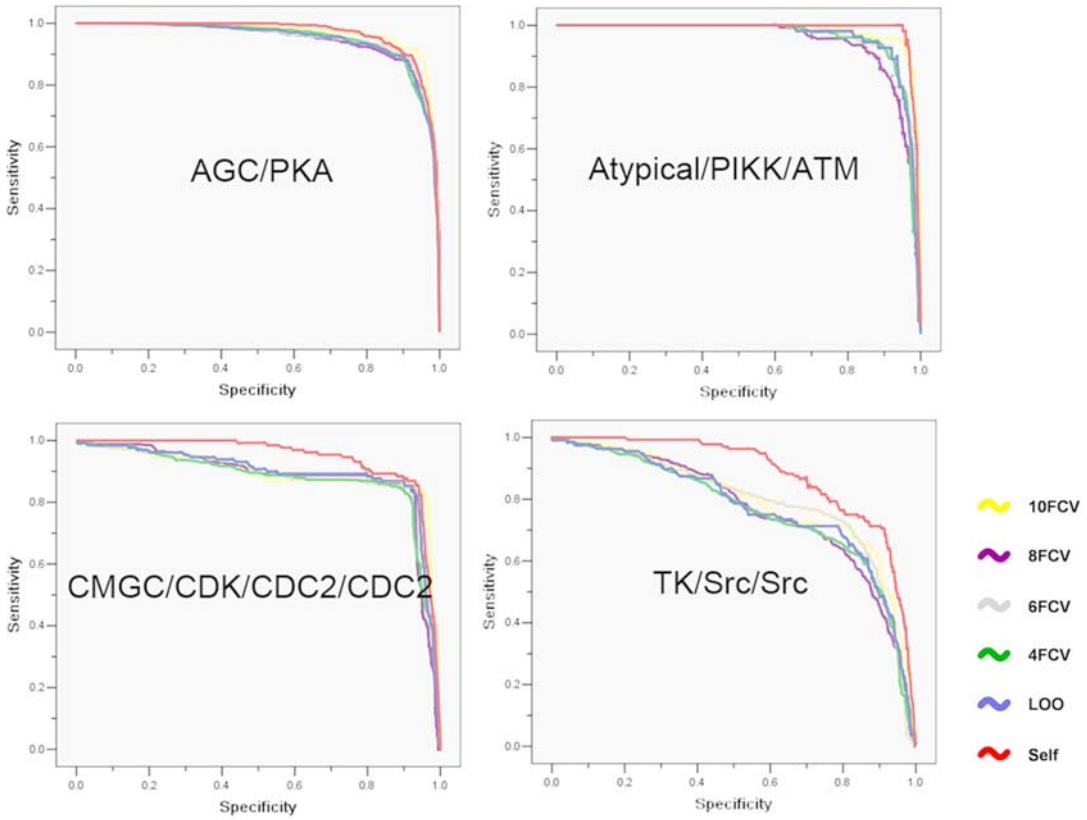
Supplementary Table S1 - Currently, GPS 2.0 could predict kinase-specific phosphorylation sites for 408 human protein kinases (PKs). Also, we recommended the predictors for these PKs.

Supplementary Table S2 - The performances of self-consistency and leave-one-out validation for 70 PK groups without less than 30 sites. Only performances of 4-fold cross-validation were shown.

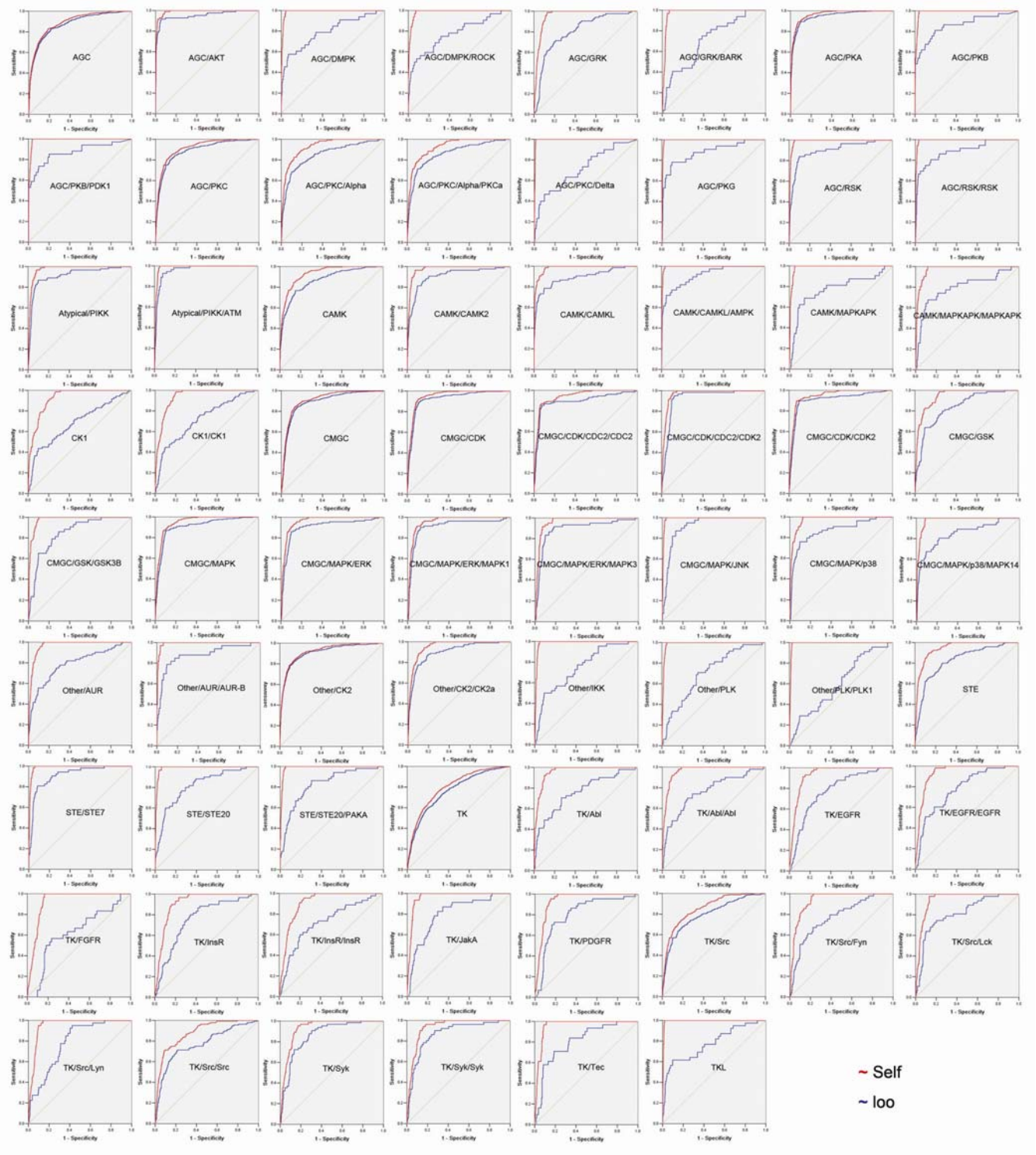
Supplementary Table S3 - The performances of self-consistency and leave-one-out validation for other PK groups with less than 30 sites.

Supplementary Table S4 - The prediction performance of a large-scale prediction for mammalian sites. Known sub., the known substrates of a PK; Other's sub., the known substrates of other PKs; Unknown sub., the sites without PK information. The PK clusters with low performances (The Pr of either Other’s sub. or Unknown sub < 50%) were marked in grey and the results were removed for large-scale predictions.

Supplementary Figure S1. The performance of *n*-fold cross-validation is very similar with leave-one-out validation. 10FCV, 10-fold cross-validation; 8FCV, 8-fold cross-validation; 6FCV, 6-fold cross-validation; 4FCV, 4-fold cross-validation; LOO, leave-one-out validation; Self, self-consistency.



Supplementary Figure S2. The ROC curves for 70 PK clusters with ⩾ 30 sites. loo, leave-one-out validation; Self, self-consistency.



Supplementary Table S1. Currently, GPS 2.0 could predict kinase-specific phosphorylation sites for 408 human protein kinases (PKs). Also, we recommended the predictors for these PKs.

Name	Group	Family	Subfamily	Predictors in GPS 2.0
AKT1	AGC	AKT		AGC/AKT
AKT2	AGC	AKT		AGC/AKT; AGC/AKT/AKT2
AKT3	AGC	AKT		AGC/AKT
DMPK1	AGC	DMPK	GEK	AGC/DMPK
DMPK2	AGC	DMPK	GEK	AGC/DMPK
MRCKb	AGC	DMPK	GEK	AGC/DMPK
MRCKa	AGC	DMPK	GEK	AGC/DMPK
ROCK2	AGC	DMPK	ROCK	AGC/DMPK; AGC/DMPK/ROCK
ROCK1	AGC	DMPK	ROCK	AGC/DMPK; AGC/DMPK/ROCK; AGC/DMPK/ROCK/ROCK1
CRIK	AGC	DMPK		AGC/DMPK
BARK1	AGC	GRK	BARK	AGC/GRK; AGC/GRK/BARK; AGC/GRK/BARK/GRK-2
BARK2	AGC	GRK	BARK	AGC/GRK; AGC/GRK/BARK; AGC/GRK/BARK/GRK-3
GPRK4	AGC	GRK	GRK	AGC/GRK; AGC/GRK/GRK; AGC/GRK/GRK/GRK-4
GPRK5	AGC	GRK	GRK	AGC/GRK; AGC/GRK/GRK; AGC/GRK/GRK/GRK-5
GPRK6	AGC	GRK	GRK	AGC/GRK
RHOK	AGC	GRK	GRK	AGC/GRK; AGC/GRK/GRK; AGC/GRK/GRK/GRK-1
GPRK7	AGC	GRK	GRK	AGC/GRK
MAST3	AGC	MAST		AGC
MAST2	AGC	MAST		AGC
MAST1	AGC	MAST		AGC
MASTL	AGC	MAST		AGC
MAST4	AGC	MAST		AGC
NDR1	AGC	NDR		AGC

LATS1	AGC	NDR		AGC
LATS2	AGC	NDR		AGC
NDR2	AGC	NDR		AGC
PKACa	AGC	PKA		AGC/PKA
PKACb	AGC	PKA		AGC/PKA
PKACg	AGC	PKA		AGC/PKA
PRKX	AGC	PKA		AGC/PKA
PRKY	AGC	PKA		AGC/PKA
PDK1	AGC	PKB		AGC/PKB; AGC/PKB/PDK1
PKCa	AGC	PKC	Alpha	AGC/PKC; AGC/PKC/Alpha; AGC/PKC/Alpha/PKCa
PKCb	AGC	PKC	Alpha	AGC/PKC; AGC/PKC/Alpha; AGC/PKC/Alpha/PKCb
PKCg	AGC	PKC	Alpha	AGC/PKC; AGC/PKC/Alpha; AGC/PKC/Alpha/PKCg
PKCd	AGC	PKC	Delta	AGC/PKC; AGC/PKC/Delta; AGC/PKC/Delta/PKCd
PKCt	AGC	PKC	Delta	AGC/PKC; AGC/PKC/Delta; AGC/PKC/Delta/PKCt
PKCh	AGC	PKC	Eta	AGC/PKC; AGC/PKC/Eta; AGC/PKC/Eta/PKCh
PKCe	AGC	PKC	Eta	AGC/PKC; AGC/PKC/Eta; AGC/PKC/Eta/PKCe
PKCi	AGC	PKC	Iota	AGC/PKC; AGC/PKC/Iota
PKCz	AGC	PKC	Iota	AGC/PKC; AGC/PKC/Iota; AGC/PKC/Iota/PKCz
PKG1a	AGC	PKG		AGC/PKG; AGC/PKG/PKG1
PKG1b	AGC	PKG		AGC/PKG; AGC/PKG/PKG1
PKG2	AGC	PKG		AGC/PKG; AGC/PKG/PKG2
PKN1	AGC	PKN		AGC
PKN2	AGC	PKN		AGC
PKN3	AGC	PKN		AGC
MSK1	AGC	RSK	MSK	AGC/RSK; AGC/RSK/MSK; AGC/RSK/MSK/RSK5
MSK2	AGC	RSK	MSK	AGC/RSK; AGC/RSK/MSK
p70S6K	AGC	RSK	p70	AGC/RSK; AGC/RSK/p70

p70S6Kb	AGC	RSK	p70	AGC/RSK; AGC/RSK/p70
RSK1	AGC	RSK	RSK	AGC/RSK; AGC/RSK/RSK; AGC/RSK/RSK/RSK1
RSK2	AGC	RSK	RSK	AGC/RSK; AGC/RSK/RSK; AGC/RSK/RSK/RSK2
RSK3	AGC	RSK	RSK	AGC/RSK; AGC/RSK/RSK
RSK4	AGC	RSK	RSK	AGC/RSK; AGC/RSK/RSK
SgK494	AGC	RSK		AGC/RSK
RSKL2	AGC	RSKL		AGC
RSKL1	AGC	RSKL		AGC
SGK	AGC	SGK		AGC/SGK
SGK2	AGC	SGK		AGC/SGK
SGK3	AGC	SGK		AGC/SGK
YANK3	AGC	YANK		AGC
YANK2	AGC	YANK		AGC
YANK1	AGC	YANK		AGC
BCKDK	Atypical	PDHK		Atypical/PDHK
PDHK1	Atypical	PDHK		Atypical/PDHK
PDHK2	Atypical	PDHK		Atypical/PDHK
PDHK3	Atypical	PDHK		Atypical/PDHK
PDHK4	Atypical	PDHK		Atypical/PDHK
ATM	Atypical	PIKK	ATM	Atypical/PIKK; Atypical/PIKK/ATM
ATR	Atypical	PIKK	ATR	Atypical/PIKK; Atypical/PIKK/ATR
DNAPK	Atypical	PIKK	DNAPK	Atypical/PIKK; Atypical/PIKK/DNAPK
FRAP	Atypical	PIKK	FRAP	Atypical/PIKK; Atypical/PIKK/FRAP
SMG1	Atypical	PIKK	SMG1	Atypical/PIKK
TRRAP	Atypical	PIKK	TRRAP	Atypical/PIKK
CaMK1g	CAMK	CAMK1		CAMK/CAMK1
CaMK1a	CAMK	CAMK1		CAMK/CAMK1; CAMK/CAMK1/CAMK1a
CaMK4	CAMK	CAMK1		CAMK/CAMK1; CAMK/CAMK1/CAMK4

CaMK1d	CAMK	CAMK1		CAMK/CAMK1
CaMK1b	CAMK	CAMK1		CAMK/CAMK1
CaMK2a	CAMK	CAMK2		CAMK/CAMK2; CAMK/CAMK2/CAMK2a
CaMK2b	CAMK	CAMK2		CAMK/CAMK2
CaMK2g	CAMK	CAMK2		CAMK/CAMK2
CaMK2d	CAMK	CAMK2		CAMK/CAMK2
AMPKa1	CAMK	CAMKL	AMPK	CAMK/CAMKL; CAMK/CAMKL/AMPK
AMPKa2	CAMK	CAMKL	AMPK	CAMK/CAMKL; CAMK/CAMKL/AMPK
BRSK2	CAMK	CAMKL	BRSK	CAMK/CAMKL
BRSK1	CAMK	CAMKL	BRSK	CAMK/CAMKL
CHK1	CAMK	CAMKL	CHK1	CAMK/CAMKL; CAMK/CAMKL/CHK1
HUNK	CAMK	CAMKL	HUNK	CAMK/CAMKL
LKB1	CAMK	CAMKL	LKB	CAMK/CAMKL; CAMK/CAMKL/LKB1
MARK3	CAMK	CAMKL	MARK	CAMK/CAMKL
MARK2	CAMK	CAMKL	MARK	CAMK/CAMKL
MARK1	CAMK	CAMKL	MARK	CAMK/CAMKL
MARK4	CAMK	CAMKL	MARK	CAMK/CAMKL
MELK	CAMK	CAMKL	MELK	CAMK/CAMKL
NIM1	CAMK	CAMKL	NIM1	CAMK/CAMKL
NuaK1	CAMK	CAMKL	NuaK	CAMK/CAMKL
NuaK2	CAMK	CAMKL	NuaK	CAMK/CAMKL
PASK	CAMK	CAMKL	PASK	CAMK/CAMKL
QSK	CAMK	CAMKL	QIK	CAMK/CAMKL
QIK	CAMK	CAMKL	QIK	CAMK/CAMKL
SIK	CAMK	CAMKL	QIK	CAMK/CAMKL
SNRK	CAMK	CAMKL	SNRK	CAMK/CAMKL
VACAMKL	CAMK	CAMK-Unique		CAMK

STK33	CAMK	CAMK-Unique		CAMK
SgK495	CAMK	CAMK-Unique		CAMK
CASK	CAMK	CASK		CAMK
DAPK1	CAMK	DAPK		CAMK/DAPK
DAPK2	CAMK	DAPK		CAMK/DAPK
DRAK1	CAMK	DAPK		CAMK/DAPK
DRAK2	CAMK	DAPK		CAMK/DAPK
DAPK3	CAMK	DAPK		CAMK/DAPK; CAMK/DAPK/DAPK3
DCAMKL1	CAMK	DCAMKL		CAMK
DCAMKL3	CAMK	DCAMKL		CAMK
DCAMKL2	CAMK	DCAMKL		CAMK
MAPKAPK2	CAMK	MAPKAPK	MAPKAPK	CAMK/MAPKAPK; CAMK/MAPKAPK/MAPKAPK
MAPKAPK3	CAMK	MAPKAPK	MAPKAPK	CAMK/MAPKAPK; CAMK/MAPKAPK/MAPKAPK
MAPKAPK5	CAMK	MAPKAPK	MAPKAPK	CAMK/MAPKAPK; CAMK/MAPKAPK/MAPKAPK
MNK1	CAMK	MAPKAPK	MNK	CAMK/MAPKAPK
MNK2	CAMK	MAPKAPK	MNK	CAMK/MAPKAPK
smMLCK	CAMK	MLCK		CAMK/MLCK
TTN	CAMK	MLCK		CAMK/MLCK
caMLCK	CAMK	MLCK		CAMK/MLCK
skMLCK	CAMK	MLCK		CAMK/MLCK
SgK085	CAMK	MLCK		CAMK/MLCK
PHKg1	CAMK	PHK		CAMK/PHK
PHKg2	CAMK	PHK		CAMK/PHK
PIM3	CAMK	PIM		CAMK
PIM1	CAMK	PIM		CAMK
PIM2	CAMK	PIM		CAMK
PKD1	CAMK	PKD		CAMK/PKD; CAMK/PKD1

PKD2	CAMK	PKD	CAMK/PKD
PKD3	CAMK	PKD	CAMK/PKD
PSKH1	CAMK	PSK	CAMK
PSKH2	CAMK	PSK	CAMK
CHK2	CAMK	RAD53	CAMK/RAD53
Trb1	CAMK	Trbl	CAMK
Trb2	CAMK	Trbl	CAMK
Trb3	CAMK	Trbl	CAMK
Trio	CAMK	Trio	CAMK
Trad	CAMK	Trio	CAMK
SPEG	CAMK	Trio	CAMK
Obscn	CAMK	Trio	CAMK
TSSK3	CAMK	TSSK	CAMK
TSSK2	CAMK	TSSK	CAMK
SSTK	CAMK	TSSK	CAMK
TSSK4	CAMK	TSSK	CAMK
TSSK1	CAMK	TSSK	CAMK
CK1a	CK1	CK1	CK1; CK1/CK1; CK1/CK1/CK1a
CK1d	CK1	CK1	CK1; CK1/CK1; CK1/CK1/CK1d
CK1e	CK1	CK1	CK1; CK1/CK1; CK1/CK1/CK1e
CK1g2	CK1	CK1	CK1; CK1/CK1
CK1g3	CK1	CK1	CK1; CK1/CK1
CK1a2	CK1	CK1	CK1; CK1/CK1
CK1g1	CK1	CK1	CK1; CK1/CK1
TTBK2	CK1	TTBK	CK1
TTBK1	CK1	TTBK	CK1
VRK1	CK1	VRK	CK1; CK1/VRK

VRK2	CK1	VRK		CK1; CK1/VRK
VRK3	CK1	VRK		CK1; CK1/VRK
CDC2	CMGC	CDK	CDC2	CMGC/CDK; CMGC/CDK/CDC2; CMGC/CDK/CDC2/CDC2
CDK2	CMGC	CDK	CDC2	CMGC/CDK; CMGC/CDK/CDC2; CMGC/CDK/CDC2/CDK2
CDK3	CMGC	CDK	CDC2	CMGC/CDK
CDK10	CMGC	CDK	CDK10	CMGC/CDK
CDK4	CMGC	CDK	CDK4	CMGC/CDK; CMGC/CDK4; CMGC/CDK4/CDK4
CDK6	CMGC	CDK	CDK4	CMGC/CDK; CMGC/CDK4; CMGC/CDK4/CDK6
CDK5	CMGC	CDK	CDK5	CMGC/CDK; CMGC/CDK5
CDK7	CMGC	CDK	CDK7	CMGC/CDK; CMGC/CDK7
CDK8	CMGC	CDK	CDK8	CMGC/CDK
CDK11	CMGC	CDK	CDK8	CMGC/CDK
CDK9	CMGC	CDK	CDK9	CMGC/CDK
CHED	CMGC	CDK	CRK7	CMGC/CDK
CRK7	CMGC	CDK	CRK7	CMGC/CDK
PITSLRE	CMGC	CDK	PITSLRE	CMGC/CDK
PCTAIRE1	CMGC	CDK	TAIRE	CMGC/CDK
PCTAIRE2	CMGC	CDK	TAIRE	CMGC/CDK
PCTAIRE3	CMGC	CDK	TAIRE	CMGC/CDK
PFTAIRE1	CMGC	CDK	TAIRE	CMGC/CDK
PFTAIRE2	CMGC	CDK	TAIRE	CMGC/CDK
CCRK	CMGC	CDK		CMGC/CDK
CDKL2	CMGC	CDKL		CMGC
CDKL1	CMGC	CDKL		CMGC
CDKL5	CMGC	CDKL		CMGC
CDKL4	CMGC	CDKL		CMGC
CDKL3	CMGC	CDKL		CMGC
CLK1	CMGC	CLK		CMGC

CLK2	CMGC	CLK		CMGC
CLK3	CMGC	CLK		CMGC
CLK4	CMGC	CLK		CMGC
DYRK1B	CMGC	DYRK	Dyrk1	CMGC/DYRK; CMGC/DYRK/Dyrk1
DYRK1A	CMGC	DYRK	Dyrk1	CMGC/DYRK; CMGC/DYRK/Dyrk1
DYRK2	CMGC	DYRK	Dyrk2	CMGC/DYRK
DYRK4	CMGC	DYRK	Dyrk2	CMGC/DYRK
DYRK3	CMGC	DYRK	Dyrk2	CMGC/DYRK
HIPK1	CMGC	DYRK	HIPK	CMGC/DYRK
HIPK3	CMGC	DYRK	HIPK	CMGC/DYRK
HIPK2	CMGC	DYRK	HIPK	CMGC/DYRK
HIPK4	CMGC	DYRK	HIPK	CMGC/DYRK
PRP4	CMGC	DYRK	PRP4	CMGC/DYRK
GSK3A	CMGC	GSK		CMGC/GSK; CMGC/GSK/GSK3A
GSK3B	CMGC	GSK		CMGC/GSK; CMGC/GSK/GSK3B
Erk1	CMGC	MAPK	ERK	CMGC/MAPK; CMGC/MAPK/ERK; CMGC/MAPK/ERK/MAPK3
Erk2	CMGC	MAPK	ERK	CMGC/MAPK; CMGC/MAPK/ERK; CMGC/MAPK/ERK/MAPK1
Erk3	CMGC	MAPK	ERK	CMGC/MAPK; CMGC/MAPK/ERK
Erk4	CMGC	MAPK	ERK	CMGC/MAPK; CMGC/MAPK/ERK
Erk5	CMGC	MAPK	ERK	CMGC/MAPK; CMGC/MAPK/ERK; CMGC/MAPK/ERK/MAPK7
Erk7	CMGC	MAPK	Erk7	CMGC/MAPK
JNK1	CMGC	MAPK	JNK	CMGC/MAPK; CMGC/MAPK/JNK; CMGC/MAPK/JNK/MAPK8
JNK2	CMGC	MAPK	JNK	CMGC/MAPK; CMGC/MAPK/JNK; CMGC/MAPK/JNK/MAPK9
JNK3	CMGC	MAPK	JNK	CMGC/MAPK; CMGC/MAPK/JNK; CMGC/MAPK/JNK/MAPK10
NLK	CMGC	MAPK	nmo	CMGC/MAPK
p38a	CMGC	MAPK	p38	CMGC/MAPK; CMGC/MAPK/p38; CMGC/MAPK/p38/MAPK14
p38b	CMGC	MAPK	p38	CMGC/MAPK; CMGC/MAPK/p38; CMGC/MAPK/p38/MAPK11

p38g	CMGC	MAPK	p38	CMGC/MAPK; CMGC/MAPK/p38; CMGC/MAPK/p38/MAPK12
p38d	CMGC	MAPK	p38	CMGC/MAPK; CMGC/MAPK/p38; CMGC/MAPK/p38/MAPK13
MAK	CMGC	RCK		CMGC
ICK	CMGC	RCK		CMGC
MOK	CMGC	RCK		CMGC
SRPK1	CMGC	SRPK		CMGC
SRPK2	CMGC	SRPK		CMGC
MSSK1	CMGC	SRPK		CMGC
AurC	Other	AUR		Other/AUR
AurB	Other	AUR		Other/AUR; Other/AUR/AUR-B
AurA	Other	AUR		Other/AUR; Other/AUR/AUR-A
CK2a1	Other	CK2		Other/CK2; Other/CK2a
CK2a2	Other	CK2		Other/CK2; Other/CK2a
IKKa	Other	IKK		Other/IKK; Other/IKK/IKKa
IKKb	Other	IKK		Other/IKK; Other/IKK/IKKb
IKKe	Other	IKK		Other/IKK
TBK1	Other	IKK		Other/IKK
NEK1	Other	NEK		Other/NEK
NEK2	Other	NEK		Other/NEK; Other/NEK/NEK2
NEK3	Other	NEK		Other/NEK
NEK4	Other	NEK		Other/NEK
NEK6	Other	NEK		Other/NEK; Other/NEK/NEK6
NEK7	Other	NEK		Other/NEK
NEK9	Other	NEK		Other/NEK; Other/NEK/NEK9
NEK8	Other	NEK		Other/NEK
NEK5	Other	NEK		Other/NEK
NEK11	Other	NEK		Other/NEK

NEK10	Other	NEK		Other/NEK
GCN2	Other	PEK	GCN2	Other/PEK
PEK	Other	PEK	PEK	Other/PEK
PKR	Other	PEK		Other/PEK; Other/PEK/PKR
HRI	Other	PEK		Other/PEK
PLK1	Other	PLK		Other/PLK; Other/PLK/PLK1
PLK3	Other	PLK		Other/PLK
PLK4	Other	PLK		Other/PLK
PLK2	Other	PLK		Other/PLK
Wnk2	Other	Wnk		Other/Wnk
Wnk1	Other	Wnk		Other/Wnk
Wnk4	Other	Wnk		Other/Wnk
Wnk3	Other	Wnk		Other/Wnk
MAP3K1	STE	STE11		STE/STE11
MAP3K2	STE	STE11		STE/STE11
MAP3K3	STE	STE11		STE/STE11
MAP3K4	STE	STE11		STE/STE11
MAP3K5	STE	STE11		STE/STE11
MAP3K6	STE	STE11		STE/STE11
MAP3K8	STE	STE11		STE/STE11
MAP3K7	STE	STE11		STE/STE11
OSR1	STE	STE20	FRAY	STE/STE20
STLK3	STE	STE20	FRAY	STE/STE20
GCK	STE	STE20	KHS	STE/STE20
HPK1	STE	STE20	KHS	STE/STE20
KHS1	STE	STE20	KHS	STE/STE20
KHS2	STE	STE20	KHS	STE/STE20
ZC1/HGK	STE	STE20	MSN	STE/STE20

ZC2/TNIK	STE	STE20	MSN	STE/STE20
ZC3/MINK	STE	STE20	MSN	STE/STE20
ZC4/NRK	STE	STE20	MSN	STE/STE20
MST1	STE	STE20	MST	STE/STE20
MST2	STE	STE20	MST	STE/STE20
MYO3B	STE	STE20	NinaC	STE/STE20
MYO3A	STE	STE20	NinaC	STE/STE20
PAK1	STE	STE20	PAKA	STE/STE20; STE/STE20/PAKA; STE/STE20/PAKA/PAK1
PAK2	STE	STE20	PAKA	STE/STE20; STE/STE20/PAKA; STE/STE20/PAKA/PAK2
PAK3	STE	STE20	PAKA	STE/STE20; STE/STE20/PAKA; STE/STE20/PAKA/PAK3
PAK6	STE	STE20	PAKB	STE/STE20
PAK4	STE	STE20	PAKB	STE/STE20
PAK5	STE	STE20	PAKB	STE/STE20
SLK	STE	STE20	SLK	STE/STE20
LOK	STE	STE20	SLK	STE/STE20
STLK5	STE	STE20	STLK	STE/STE20
STLK6	STE	STE20	STLK	STE/STE20
TAO2	STE	STE20	TAO	STE/STE20
TAO3	STE	STE20	TAO	STE/STE20
TAO1	STE	STE20	TAO	STE/STE20
MST3	STE	STE20	YSK	STE/STE20
YSK1	STE	STE20	YSK	STE/STE20
MST4	STE	STE20	YSK	STE/STE20
MAP2K1	STE	STE7		STE/STE7; STE/STE7/MAP2K1
MAP2K2	STE	STE7		STE/STE7; STE/STE7/MAP2K2
MAP2K5	STE	STE7		STE/STE7
MAP2K6	STE	STE7		STE/STE7; STE/STE7/MAP2K6

MAP2K7	STE	STE7	STE/STE7; STE/STE7/MAP2K7
MAP2K3	STE	STE7	STE/STE7; STE/STE7/MAP2K3
MAP2K4	STE	STE7	STE/STE7
COT	STE	STE-Unique	STE/STE-Unique/COT
NIK	STE	STE-Unique	STE/STE-Unique/NIK
ABL	TK	Abl	TK/Abl; TK/Abl/Abl
ARG	TK	Abl	TK/Abl; TK/Abl/Abl2
ALK	TK	Alk	TK/Alk
LTK	TK	Alk	TK/Alk
AXL	TK	Axl	TK/Axl; TK/Axl/Axl
MER	TK	Axl	TK/Axl; TK/Axl/Mer
TYRO3	TK	Axl	TK/Axl
CSK	TK	Csk	TK/Csk
CTK	TK	Csk	TK/Csk
EGFR	TK	EGFR	TK/EGFR; TK/EGFR/EGFR
HER2/ErbB2	TK	EGFR	TK/EGFR; TK/EGFR/ErbB2
HER3/ErbB3	TK	EGFR	TK/EGFR
HER4/ErbB4	TK	EGFR	TK/EGFR
EphA1	TK	Eph	TK/Eph
EphA2	TK	Eph	TK/Eph
EphA3	TK	Eph	TK/Eph; TK/Eph/EphA3
EphA4	TK	Eph	TK/Eph
EphA5	TK	Eph	TK/Eph
EphA8	TK	Eph	TK/Eph
EphB1	TK	Eph	TK/Eph; TK/Eph/EphB1
EphB2	TK	Eph	TK/Eph; TK/Eph/EphB2
EphB3	TK	Eph	TK/Eph
EphB4	TK	Eph	TK/Eph

EphB6	TK	Eph	TK/Eph
EphA7	TK	Eph	TK/Eph
EphA10	TK	Eph	TK/Eph
EphA6	TK	Eph	TK/Eph
FAK	TK	Fak	TK/Fak; TK/Fak/FAK
PYK2	TK	Fak	TK/Fak; TK/Fak/PYK2
FER	TK	Fer	TK/Fer/Fer
FES	TK	Fer	TK/Fer/Fes
FGFR1	TK	FGFR	TK/FGFR; TK/FGFR/FGFR1
FGFR2	TK	FGFR	TK/FGFR
FGFR3	TK	FGFR	TK/FGFR; TK/FGFR/FGFR3
FGFR4	TK	FGFR	TK/FGFR
IGF1R	TK	InsR	TK/InsR; TK/InsR/IGF1R
INSR	TK	InsR	TK/InsR; TK/InsR/InsR
IRR	TK	InsR	TK/InsR
JAK1	TK	JakA	TK/JakA; TK/JakA/JAK1
JAK2	TK	JakA	TK/JakA; TK/JakA/JAK2
JAK3	TK	JakA	TK/JakA; TK/JakA/JAK3
TYK2	TK	JakA	TK/JakA; TK/JakA/TYK2
MET	TK	Met	TK/Met; TK/Met/Met
RON	TK	Met	TK/Met; TK/Met/Ron
FMS	TK	PDGFR	TK/PDGFR; ; TK/PDGFR/CSF1R
FLT3	TK	PDGFR	TK/PDGFR; ; TK/PDGFR/FLT3
KIT	TK	PDGFR	TK/PDGFR; ; TK/PDGFR/KIT
PDGFRa	TK	PDGFR	TK/PDGFR; TK/PDGFR/PDGFRa
PDGFRb	TK	PDGFR	TK/PDGFR; TK/PDGFR/PDGFRb
RET	TK	Ret	TK/Ret
BLK	TK	Src	TK/Src; TK/Src/BLK

BRK	TK	Src	TK/Src; TK/Src/Brk
FGR	TK	Src	TK/Src; TK/Src/Fgr
FYN	TK	Src	TK/Src; TK/Src/Fyn
HCK	TK	Src	TK/Src; TK/Src/HCK
LCK	TK	Src	TK/Src; TK/Src/Lck
LYN	TK	Src	TK/Src; TK/Src/Lyn
SRC	TK	Src	TK/Src; TK/Src/Src
YES	TK	Src	TK/Src; TK/Src/Yes
FRK	TK	Src	TK/Src
SRM	TK	Src	TK/Src
SYK	TK	Syk	TK/Syk; TK/Syk/Syk
ZAP70	TK	Syk	TK/Syk; TK/Syk/ZAP70
BTK	TK	Tec	TK/Tec; TK/Tec/BTK
ITK	TK	Tec	TK/Tec; TK/Tec/ITK
TEC	TK	Tec	TK/Tec; TK/Tec/Tec
TXK	TK	Tec	TK/Tec; TK/Tec/TXK
BMX	TK	Tec	TK/Tec
TIE2	TK	Tie	TK/Tie
TIE1	TK	Tie	TK/Tie
TRKA	TK	Trk	TK/Trk; TK/Trk/TRKA
TRKB	TK	Trk	TK/Trk; TK/Trk/TRKB
TRKC	TK	Trk	TK/Trk
FLT1	TK	VEGFR	TK/VEGFR; TK/VEGFR/FLT1
FLT4	TK	VEGFR	TK/VEGFR; TK/VEGFR/FLT4
KDR	TK	VEGFR	TK/VEGFR; TK/VEGFR/KDR
IRAK1	TKL	IRAK	TKL/IRAK
IRAK2	TKL	IRAK	TKL/IRAK

IRAK3	TKL	IRAK		TKL/IRAK
IRAK4	TKL	IRAK		TKL/IRAK
HH498	TKL	MLK	HH498	TKL/MLK
ILK	TKL	MLK	ILK	TKL/MLK; TKL/MLK/ILK
DLK	TKL	MLK	LZK	TKL/MLK
LZK	TKL	MLK	LZK	TKL/MLK
MLK1	TKL	MLK	MLK	TKL/MLK
MLK2	TKL	MLK	MLK	TKL/MLK
MLK3	TKL	MLK	MLK	TKL/MLK; TKL/MLK/MLK/MAP3K11
ZAK	TKL	MLK	MLK	TKL/MLK
MLK4	TKL	MLK	MLK	TKL/MLK
TAK1	TKL	MLK	TAK1	TKL/MLK; TKL/MLK/TAK1
ARAF	TKL	RAF		TKL/RAF
BRAF	TKL	RAF		TKL/RAF
KSR1	TKL	RAF		TKL/RAF
RAF1	TKL	RAF		TKL/RAF
KSR2	TKL	RAF		TKL/RAF
ALK1	TKL	STKR	Type1	TKL/STKR
ALK2	TKL	STKR	Type1	TKL/STKR
BMPR1A	TKL	STKR	Type1	TKL/STKR
ALK4	TKL	STKR	Type1	TKL/STKR
TGFbR1	TKL	STKR	Type1	TKL/STKR
BMPR1B	TKL	STKR	Type1	TKL/STKR
ALK7	TKL	STKR	Type1	TKL/STKR
ACTR2	TKL	STKR	Type2	TKL/STKR
ACTR2B	TKL	STKR	Type2	TKL/STKR
MISR2	TKL	STKR	Type2	TKL/STKR

BMPR2	TKL	STKR	Type2	TKL/STKR
TGFbR2	TKL	STKR	Type2	TKL/STKR

Supplementary Table S2. The performances of self-consistency and leave-one-out validation for 70 PK groups without less than 30 sites. Only performances of 4-fold cross-validation were shown.

Kinase Group	P.	N.	Threshold	Cutoff	Self-consistency				Leave-one-out validation				4-fold cross-validation			
					Ac	*Sn*	*Sp*	*Mcc*	*Ac*	*Sn*	*Sp*	*Mcc*	*Ac*	*Sn*	*Sp*	*Mcc*
			High	2.72	96.96%	39.14%	98.20%	0.3378	96.92%	37.45%	98.20%	0.3247	67.31%	36.74%	97.88%	0.4375
AGC	948	44079	Medium	1.94	94.44%	55.38%	95.28%	0.3116	94.40%	53.27%	95.28%	0.2997	74.01%	52.58%	95.44%	0.5315
			Low	1.59	91.86%	65.19%	92.43%	0.2923	91.79%	62.13%	92.43%	0.2777	77.44%	62.31%	92.56%	0.5757
			High	2.56	98.10%	89.29%	98.20%	0.5620	97.96%	77.38%	98.20%	0.4974	87.95%	76.82%	99.09%	0.7786
AGC/AKT	84	7329	Medium	1.64	94.81%	92.86%	94.83%	0.3859	94.78%	90.48%	94.83%	0.3762	93.41%	90.68%	96.14%	0.8695
			Low	1.21	91.89%	96.43%	91.84%	0.3239	91.84%	91.67%	91.84%	0.3072	92.50%	92.95%	92.05%	0.8500
			High	1.99	94.02%	100.00%	93.89%	0.4882	93.15%	57.58%	93.89%	0.2820	67.78%	45.00%	90.56%	0.3994
AGC/DMPK	33	1588	Medium	1.46	86.98%	100.00%	86.71%	0.3425	86.12%	57.58%	86.71%	0.1792	69.44%	55.56%	83.33%	0.4048
			Low	1.21	79.83%	100.00%	79.41%	0.2698	79.09%	63.64%	79.41%	0.1480	70.00%	61.67%	78.33%	0.4057
			High	2.35	93.59%	100.00%	93.45%	0.4834	92.52%	50.00%	93.45%	0.2389	68.06%	42.78%	93.33%	0.4185
AGC/DMPK/ROCK	32	1466	Medium	1.78	84.98%	100.00%	84.65%	0.3247	84.05%	56.25%	84.65%	0.1604	68.33%	49.44%	87.22%	0.3960
			Low	1.49	79.31%	100.00%	78.85%	0.2716	78.44%	59.38%	78.85%	0.1335	68.06%	53.33%	82.78%	0.3779
			High	1.45	95.57%	67.86%	97.20%	0.6082	93.39%	28.57%	97.20%	0.2932	62.27%	28.41%	96.14%	0.3336
AGC/GRK	84	1428	Medium	1.14	94.25%	88.10%	94.61%	0.6318	91.87%	45.24%	94.61%	0.3443	68.75%	44.55%	92.95%	0.4286
			Low	0.98	92.46%	94.05%	92.37%	0.5999	90.41%	57.14%	92.37%	0.3718	72.05%	53.86%	90.23%	0.4733
			High	3.51	96.71%	40.62%	99.28%	0.5269	95.07%	3.12%	99.28%	0.0546	51.94%	4.44%	99.44%	0.1245
AGC/GRK/BARK	32	698	Medium	2.82	97.67%	84.38%	98.28%	0.7525	94.66%	15.62%	98.28%	0.1888	56.94%	16.11%	97.78%	0.2407
			Low	2.44	97.40%	96.88%	97.42%	0.7715	94.25%	25.00%	97.42%	0.2477	62.22%	27.22%	97.22%	0.3423
			High	2.54	97.71%	65.28%	98.29%	0.5026	97.65%	62.02%	98.29%	0.4816	78.88%	59.59%	98.18%	0.6261
AGC/PKA	337	18964	Medium	1.81	95.18%	81.31%	95.43%	0.4262	95.09%	75.96%	95.43%	0.3995	85.15%	75.18%	95.12%	0.7173
			Low	1.35	92.00%	89.61%	92.04%	0.3668	91.95%	86.65%	92.04%	0.3543	88.76%	86.00%	91.53%	0.7765
			High	2.76	97.69%	78.38%	98.12%	0.6050	97.09%	51.35%	98.12%	0.4272	74.50%	50.50%	98.50%	0.5586
AGC/PKB	37	1648	Medium	1.6	95.07%	100.00%	94.96%	0.5411	94.18%	59.46%	94.96%	0.3299	76.25%	57.50%	95.00%	0.5663
			Low	1.18	91.04%	100.00%	90.84%	0.4228	90.27%	64.86%	90.84%	0.2676	79.25%	65.50%	93.00%	0.6085
			High	2.98	97.87%	79.41%	98.26%	0.6147	97.39%	55.88%	98.26%	0.4624	79.72%	61.67%	97.78%	0.6375
AGC/PKB/PDK1	34	1613	Medium	1.68	94.96%	100.00%	94.85%	0.5250	94.17%	61.76%	94.85%	0.3310	81.67%	70.00%	93.33%	0.6513
			Low	1.21	91.86%	100.00%	91.69%	0.4308	91.20%	67.65%	91.69%	0.2873	79.44%	72.22%	86.67%	0.5951
			High	3.18	96.81%	40.62%	98.07%	0.3454	96.71%	35.94%	98.07%	0.3092	67.40%	37.37%	97.42%	0.4351
AGC/PKC	384	17086	Medium	2.36	94.38%	63.80%	95.07%	0.3572	94.26%	58.33%	95.07%	0.3269	76.37%	58.56%	94.18%	0.5643

			Low	1.98	91.85%	75.00%	92.23%	0.3403	91.71%	68.49%	92.23%	0.3095	79.85%	68.71%	90.98%	0.6123
			High	3.27	96.43%	56.67%	97.16%	0.3723	96.09%	37.50%	97.16%	0.2509	66.77%	37.42%	96.13%	0.4144
AGC/PKC/Alpha	120	6609	Medium	2.43	92.64%	73.33%	92.99%	0.3202	92.36%	57.50%	92.99%	0.2477	74.76%	56.77%	92.74%	0.5307
			Low	2.04	88.81%	80.00%	88.97%	0.2783	88.60%	68.33%	88.97%	0.2329	77.58%	65.48%	89.68%	0.5685
			High	1.9	97.06%	100.00%	97.03%	0.5368	96.11%	23.33%	97.03%	0.1276	62.81%	28.12%	97.50%	0.3558
AGC/PKC/Delta	30	2388	Medium	1.44	93.18%	100.00%	93.09%	0.3784	92.43%	40.00%	93.09%	0.1406	66.88%	39.38%	94.38%	0.4041
			Low	1.2	89.78%	100.00%	89.66%	0.3116	89.12%	46.67%	89.66%	0.1296	68.12%	44.38%	91.88%	0.4119
			High	4.48	97.04%	49.11%	97.91%	0.3700	96.80%	35.71%	97.91%	0.2758	66.81%	36.38%	97.24%	0.4237
AGC/PKC/Alpha/PKCa	112	6132	Medium	3.31	93.87%	71.43%	94.28%	0.3440	93.56%	54.46%	94.28%	0.2606	73.88%	54.83%	92.93%	0.5166
			Low	2.75	90.57%	78.57%	90.79%	0.3008	90.41%	69.64%	90.79%	0.2639	78.45%	68.45%	88.45%	0.5807
			High	2.38	97.97%	100.00%	97.94%	0.6464	97.26%	53.12%	97.94%	0.3755	77.50%	58.89%	96.11%	0.5926
AGC/PKG	32	2088	Medium	1.72	94.25%	100.00%	94.16%	0.4423	93.73%	65.62%	94.16%	0.2906	80.00%	68.89%	91.11%	0.6154
			Low	1.44	91.08%	100.00%	90.95%	0.3629	90.75%	78.12%	90.95%	0.2796	79.72%	71.11%	88.33%	0.6035
			High	1.72	97.01%	92.86%	97.08%	0.5611	96.29%	50.00%	97.08%	0.3197	77.00%	57.33%	96.67%	0.5873
AGC/RSK	56	3284	Medium	1.27	94.01%	100.00%	93.91%	0.4532	93.53%	71.43%	93.91%	0.3248	81.83%	72.67%	91.00%	0.6476
			Low	1.08	91.32%	100.00%	91.17%	0.3841	91.02%	82.14%	91.17%	0.3129	83.50%	79.00%	88.00%	0.6727
			High	1.48	93.39%	100.00%	93.28%	0.4193	92.92%	69.44%	93.28%	0.2897	82.75%	73.50%	92.00%	0.6665
AGC/RSK/RSK	36	2308	Medium	1.03	87.50%	100.00%	87.31%	0.3091	87.12%	75.00%	87.31%	0.2232	82.50%	79.00%	86.00%	0.6516
			Low	0.84	82.51%	100.00%	82.24%	0.2576	82.21%	80.56%	82.24%	0.1979	80.75%	82.50%	79.00%	0.6154
			High	1.63	95.54%	59.69%	96.11%	0.3263	95.38%	50.00%	96.11%	0.2738	72.65%	50.31%	95.00%	0.5065
CAMK	258	16094	Medium	1.17	89.68%	77.91%	89.87%	0.2678	89.49%	65.89%	89.87%	0.2219	78.00%	67.62%	88.38%	0.5725
			Low	0.98	83.96%	86.82%	83.91%	0.2336	83.80%	76.74%	83.91%	0.2010	78.38%	74.77%	82.00%	0.5692
			High	2.61	97.69%	58.14%	98.23%	0.4119	97.54%	46.51%	98.23%	0.3372	71.36%	44.32%	98.41%	0.5080
CAMK/CAMK2	86	6369	Medium	1.56	94.04%	90.70%	94.08%	0.3797	93.66%	62.79%	94.08%	0.2612	78.86%	63.64%	94.09%	0.6061
			Low	1.21	90.12%	96.51%	90.03%	0.3156	89.91%	81.40%	90.03%	0.2625	83.41%	76.59%	90.23%	0.6745
			High	1.74	95.63%	86.67%	95.74%	0.4036	95.44%	70.67%	95.74%	0.3311	79.21%	63.42%	95.00%	0.6157
CAMK/CAMKL	75	6132	Medium	1.28	90.20%	97.33%	90.12%	0.3061	89.98%	78.67%	90.12%	0.2430	78.95%	70.53%	87.37%	0.5873
			Low	1.08	85.21%	100.00%	85.03%	0.2534	84.95%	78.67%	85.03%	0.1911	79.61%	76.05%	83.16%	0.5936
			High	2.06	97.12%	100.00%	97.09%	0.5146	96.71%	61.54%	97.09%	0.3277	79.25%	62.50%	96.00%	0.6209
CAMK/CAMKL/AMPK	39	3575	Medium	1.54	92.36%	100.00%	92.28%	0.3380	92.06%	71.79%	92.28%	0.2385	79.25%	69.50%	89.00%	0.5964
			Low	1.29	88.41%	100.00%	88.28%	0.2742	88.16%	76.92%	88.28%	0.2042	80.25%	75.00%	85.50%	0.6084
			High	2.51	96.43%	93.75%	96.48%	0.5633	95.18%	31.25%	96.48%	0.1967	62.22%	30.56%	93.89%	0.3159
CAMK/MAPKAPK	32	1564	Medium	1.85	91.98%	100.00%	91.82%	0.4285	91.17%	59.38%	91.82%	0.2481	73.61%	60.56%	86.67%	0.4892
			Low	1.57	88.60%	100.00%	88.36%	0.3635	87.84%	62.50%	88.36%	0.2144	76.11%	68.89%	83.33%	0.5278

			High	3.81	94.44%	83.87%	94.66%	0.4317	93.74%	48.39%	94.66%	0.2487	70.62%	42.50%	98.75%	0.4989
CAMK/MAPKAPK/MAPKAPK	31	1535	Medium	2.68	88.19%	100.00%	87.95%	0.3553	87.55%	67.74%	87.95%	0.2295	76.88%	65.00%	88.75%	0.5533
			Low	2.23	82.69%	100.00%	82.35%	0.2907	82.06%	67.74%	82.35%	0.1791	75.94%	66.88%	85.00%	0.5275
			High	2.15	93.79%	59.15%	94.81%	0.3602	93.05%	33.80%	94.81%	0.2015	60.56%	28.06%	93.06%	0.2778
CK1	71	2391	Medium	1.72	89.11%	77.46%	89.46%	0.3390	88.14%	43.66%	89.46%	0.1738	64.17%	39.44%	88.89%	0.3260
			Low	1.5	84.48%	81.69%	84.57%	0.2929	83.43%	45.07%	84.57%	0.1343	65.14%	45.28%	85.00%	0.3299
			High	2.11	92.86%	71.64%	93.49%	0.3941	91.90%	38.81%	93.49%	0.2065	60.74%	30.29%	91.18%	0.2706
CK1/CK1	67	2243	Medium	1.69	86.45%	88.06%	86.40%	0.3430	85.28%	47.76%	86.40%	0.1624	62.94%	40.59%	85.29%	0.2893
			Low	1.5	82.21%	97.01%	81.77%	0.3274	80.87%	50.75%	81.77%	0.1386	62.50%	45.29%	79.71%	0.2663
			High	2.59	94.48%	57.29%	95.38%	0.3413	94.37%	52.83%	95.38%	0.3151	73.81%	51.69%	95.93%	0.5310
CMGC	494	20297	Medium	1.46	86.84%	84.62%	86.89%	0.3066	86.77%	81.98%	86.89%	0.2958	84.17%	81.25%	87.10%	0.6846
			Low	1.09	78.67%	89.88%	78.40%	0.2463	78.62%	87.65%	78.40%	0.2384	82.56%	87.02%	78.10%	0.6538
			High	2.22	95.69%	58.75%	96.58%	0.3957	95.41%	47.19%	96.58%	0.3221	72.53%	48.95%	96.12%	0.5111
CMGC/CDK	303	12543	Medium	1.11	91.05%	90.10%	91.07%	0.3962	90.95%	85.81%	91.07%	0.3768	87.76%	85.66%	89.87%	0.7559
			Low	0.8	85.82%	94.06%	85.63%	0.3278	85.77%	91.75%	85.63%	0.3187	87.53%	90.59%	84.47%	0.7521
			High	3.13	96.36%	57.53%	97.25%	0.4156	96.08%	45.16%	97.25%	0.3332	70.85%	44.26%	97.45%	0.4925
CMGC/CDK/CDC2	186	8078	Medium	1.58	91.48%	90.32%	91.51%	0.3987	91.42%	87.63%	91.51%	0.3866	89.95%	87.45%	92.45%	0.7999
			Low	1.12	84.86%	93.01%	84.67%	0.3062	84.80%	90.32%	84.67%	0.2960	87.93%	89.79%	86.06%	0.7590
			High	5.52	97.00%	46.92%	98.03%	0.3785	96.86%	40.00%	98.03%	0.3281	68.41%	38.64%	98.18%	0.4583
CMGC/CDK/CDC2/CDC2	130	6297	Medium	2.82	93.82%	86.15%	93.98%	0.4247	93.75%	82.31%	93.98%	0.4062	88.41%	83.18%	93.64%	0.7724
			Low	1.99	89.98%	88.46%	90.01%	0.3453	89.95%	86.92%	90.01%	0.3389	87.73%	86.36%	89.09%	0.7548
			High	5.04	95.26%	80.33%	95.75%	0.5329	94.18%	45.90%	95.75%	0.3170	71.56%	47.19%	95.94%	0.4939
CMGC/CDK/CDC2/CDK2	61	1881	Medium	3.22	91.66%	95.08%	91.55%	0.4796	91.56%	91.80%	91.55%	0.4633	88.91%	85.00%	92.81%	0.7805
			Low	1.5	83.63%	100.00%	83.09%	0.3657	83.52%	96.72%	83.09%	0.3520	90.78%	97.50%	84.06%	0.8231
			High	2.21	91.64%	81.33%	91.86%	0.3518	91.12%	56.00%	91.86%	0.2358	73.29%	55.00%	91.58%	0.5005
CMGC/GSK	75	3575	Medium	1.62	80.55%	92.00%	80.31%	0.2511	80.08%	69.33%	80.31%	0.1738	75.66%	71.05%	80.26%	0.5153
			Low	1.35	76.47%	98.67%	76.00%	0.2429	76.03%	77.33%	76.00%	0.1745	76.58%	79.74%	73.42%	0.5326
			High	2.33	92.64%	95.35%	92.58%	0.4246	91.76%	51.16%	92.58%	0.2210	71.14%	51.82%	90.45%	0.4583
CMGC/GSK/GSK3B	43	2130	Medium	1.59	81.09%	100.00%	80.70%	0.2765	80.53%	72.09%	80.70%	0.1827	75.00%	70.91%	79.09%	0.5017
			Low	1.26	73.68%	100.00%	73.15%	0.2261	73.31%	81.40%	73.15%	0.1693	75.91%	79.55%	72.27%	0.5196
			High	2.11	95.51%	60.25%	96.22%	0.3631	95.32%	50.63%	96.22%	0.3069	73.50%	50.75%	96.25%	0.5278
CMGC/MAPK	239	11951	Medium	1.17	90.57%	87.87%	90.62%	0.3489	90.53%	86.19%	90.62%	0.3419	88.00%	84.75%	91.25%	0.7616
			Low	0.83	86.05%	91.21%	85.94%	0.2950	85.99%	88.28%	85.94%	0.2843	88.12%	89.33%	86.92%	0.7627
			High	2.49	94.75%	76.52%	95.01%	0.3542	94.47%	56.52%	95.01%	0.2610	77.33%	59.31%	95.34%	0.5859

CMGC/MAPK/ERK	115	8100	Medium	1.47	89.64%	90.43%	89.63%	0.2949	89.58%	86.09%	89.63%	0.2796	87.07%	84.66%	89.48%	0.7422
			Low	1.03	84.38%	95.65%	84.22%	0.2504	84.28%	88.70%	84.22%	0.2291	86.55%	88.10%	85.00%	0.7314
			High	3.79	94.17%	82.93%	94.32%	0.3527	94.01%	70.73%	94.32%	0.3004	81.79%	68.57%	95.00%	0.6592
CMGC/MAPK/ERK/MAPK1	82	6132	Medium	2.21	88.82%	91.46%	88.78%	0.2790	88.77%	87.80%	88.78%	0.2667	87.38%	85.95%	88.81%	0.7479
			Low	1.47	82.38%	96.34%	82.19%	0.2292	82.31%	91.46%	82.19%	0.2152	85.36%	90.95%	79.76%	0.7116
			High	3.21	94.03%	83.33%	94.15%	0.3341	93.69%	55.00%	94.15%	0.2170	77.34%	59.06%	95.62%	0.5876
CMGC/MAPK/ERK/MAPK3	60	4995	Medium	1.9	88.15%	93.33%	88.09%	0.2632	88.03%	83.33%	88.09%	0.2318	87.03%	83.44%	90.62%	0.7425
			Low	1.47	83.24%	98.33%	83.06%	0.2299	83.13%	88.33%	83.06%	0.2022	86.72%	90.00%	83.44%	0.7360
			High	2.65	98.03%	97.44%	98.04%	0.7095	96.39%	23.08%	98.04%	0.2013	62.00%	26.00%	98.00%	0.3458
CMGC/MAPK/JNK	39	1734	Medium	1.49	92.55%	100.00%	92.39%	0.4590	91.93%	71.79%	92.39%	0.3285	85.00%	75.50%	94.50%	0.7130
			Low	1.13	88.89%	100.00%	88.64%	0.3827	88.49%	82.05%	88.64%	0.3092	85.50%	81.00%	90.00%	0.7129
			High	2.65	95.31%	83.33%	95.62%	0.5095	94.69%	59.26%	95.62%	0.3713	78.39%	58.57%	98.21%	0.6185
CMGC/MAPK/p38	54	2057	Medium	1.63	88.44%	100.00%	88.14%	0.3996	87.83%	75.93%	88.14%	0.2960	84.64%	76.43%	92.86%	0.7024
			Low	1.3	82.61%	100.00%	82.16%	0.3246	82.09%	79.63%	82.16%	0.2466	83.04%	81.43%	84.64%	0.6611
			High	2.51	96.42%	80.43%	96.85%	0.5568	95.74%	54.35%	96.85%	0.3945	73.54%	50.83%	96.25%	0.5285
CMGC/MAPK/p38/MAPK14	46	1715	Medium	1.61	91.14%	100.00%	90.90%	0.4550	90.29%	67.39%	90.90%	0.3018	76.04%	62.50%	89.58%	0.5411
			Low	1.29	87.00%	100.00%	86.65%	0.3807	86.14%	67.39%	86.65%	0.2430	76.88%	68.75%	85.00%	0.5447
			High	2.41	96.81%	54.17%	97.79%	0.4279	95.99%	18.33%	97.79%	0.1517	58.95%	20.81%	97.10%	0.2769
STE	120	5170	Medium	1.9	93.53%	73.33%	94.00%	0.3801	92.84%	42.50%	94.00%	0.2155	68.23%	41.77%	94.68%	0.4295
			Low	1.65	90.76%	81.67%	90.97%	0.3501	90.23%	58.33%	90.97%	0.2431	72.82%	53.55%	92.10%	0.4947
			High	1.7	97.84%	88.46%	98.12%	0.7124	96.19%	32.69%	98.12%	0.3172	68.21%	37.50%	98.93%	0.4617
STE/STE7	52	1705	Medium	1.16	95.28%	100.00%	95.13%	0.6053	94.42%	71.15%	95.13%	0.4453	80.18%	64.64%	95.71%	0.6350
			Low	0.95	92.66%	100.00%	92.43%	0.5153	92.09%	80.77%	92.43%	0.4185	81.25%	70.00%	92.50%	0.6414
			High	1.8	97.59%	88.33%	97.77%	0.6150	96.28%	21.67%	97.77%	0.1689	60.47%	23.44%	97.50%	0.3116
STE/STE20	60	3007	Medium	1.4	94.13%	100.00%	94.01%	0.4848	92.92%	38.33%	94.01%	0.1802	68.28%	42.50%	94.06%	0.4267
			Low	1.22	91.20%	100.00%	91.02%	0.4068	90.38%	58.33%	91.02%	0.2284	71.09%	51.88%	90.31%	0.4570
			High	1.77	96.93%	96.08%	96.95%	0.6057	95.45%	23.53%	96.95%	0.1579	62.50%	27.69%	97.31%	0.3482
STE/STE20/PAKA	51	2457	Medium	1.36	92.78%	100.00%	92.63%	0.4513	91.71%	47.06%	92.63%	0.2045	70.58%	48.46%	92.69%	0.4589
			Low	1.16	88.84%	100.00%	88.60%	0.3695	87.96%	56.86%	88.60%	0.1952	72.69%	55.38%	90.00%	0.4838
			High	2.38	88.68%	39.06%	94.92%	0.3763	88.24%	35.11%	94.92%	0.3403	65.61%	35.85%	95.36%	0.3884
TK	658	5235	Medium	2.05	85.75%	53.50%	89.80%	0.3815	85.13%	48.02%	89.80%	0.3391	69.20%	47.64%	90.76%	0.4255
			Low	1.81	81.47%	62.16%	83.90%	0.3546	81.06%	58.51%	83.90%	0.3288	71.27%	57.94%	84.61%	0.4414
			High	2.79	93.56%	78.43%	94.88%	0.6362	90.58%	41.18%	94.88%	0.3606	65.96%	38.08%	93.85%	0.3846
TK/Abl	51	586	Medium	2.3	88.85%	94.12%	88.40%	0.5802	85.24%	49.02%	88.40%	0.2876	68.85%	47.69%	90.00%	0.4160

			Low	1.97	84.30%	98.04%	83.11%	0.5202	81.16%	58.82%	83.11%	0.2832	69.62%	53.85%	85.38%	0.4134
			High	2.65	94.48%	86.00%	95.21%	0.6941	91.01%	42.00%	95.21%	0.3755	68.65%	45.38%	91.92%	0.4215
TK/Abl/Abl	50	584	Medium	2.17	88.33%	96.00%	87.67%	0.5757	84.54%	48.00%	87.67%	0.2682	71.15%	56.15%	86.15%	0.4435
			Low	1.86	84.70%	100.00%	83.39%	0.5326	81.39%	58.00%	83.39%	0.2796	72.12%	63.46%	80.77%	0.4491
			High	2.8	91.67%	87.93%	92.15%	0.6793	86.51%	43.10%	92.15%	0.3474	64.33%	40.67%	88.00%	0.3254
TK/EGFR	58	446	Medium	2.32	87.30%	93.10%	86.55%	0.6076	83.73%	62.07%	86.55%	0.3951	68.67%	56.67%	80.67%	0.3846
			Low	1.99	81.15%	98.28%	78.92%	0.5378	77.58%	67.24%	78.92%	0.3343	71.00%	67.67%	74.33%	0.4209
			High	3.23	92.32%	84.91%	93.27%	0.6827	88.49%	50.94%	93.27%	0.4351	69.82%	47.86%	91.79%	0.4413
TK/EGFR/EGFR	53	416	Medium	2.68	87.63%	94.34%	86.78%	0.6161	83.16%	54.72%	86.78%	0.3426	69.46%	56.43%	82.50%	0.4032
			Low	2.31	81.45%	98.11%	79.33%	0.5380	77.19%	60.38%	79.33%	0.2897	70.00%	64.64%	75.36%	0.4023
			High	2.54	89.30%	100.00%	87.79%	0.6858	83.13%	50.00%	87.79%	0.3320	65.94%	41.25%	90.62%	0.3665
TK/FGFR	30	213	Medium	2.14	84.36%	100.00%	82.16%	0.6021	79.01%	56.67%	82.16%	0.3052	65.00%	45.00%	85.00%	0.3273
			Low	1.84	78.19%	100.00%	75.12%	0.5211	72.84%	56.67%	75.12%	0.2309	61.56%	46.88%	76.25%	0.2419
			High	2.54	91.97%	88.33%	92.55%	0.7165	85.55%	41.67%	92.55%	0.3608	67.66%	43.12%	92.19%	0.4053
TK/InsR	60	376	Medium	2.09	87.16%	93.33%	86.17%	0.6345	81.65%	53.33%	86.17%	0.3451	73.44%	60.31%	86.56%	0.4858
			Low	1.79	82.11%	96.67%	79.79%	0.5708	78.44%	70.00%	79.79%	0.3860	72.81%	66.56%	79.06%	0.4599
			High	3.32	89.02%	80.00%	90.41%	0.6106	84.57%	46.67%	90.41%	0.3578	68.33%	47.08%	89.58%	0.4051
TK/InsR/InsR	45	292	Medium	2.72	85.76%	91.11%	84.93%	0.5956	81.60%	60.00%	84.93%	0.3748	72.29%	59.17%	85.42%	0.4620
			Low	2.29	79.23%	95.56%	76.71%	0.5230	75.37%	66.67%	76.71%	0.3249	68.75%	65.00%	72.50%	0.3761
			High	2.68	97.17%	93.48%	97.54%	0.8477	92.11%	39.13%	97.54%	0.4534	64.79%	33.75%	95.83%	0.3774
TK/JakA	46	448	Medium	2.22	90.89%	100.00%	89.96%	0.6743	86.23%	50.00%	89.96%	0.3370	68.96%	46.67%	91.25%	0.4236
			Low	1.92	87.25%	100.00%	85.94%	0.6022	83.20%	56.52%	85.94%	0.3210	71.04%	56.67%	85.42%	0.4394
			High	2.59	91.60%	56.70%	94.87%	0.4911	90.55%	44.44%	94.87%	0.3945	68.56%	42.20%	94.92%	0.4369
TK/Src	261	2788	Medium	2.16	87.57%	66.67%	89.53%	0.4369	86.75%	57.09%	89.53%	0.3708	73.11%	57.35%	88.86%	0.4869
			Low	1.86	82.62%	73.95%	83.43%	0.3908	81.96%	66.28%	83.43%	0.3425	74.39%	66.14%	82.65%	0.4947
			High	3.54	92.43%	73.47%	94.27%	0.5977	89.19%	36.73%	94.27%	0.3159	65.58%	38.46%	92.69%	0.3708
TK/Src/Fyn	49	506	Medium	2.88	88.11%	85.71%	88.34%	0.5445	85.41%	55.10%	88.34%	0.3406	69.62%	55.00%	84.23%	0.4102
			Low	2.43	83.42%	97.96%	82.02%	0.5237	80.36%	63.27%	82.02%	0.3102	70.58%	62.69%	78.46%	0.4168
			High	3.13	93.14%	95.00%	92.95%	0.7136	87.47%	35.00%	92.95%	0.2764	61.59%	33.18%	90.00%	0.2817
TK/Src/Lyn	40	383	Medium	2.56	89.13%	100.00%	87.99%	0.6397	83.69%	42.50%	87.99%	0.2506	62.73%	40.91%	84.55%	0.2829
			Low	2.18	84.40%	100.00%	82.77%	0.5589	79.91%	52.50%	82.77%	0.2553	65.68%	54.09%	77.27%	0.3224
			High	3.35	92.59%	74.47%	94.32%	0.6040	90.93%	55.32%	94.32%	0.4664	74.38%	55.42%	93.33%	0.5268
TK/Src/Lck	47	493	Medium	2.69	90.56%	93.62%	90.26%	0.6289	87.96%	63.83%	90.26%	0.4338	77.71%	67.50%	87.92%	0.5661
			Low	2.26	86.30%	97.87%	85.19%	0.5649	84.07%	72.34%	85.19%	0.4069	78.54%	73.33%	83.75%	0.5740

			High	2.77	91.97%	63.24%	94.26%	0.5014	90.46%	42.65%	94.26%	0.3467	67.79%	40.71%	94.86%	0.4231
TK/Src/Src	136	1708	Medium	2.31	87.96%	71.32%	89.29%	0.4414	86.82%	55.88%	89.29%	0.3398	72.14%	55.29%	89.00%	0.4704
			Low	2.01	82.00%	75.00%	82.55%	0.3650	81.40%	66.91%	82.55%	0.3169	73.93%	63.71%	84.14%	0.4889
			High	2.79	92.59%	89.23%	93.11%	0.7311	90.33%	72.31%	93.11%	0.6131	79.56%	67.35%	91.76%	0.6096
TK/Syk	65	421	Medium	2.21	88.07%	96.92%	86.70%	0.6619	85.19%	75.38%	86.70%	0.5135	81.03%	75.00%	87.06%	0.6252
			Low	1.82	82.10%	96.92%	79.81%	0.5675	80.04%	81.54%	79.81%	0.4631	82.21%	83.53%	80.88%	0.6443
			High	3.71	93.23%	90.20%	93.68%	0.7448	90.23%	66.67%	93.68%	0.5801	83.65%	74.23%	93.08%	0.6854
TK/Syk/Syk	51	348	Medium	2.87	89.47%	94.12%	88.79%	0.6704	87.47%	78.43%	88.79%	0.5633	86.54%	84.23%	88.85%	0.7315
			Low	2.32	82.21%	96.08%	80.17%	0.5579	80.95%	86.27%	80.17%	0.4924	85.00%	88.85%	81.15%	0.7021
			High	3.84	95.43%	96.77%	95.31%	0.7731	92.20%	58.06%	95.31%	0.5119	70.31%	45.62%	95.00%	0.4672
TK/Tec	31	341	Medium	3.13	90.05%	100.00%	89.15%	0.6375	86.83%	61.29%	89.15%	0.3898	71.25%	53.75%	88.75%	0.4537
			Low	2.68	84.41%	100.00%	82.99%	0.5377	81.99%	70.97%	82.99%	0.3630	71.56%	61.88%	81.25%	0.4396
			High	2.87	91.59%	93.18%	91.41%	0.6793	88.32%	61.36%	91.41%	0.4616	73.96%	55.83%	92.08%	0.5141
TK/PDGFR	44	384	Medium	2.32	87.62%	97.73%	86.46%	0.6152	85.05%	72.73%	86.46%	0.4526	75.42%	67.50%	83.33%	0.5148
			Low	1.96	81.78%	100.00%	79.69%	0.5361	78.97%	72.73%	79.69%	0.3643	76.25%	75.00%	77.50%	0.5252
			High	1.49	97.90%	100.00%	97.84%	0.7383	96.34%	41.03%	97.84%	0.3551	67.00%	37.00%	97.00%	0.4250
TKL	39	1438	Medium	1.18	94.92%	100.00%	94.78%	0.5694	93.64%	51.28%	94.78%	0.3011	67.75%	43.50%	92.00%	0.4059
			Low	1.03	91.54%	100.00%	91.31%	0.4660	90.39%	56.41%	91.31%	0.2556	66.25%	46.00%	86.50%	0.3555
			High	2.79	97.59%	67.03%	98.12%	0.4931	97.13%	39.56%	98.12%	0.3095	70.87%	42.17%	99.57%	0.5097
Atypical/PIKK	91	5306	Medium	1.38	93.50%	93.41%	93.50%	0.4132	93.29%	81.32%	93.50%	0.3600	87.50%	82.39%	92.61%	0.7539
			Low	1.08	89.77%	96.70%	89.65%	0.3446	89.61%	86.81%	89.65%	0.3070	87.50%	86.30%	88.70%	0.7502
			High	2.81	96.23%	98.18%	96.20%	0.5123	96.04%	85.45%	96.20%	0.4510	91.43%	86.07%	96.79%	0.8334
Atypical/PIKK/ATM	55	3685	Medium	1.55	94.76%	100.00%	94.68%	0.4555	94.73%	98.18%	94.68%	0.4476	96.25%	97.14%	95.36%	0.9251
			Low	1.2	94.47%	100.00%	94.38%	0.4451	94.44%	98.18%	94.38%	0.4373	96.79%	98.57%	95.00%	0.9363
			High	1.81	96.10%	79.17%	96.64%	0.5676	94.92%	41.67%	96.64%	0.3196	64.47%	33.42%	95.53%	0.3693
Other/AUR	72	2233	Medium	1.37	91.45%	93.06%	91.40%	0.4652	90.28%	55.56%	91.40%	0.2715	68.16%	47.63%	88.68%	0.3983
			Low	1.16	85.81%	100.00%	85.36%	0.3925	84.51%	58.33%	85.36%	0.2073	70.92%	56.84%	85.00%	0.4361
			High	3.03	96.65%	93.94%	96.74%	0.6719	94.82%	39.39%	96.74%	0.3148	0.9508	0.4556	0.9695	0.3804
Other/AUR/AUR-B	33	951	Medium	2.04	91.87%	100.00%	91.59%	0.5172	90.85%	69.70%	91.59%	0.3604	0.899	0.7333	0.9053	0.3709
			Low	1.63	86.89%	100.00%	86.44%	0.4196	86.18%	78.79%	86.44%	0.3223	0.8516	0.7944	0.8538	0.3235
			High	5.14	93.71%	71.95%	94.34%	0.4146	93.64%	69.31%	94.34%	0.3999	82.07%	70.20%	93.95%	0.6603
Other/CK2	303	10528	Medium	3.57	88.56%	81.52%	88.76%	0.3424	88.52%	80.20%	88.76%	0.3363	84.80%	81.32%	88.29%	0.6978
			Low	2.86	84.37%	85.81%	84.33%	0.3035	84.32%	84.16%	84.33%	0.2966	84.61%	85.46%	83.75%	0.6922
			High	2.3	93.33%	78.50%	93.66%	0.3881	93.15%	70.09%	93.66%	0.3465	81.76%	69.81%	93.70%	0.6541

Other/CK2/CK2a	107	4871	Medium	1.6	88.05%	89.72%	88.01%	0.3282	87.81%	78.50%	88.01%	0.2830	83.33%	79.44%	87.22%	0.6687
			Low	1.29	84.15%	94.39%	83.93%	0.2972	83.89%	82.24%	83.93%	0.2526	83.52%	84.26%	82.78%	0.6704
			High	1.46	97.08%	100.00%	97.00%	0.6886	94.99%	25.00%	97.00%	0.1941	62.08%	26.67%	97.50%	0.3424
Other/IKK	44	1534	Medium	1.14	92.27%	100.00%	92.05%	0.4939	90.87%	50.00%	92.05%	0.2404	66.25%	38.33%	94.17%	0.3917
			Low	0.98	89.16%	100.00%	88.85%	0.4264	87.77%	50.00%	88.85%	0.1952	67.71%	44.58%	90.83%	0.3995
			High	1.5	94.36%	100.00%	94.23%	0.5070	92.81%	27.08%	94.23%	0.1271	56.35%	21.92%	90.77%	0.1750
Other/PLK	48	2220	Medium	1.21	87.79%	100.00%	87.52%	0.3595	86.38%	33.33%	87.52%	0.0895	57.50%	34.23%	80.77%	0.1695
			Low	1.07	82.98%	100.00%	82.61%	0.3023	81.66%	37.50%	82.61%	0.0757	57.31%	40.77%	73.85%	0.1549
			High	1.43	97.88%	100.00%	97.84%	0.6956	95.95%	6.67%	97.84%	0.0432	52.92%	7.08%	98.75%	0.1460
Other/PLK/PLK1	45	2129	Medium	1.14	94.99%	100.00%	94.88%	0.5265	93.15%	11.11%	94.88%	0.0383	56.46%	19.58%	93.33%	0.1913
			Low	1	92.00%	100.00%	91.83%	0.4344	90.39%	22.22%	91.83%	0.0719	57.29%	23.33%	91.25%	0.1987

Supplementary Table S3. The performances of self-consistency and leave-one-out validation for other PK groups with less than 30 sites.

Kinase Group	P.	N.	Threshold Cutoff		Self-consistency				Leave-one-out validation			
					Ac	*Sn*	*Sp*	*Mcc*	*Ac*	*Sn*	*Sp*	*Mcc*
AGC/AKT/AKT2	4	366	High	3.51	97.84%	100.00%	97.81%	0.5710	97.30%	50.00%	97.81%	0.305
			Medium	2.26	93.51%	100.00%	93.44%	0.3654	92.97%	50.00%	93.44%	0.176
			Low	1.5	86.49%	100.00%	86.34%	0.2529	85.95%	50.00%	86.34%	0.108
AGC/DMPK/ROCK/ROCK1	13	719	High	4.3	98.77%	100.00%	98.75%	0.7639	97.27%	15.38%	98.75%	0.153
			Medium	3.53	97.40%	100.00%	97.36%	0.6289	95.90%	15.38%	97.36%	0.101
			Low	3.23	96.99%	100.00%	96.94%	0.6001	95.49%	15.38%	96.94%	0.091
AGC/GRK/BARK/GRK-2	28	590	High	2.86	98.87%	96.43%	98.98%	0.8826	94.98%	10.71%	98.98%	0.168
			Medium	2.29	98.22%	96.43%	98.14%	0.8394	94.66%	21.43%	98.14%	0.249
			Low	2	97.41%	100.00%	97.29%	0.7868	94.01%	25.00%	97.29%	0.245
AGC/GRK/BARK/GRK-3	4	108	High	4.51	99.11%	100.00%	99.07%	0.8903	95.54%	0.00%	99.07%	-0.018
			Medium	3.26	97.32%	100.00%	97.22%	0.7454	93.75%	0.00%	97.22%	-0.032
			Low	2.51	92.86%	100.00%	92.59%	0.5556	89.29%	0.00%	92.59%	-0.053
AGC/GRK/GRK	25	609	High	2.33	97.48%	100.00%	97.37%	0.7705	94.95%	36.00%	97.37%	0.334
			Medium	1.84	95.43%	100.00%	95.24%	0.6640	92.90%	36.00%	95.24%	0.256
			Low	1.6	93.53%	100.00%	93.27%	0.5944	91.01%	36.00%	93.27%	0.211
AGC/GRK/GRK/GRK-1	8	123	High	4.88	96.18%	100.00%	95.93%	0.7684	91.60%	25.00%	95.93%	0.223
			Medium	3.63	96.18%	100.00%	95.93%	0.7684	91.60%	25.00%	95.93%	0.223
			Low	3.01	94.66%	100.00%	94.31%	0.7092	90.08%	25.00%	94.31%	0.183
AGC/GRK/GRK/GRK-4	4	227	High	4.51	98.27%	100.00%	98.24%	0.7008	96.54%	0.00%	98.24%	-0.018
			Medium	3.26	95.67%	100.00%	95.59%	0.5226	94.37%	25.00%	95.59%	0.126
			Low	2.51	91.34%	100.00%	91.19%	0.3898	90.48%	50.00%	91.19%	0.183
AGC/GRK/GRK/GRK-5	11	170	High	2.19	97.79%	100.00%	97.65%	0.8462	94.48%	45.45%	97.65%	0.474
			Medium	1.64	93.92%	100.00%	93.53%	0.6838	90.61%	45.45%	93.53%	0.328
			Low	1.28	87.85%	100.00%	87.06%	0.5387	84.53%	45.45%	87.06%	0.218
AGC/PKC/Eta	13	990	High	2.7	95.91%	100.00%	95.86%	0.4804	94.82%	15.38%	95.86%	0.063
			Medium	1.93	90.93%	100.00%	90.81%	0.3369	90.33%	53.85%	90.81%	0.170
			Low	1.62	87.64%	100.00%	87.47%	0.2881	87.04%	53.85%	87.47%	0.139
			High	2.91	97.34%	100.00%	97.30%	0.5783	96.19%	18.18%	97.30%	0.108

AGC/PKC/Iota	11	777	Medium	2.1	93.15%	100.00%	93.05%	0.3968	92.13%	27.27%	93.05%	0.092
			Low	1.64	89.34%	100.00%	89.19%	0.3214	88.71%	54.55%	89.19%	0.161
			High	3.58	96.63%	100.00%	96.56%	0.5965	95.22%	28.57%	96.56%	0.180
AGC/PKC/Alpha/PKCb	14	698	Medium	2.58	91.57%	100.00%	91.40%	0.4158	90.31%	35.71%	91.40%	0.131
			Low	2.15	86.10%	100.00%	85.82%	0.3261	84.83%	35.71%	85.82%	0.085
			High	3.01	97.87%	100.00%	97.79%	0.7818	94.33%	0.00%	97.79%	-0.028
AGC/PKC/Alpha/PKCg	5	136	Medium	2	93.62%	100.00%	93.38%	0.5775	90.07%	0.00%	93.38%	-0.050
			Low	1.6	92.91%	100.00%	92.65%	0.5557	90.78%	40.00%	92.65%	0.216
			High	2.05	97.44%	100.00%	97.41%	0.5418	96.48%	13.64%	97.41%	0.071
AGC/PKC/Delta/PKCd	22	1967	Medium	1.55	94.42%	100.00%	94.36%	0.3951	93.72%	36.36%	94.36%	0.136
			Low	1.32	90.65%	100.00%	90.54%	0.3095	90.05%	45.45%	90.54%	0.126
			High	2.51	96.27%	100.00%	96.23%	0.4830	95.38%	25.00%	96.23%	0.117
AGC/PKC/Delta/PKCt	8	663	Medium	1.75	91.36%	100.00%	91.25%	0.3326	90.46%	25.00%	91.25%	0.062
			Low	1.38	86.29%	100.00%	86.12%	0.2625	85.39%	25.00%	86.12%	0.035
			High	4.12	94.87%	100.00%	94.81%	0.4131	94.12%	33.33%	94.81%	0.130
AGC/PKC/Eta/PKCe	9	790	Medium	2.89	90.74%	100.00%	90.63%	0.3135	90.61%	88.89%	90.63%	0.277
			Low	2.34	87.61%	100.00%	87.47%	0.2700	87.48%	88.89%	87.47%	0.237
			High	3.26	99.02%	100.00%	99.00%	0.8124	97.06%	0.00%	99.00%	-0.014
AGC/PKC/Eta/PKCh	4	200	Medium	2.26	97.55%	100.00%	97.50%	0.6583	95.59%	0.00%	97.50%	-0.022
			Low	1.75	94.12%	100.00%	94.00%	0.4848	92.16%	0.00%	94.00%	-0.035
			High	2.73	97.08%	100.00%	97.04%	0.5603	96.07%	27.27%	97.04%	0.160
AGC/PKC/Iota/PKCz	11	777	Medium	1.91	92.51%	100.00%	92.41%	0.3811	91.75%	45.45%	92.41%	0.163
			Low	1.55	87.44%	100.00%	87.26%	0.2954	86.80%	54.55%	87.26%	0.144
			High	2.47	95.55%	100.00%	95.46%	0.5311	94.54%	46.15%	95.46%	0.251
AGC/PKG/PKG1	13	683	Medium	1.7	89.66%	100.00%	89.46%	0.3699	89.37%	84.62%	89.46%	0.309
			Low	1.31	84.48%	100.00%	84.19%	0.3007	84.34%	92.31%	84.19%	0.274
			High	4.01	96.05%	100.00%	95.98%	0.5366	95.48%	66.67%	95.98%	0.368
AGC/PKG/PKG2	3	174	Medium	2.34	90.40%	100.00%	90.23%	0.3679	89.83%	66.67%	90.23%	0.237
			Low	1.67	85.31%	100.00%	85.06%	0.2966	84.75%	66.67%	85.06%	0.183
			High	3.42	95.27%	100.00%	95.20%	0.4733	94.79%	66.67%	95.20%	0.320
AGC/RSK/p70	12	813	Medium	2.42	89.21%	100.00%	89.05%	0.3253	89.09%	91.67%	89.05%	0.296
			Low	1.92	83.39%	100.00%	83.15%	0.2588	83.27%	91.67%	83.15%	0.234
			High	4.45	96.06%	100.00%	95.92%	0.6741	93.70%	33.33%	95.92%	0.245
AGC/RSK/MSK/RSK5	9	245	Medium	3.46	93.31%	100.00%	93.06%	0.5676	91.73%	55.56%	93.06%	0.320

			Low	3.01	90.94%	100.00%	90.61%	0.5048	89.37%	55.56%	90.61%	0.273
			High	2.11	94.88%	100.00%	94.76%	0.5359	93.32%	30.00%	94.76%	0.156
AGC/RSK/RSK/RSK1	10	439	Medium	1.4	89.31%	100.00%	89.07%	0.3919	88.42%	60.00%	89.07%	0.223
			Low	1.1	85.97%	100.00%	85.65%	0.3425	85.08%	60.00%	85.65%	0.187
			High	2.91	96.03%	100.00%	95.97%	0.5093	95.59%	70.00%	95.97%	0.364
AGC/RSK/RSK/RSK2	10	670	Medium	2.11	91.62%	100.00%	91.49%	0.3695	91.47%	90.00%	91.49%	0.331
			Low	1.7	85.59%	100.00%	85.37%	0.2812	85.44%	90.00%	85.37%	0.249
			High	3.01	96.38%	100.00%	96.32%	0.5226	96.23%	89.47%	96.32%	0.472
AGC/SGK	19	1306	Medium	2.06	91.47%	100.00%	91.35%	0.3626	91.32%	89.47%	91.35%	0.323
			Low	1.64	86.94%	100.00%	86.75%	0.2930	86.79%	89.47%	86.75%	0.259
			High	2.57	96.41%	100.00%	96.38%	0.4285	96.04%	56.25%	96.38%	0.244
CAMK/CAMK1	16	1876	Medium	1.75	89.69%	100.00%	89.61%	0.2607	89.48%	75.00%	89.61%	0.190
			Low	1.38	84.99%	100.00%	84.86%	0.2127	84.78%	75.00%	84.86%	0.151
			High	3.26	94.77%	100.00%	94.70%	0.4247	94.15%	50.00%	94.70%	0.210
CAMK/CAMK1/CAMK1a	4	321	Medium	1.75	86.77%	100.00%	86.60%	0.2715	86.46%	75.00%	86.60%	0.195
			Low	1.25	81.85%	100.00%	81.62%	0.2276	81.54%	75.00%	81.62%	0.159
			High	3.56	95.70%	100.00%	95.67%	0.3668	95.31%	44.44%	95.67%	0.160
CAMK/CAMK1/CAMK4	9	1271	Medium	2.23	88.67%	100.00%	88.59%	0.2275	88.28%	44.44%	88.59%	0.086
			Low	1.78	84.06%	100.00%	83.95%	0.1883	83.67%	44.44%	83.95%	0.064
			High	3.21	98.07%	100.00%	98.04%	0.6199	97.29%	37.93%	98.04%	0.260
CAMK/CAMK2/CAMK2a	29	2299	Medium	1.9	94.29%	100.00%	94.21%	0.4107	94.07%	82.76%	94.21%	0.340
			Low	1.45	90.59%	100.00%	90.47%	0.3253	90.51%	93.10%	90.47%	0.302
			High	2.43	95.86%	100.00%	95.74%	0.6279	95.03%	71.43%	95.74%	0.467
CAMK/CAMKL/CHK1	14	469	Medium	1.72	90.06%	100.00%	89.77%	0.4502	89.44%	78.57%	89.77%	0.350
			Low	1.43	86.34%	100.00%	85.93%	0.3878	85.71%	78.57%	85.93%	0.296
			High	2.74	97.41%	100.00%	97.38%	0.5062	97.34%	93.33%	97.38%	0.476
CAMK/CAMKL/LKB	15	1604	Medium	1.14	91.79%	100.00%	91.71%	0.3049	91.72%	93.33%	91.71%	0.284
			Low	0.74	88.76%	100.00%	88.65%	0.2598	88.70%	93.33%	88.65%	0.241
			High	3.05	95.74%	95.24%	95.76%	0.5545	94.57%	42.86%	95.76%	0.259
CAMK/DAPK	21	919	Medium	2.15	90.74%	100.00%	90.53%	0.4196	90.00%	66.67%	90.53%	0.273
			Low	1.72	86.38%	100.00%	86.07%	0.3483	85.64%	66.67%	86.07%	0.218
			High	3.18	95.07%	100.00%	94.93%	0.5860	93.76%	52.94%	94.93%	0.322
CAMK/DAPK/DAPK3	17	592	Medium	2.24	87.68%	100.00%	87.33%	0.4017	86.70%	64.71%	87.33%	0.246
			Low	1.77	79.47%	100.00%	78.89%	0.3073	78.82%	76.47%	78.89%	0.218

			High	3.41	97.56%	100.00%	97.40%	0.8341	93.90%	40.00%	97.40%	0.416
CAMK/MLCK	5	77	Medium	2.21	92.68%	100.00%	92.21%	0.6474	89.02%	40.00%	92.21%	0.260
			Low	1.6	89.02%	100.00%	88.31%	0.5616	85.37%	40.00%	88.31%	0.199
			High	1.96	95.54%	100.00%	95.40%	0.6178	93.92%	45.45%	95.40%	0.297
CAMK/PHK	22	718	Medium	1.46	92.16%	100.00%	91.92%	0.5028	90.95%	59.09%	91.92%	0.294
			Low	1.23	87.70%	100.00%	87.33%	0.4123	86.49%	59.09%	87.33%	0.227
			High	3.26	95.94%	100.00%	95.85%	0.5653	94.92%	50.00%	95.85%	0.295
CAMK/PKD	8	386	Medium	2.13	91.12%	100.00%	90.93%	0.4113	90.86%	87.50%	90.93%	0.359
			Low	1.76	87.82%	100.00%	87.56%	0.3537	87.56%	87.50%	87.56%	0.306
			High	2.81	97.80%	100.00%	97.76%	0.6666	97.07%	60.00%	97.76%	0.434
CAMK/PKD/PKD1	5	268	Medium	1.8	94.14%	100.00%	94.03%	0.4732	93.41%	60.00%	94.03%	0.285
			Low	1.2	90.48%	100.00%	90.30%	0.3816	90.11%	80.00%	90.30%	0.301
			High	2.36	97.76%	100.00%	97.71%	0.6793	96.93%	58.82%	97.71%	0.436
CAMK/RAD53	17	831	Medium	1.77	93.87%	100.00%	93.74%	0.4806	93.28%	70.59%	93.74%	0.341
			Low	1.42	89.03%	100.00%	88.81%	0.3705	88.44%	70.59%	88.81%	0.253
			High	2	95.91%	100.00%	95.77%	0.6436	93.96%	37.50%	95.77%	0.259
CK1/CK1/CK1a	16	497	Medium	1.5	92.98%	100.00%	92.76%	0.5342	91.03%	37.50%	92.76%	0.192
			Low	1.19	86.94%	100.00%	86.52%	0.4084	85.96%	68.75%	86.52%	0.268
			High	2.84	99.40%	100.00%	99.38%	0.9229	95.81%	0.00%	99.38%	-0.015
CK1/CK1/CK1d	6	161	Medium	2	95.21%	100.00%	95.03%	0.6382	91.62%	0.00%	95.03%	-0.043
			Low	1.5	92.22%	100.00%	91.93%	0.5388	89.82%	33.33%	91.93%	0.164
			High	2.1	98.06%	100.00%	98.03%	0.6206	97.03%	18.18%	98.03%	0.124
CK1/CK1/CK1e	11	865	Medium	1.46	95.32%	100.00%	95.26%	0.4489	94.41%	27.27%	95.26%	0.115
			Low	1.19	92.69%	100.00%	92.60%	0.3685	91.89%	36.36%	92.60%	0.121
			High	4.51	97.37%	100.00%	97.30%	0.6975	94.74%	0.00%	97.30%	-0.027
CK1/VRK	4	148	Medium	3.01	93.42%	100.00%	93.24%	0.5161	90.79%	0.00%	93.24%	-0.044
			Low	2.26	87.50%	100.00%	87.16%	0.3893	86.18%	50.00%	87.16%	0.172
			High	3.01	95.14%	100.00%	95.01%	0.5791	95.14%	100.00%	95.01%	0.579
CMGC/CDK/CDK4	12	441	Medium	1.84	87.64%	100.00%	87.30%	0.3925	87.64%	100.00%	87.30%	0.393
			Low	1.42	83.44%	100.00%	82.99%	0.3383	83.44%	100.00%	82.99%	0.338
			High	3.01	95.14%	100.00%	95.01%	0.5791	95.14%	100.00%	95.01%	0.579
CMGC/CDK/CDK4/CDK4	12	441	Medium	1.84	87.64%	100.00%	87.30%	0.3925	87.64%	100.00%	87.30%	0.393
			Low	1.42	83.44%	100.00%	82.99%	0.3383	83.44%	100.00%	82.99%	0.338
			High	5.01	95.76%	100.00%	95.68%	0.5358	93.94%	0.00%	95.68%	-0.029

CMGC/CDK/CDK4/CDK6	3	162	Medium	3.34	91.52%	100.00%	91.36%	0.4015	90.30%	33.33%	91.36%	0.115
			Low	2.34	86.67%	100.00%	86.42%	0.3220	86.06%	66.67%	86.42%	0.201
			High	4.56	96.78%	100.00%	96.69%	0.6768	95.50%	55.56%	96.69%	0.409
CMGC/CDK/CDK5	9	302	Medium	2.78	94.21%	100.00%	94.04%	0.5599	92.93%	55.56%	94.04%	0.318
			Low	2	88.42%	100.00%	88.08%	0.4197	87.78%	77.78%	88.08%	0.320
			High	2.17	97.56%	100.00%	97.50%	0.6982	95.94%	33.33%	97.50%	0.268
CMGC/CDK/CDK7	18	721	Medium	1.62	93.64%	100.00%	93.48%	0.5088	92.29%	44.44%	93.48%	0.223
			Low	1.39	89.58%	100.00%	89.32%	0.4114	88.36%	50.00%	89.32%	0.189
			High	2.09	94.31%	100.00%	94.22%	0.4493	93.01%	16.67%	94.22%	0.057
CMGC/DYRK	12	761	Medium	1.5	88.23%	100.00%	88.04%	0.3203	87.19%	33.33%	88.04%	0.081
			Low	1.17	83.05%	100.00%	82.79%	0.2636	82.02%	33.33%	82.79%	0.053
			High	2.43	95.63%	100.00%	95.57%	0.4978	94.10%	0.00%	95.57%	-0.027
CMGC/DYRK/Dyrk1	7	451	Medium	1.86	90.83%	100.00%	90.69%	0.3599	89.30%	0.00%	90.69%	-0.040
			Low	1.43	84.72%	100.00%	84.48%	0.2771	83.19%	0.00%	84.48%	-0.053
			High	3.67	96.28%	100.00%	96.17%	0.6420	94.88%	50.00%	96.17%	0.345
CMGC/GSK/GSK3A	6	209	Medium	2.51	92.09%	100.00%	91.87%	0.4895	91.63%	83.33%	91.87%	0.409
			Low	1.84	86.05%	100.00%	85.65%	0.3778	85.58%	83.33%	85.65%	0.308
			High	2.93	94.58%	100.00%	94.40%	0.5921	92.86%	46.15%	94.40%	0.282
CMGC/MAPK/ERK/MAPK7	13	393	Medium	2.08	88.18%	100.00%	87.79%	0.4325	87.19%	69.23%	87.79%	0.289
			Low	1.7	82.27%	100.00%	81.68%	0.3534	81.28%	69.23%	81.68%	0.224
			High	8.34	95.55%	81.48%	95.85%	0.4761	94.45%	29.63%	95.85%	0.173
CMGC/MAPK/JNK/MAPK8	27	1253	Medium	4.08	90.39%	100.00%	90.18%	0.4029	90.39%	100.00%	90.18%	0.403
			Low	2.45	81.09%	100.00%	80.69%	0.2846	81.09%	100.00%	80.69%	0.285
			High	3.01	95.02%	100.00%	94.90%	0.5427	93.28%	22.22%	94.90%	0.111
CMGC/MAPK/JNK/MAPK9	18	785	Medium	2.06	91.03%	100.00%	90.83%	0.4262	89.79%	44.44%	90.83%	0.174
			Low	1.62	84.56%	100.00%	84.20%	0.3267	83.81%	66.67%	84.20%	0.201
			High	2.76	89.00%	100.00%	88.70%	0.4160	86.67%	12.50%	88.70%	0.006
CMGC/MAPK/JNK/MAPK10	8	292	Medium	1.88	82.33%	100.00%	81.85%	0.3276	80.33%	25.00%	81.85%	0.029
			Low	1.38	76.00%	100.00%	75.34%	0.2745	74.67%	50.00%	75.34%	0.094
			High	3.67	96.91%	100.00%	96.86%	0.5682	95.36%	0.00%	96.86%	-0.022
CMGC/MAPK/p38/MAPK11	3	191	Medium	2	94.85%	100.00%	94.76%	0.4676	94.33%	66.67%	94.76%	0.315
			Low	1.34	90.72%	100.00%	90.58%	0.3597	90.21%	66.67%	90.58%	0.232
			High	5.01	97.30%	100.00%	97.22%	0.6972	96.40%	66.67%	97.22%	0.500
CMGC/MAPK/p38/MAPK12	3	108	Medium	3.01	90.99%	100.00%	90.74%	0.4576	90.99%	100.00%	90.74%	0.458

			Low	2	83.78%	100.00%	83.33%	0.3450	83.78%	100.00%	83.33%	0.345
			High	4.67	98.96%	100.00%	98.92%	0.8614	97.92%	66.67%	98.92%	0.656
CMGC/MAPK/p38/MAPK13	3	93	Medium	3.01	95.83%	100.00%	95.70%	0.6404	94.79%	66.67%	95.70%	0.448
			Low	2	92.71%	100.00%	92.47%	0.5267	91.67%	66.67%	92.47%	0.353
			High	2.72	98.01%	100.00%	97.95%	0.7559	97.48%	80.95%	97.95%	0.644
STE/STE7/MAP2K1	21	732	Medium	1.86	93.76%	100.00%	93.58%	0.5376	93.63%	95.24%	93.58%	0.514
			Low	1.53	90.97%	100.00%	90.71%	0.4626	90.84%	95.24%	90.71%	0.441
			High	4.55	98.79%	100.00%	98.76%	0.7994	97.77%	54.55%	98.76%	0.511
STE/STE7/MAP2K2	11	483	Medium	3.01	95.75%	100.00%	95.65%	0.5734	95.34%	81.82%	95.65%	0.479
			Low	2.28	91.70%	100.00%	91.51%	0.4400	91.50%	90.91%	91.51%	0.400
			High	3.26	97.50%	100.00%	97.41%	0.7461	95.83%	50.00%	97.41%	0.426
STE/STE7/MAP2K3	4	116	Medium	2	93.33%	100.00%	93.10%	0.5571	91.67%	50.00%	93.10%	0.280
			Low	1.5	90.00%	100.00%	89.66%	0.4734	88.33%	50.00%	89.66%	0.222
			High	4.01	98.88%	100.00%	98.86%	0.7702	98.32%	66.67%	98.86%	0.569
STE/STE7/MAP2K6	3	176	Medium	2	95.53%	100.00%	95.45%	0.5102	94.97%	66.67%	95.45%	0.347
			Low	1	92.18%	100.00%	92.05%	0.4030	91.62%	66.67%	92.05%	0.264
			High	4.17	95.77%	100.00%	95.63%	0.6402	94.18%	50.00%	95.63%	0.342
STE/STE7/MAP2K7	6	183	Medium	2.84	92.59%	100.00%	92.35%	0.5264	91.01%	50.00%	92.35%	0.260
			Low	2.34	90.48%	100.00%	90.16%	0.4748	88.89%	50.00%	90.16%	0.224
			High	2.51	95.41%	100.00%	95.33%	0.5219	94.72%	62.50%	95.33%	0.334
STE/STE11	8	428	Medium	1.63	89.91%	100.00%	89.72%	0.3715	89.22%	62.50%	89.72%	0.222
			Low	1.25	86.01%	100.00%	85.75%	0.3153	85.32%	62.50%	85.75%	0.181
			High	2.15	97.06%	100.00%	97.02%	0.5588	96.31%	46.43%	97.02%	0.274
STE/STE20/PAKA/PAK1	28	1980	Medium	1.58	92.38%	100.00%	92.27%	0.3778	91.73%	53.57%	92.27%	0.194
			Low	1.29	88.15%	100.00%	87.98%	0.3043	87.65%	64.29%	87.98%	0.184
			High	2.58	97.93%	100.00%	97.81%	0.8489	92.15%	0.00%	97.81%	-0.036
STE/STE20/PAKA/PAK2	14	228	Medium	1.93	95.04%	100.00%	94.74%	0.7142	90.08%	14.29%	94.74%	0.090
			Low	1.65	92.98%	100.00%	92.54%	0.6465	88.84%	28.57%	92.54%	0.175
			High	2.34	96.34%	100.00%	96.25%	0.6008	94.14%	0.00%	96.25%	-0.029
STE/STE20/PAKA/PAK3	6	267	Medium	1.67	93.41%	100.00%	93.26%	0.4829	91.21%	0.00%	93.26%	-0.040
			Low	1.34	89.01%	100.00%	88.76%	0.3846	86.81%	0.00%	88.76%	-0.053
			High	2.55	96.40%	100.00%	96.31%	0.6383	95.68%	72.73%	96.31%	0.485
STE/STE-Unique	11	406	Medium	1.73	91.85%	100.00%	91.63%	0.4733	91.61%	90.91%	91.63%	0.431
			Low	1.37	88.49%	100.00%	88.18%	0.4055	88.25%	90.91%	88.18%	0.366

			High	3.01	97.78%	100.00%	97.72%	0.7254	97.41%	85.71%	97.72%	0.643
STE/STE-Unique/COT	7	263	Medium	1.86	94.07%	100.00%	93.92%	0.5346	93.70%	85.71%	93.92%	0.463
			Low	1.43	91.11%	100.00%	90.87%	0.4530	90.74%	85.71%	90.87%	0.387
			High	3.76	95.92%	100.00%	95.80%	0.6190	95.24%	75.00%	95.80%	0.481
STE/STE-Unique/NIK	4	143	Medium	2.51	93.20%	100.00%	93.01%	0.5155	93.20%	100.00%	93.01%	0.516
			Low	1.75	85.71%	100.00%	85.31%	0.3695	85.71%	100.00%	85.31%	0.370
			High	4.34	87.50%	100.00%	85.71%	0.6547	75.00%	0.00%	85.71%	-0.143
TK/Abl/Abl2	3	21	Medium	3.34	83.33%	100.00%	80.95%	0.5890	70.83%	0.00%	80.95%	-0.169
			Low	2.34	79.17%	100.00%	76.19%	0.5345	66.67%	0.00%	76.19%	-0.194
			High	2.1	98.44%	100.00%	97.62%	0.9663	64.06%	0.00%	97.62%	-0.091
TK/Alk	22	42	Medium	1.73	92.19%	100.00%	88.10%	0.8472	57.81%	0.00%	88.10%	-0.211
			Low	1.5	89.06%	100.00%	83.33%	0.7951	54.69%	0.00%	83.33%	-0.254
			High	3.01	91.43%	100.00%	90.82%	0.6303	84.76%	0.00%	90.82%	-0.082
TK/Axl	7	98	Medium	2.29	86.67%	100.00%	85.71%	0.5345	80.00%	0.00%	85.71%	-0.105
			Low	1.86	80.95%	100.00%	79.59%	0.4543	74.29%	0.00%	79.59%	-0.130
			High	4.34	88.46%	100.00%	86.96%	0.6594	76.92%	0.00%	86.96%	-0.130
TK/Axl/Axl	3	23	Medium	3.01	88.46%	100.00%	86.96%	0.6594	76.92%	0.00%	86.96%	-0.130
			Low	2	84.62%	100.00%	82.61%	0.5950	73.08%	0.00%	82.61%	-0.154
			High	4.34	100.00%	100.00%	100.00%	1.0000	89.29%	0.00%	100.00%	NaN
TK/Axl/Mer	3	25	Medium	3.34	96.43%	100.00%	96.00%	0.8485	85.71%	0.00%	96.00%	-0.067
			Low	2.34	92.86%	100.00%	92.00%	0.7430	82.14%	0.00%	92.00%	-0.096
			High	7.01	95.89%	100.00%	95.74%	0.6597	95.89%	100.00%	95.74%	0.660
TK/Csk	5	141	Medium	4.61	93.15%	100.00%	92.91%	0.5565	93.15%	100.00%	92.91%	0.557
			Low	3.21	90.41%	100.00%	90.07%	0.4869	90.41%	100.00%	90.07%	0.487
			High	4.01	91.43%	100.00%	90.00%	0.7500	85.71%	60.00%	90.00%	0.464
TK/EGFR/ErbB2	5	30	Medium	2.81	88.57%	100.00%	86.67%	0.6939	85.71%	80.00%	86.67%	0.556
			Low	2	88.57%	100.00%	86.67%	0.6939	85.71%	80.00%	86.67%	0.556
			High	3.05	92.21%	100.00%	91.61%	0.6619	88.64%	50.00%	91.61%	0.338
TK/Eph	22	286	Medium	2.37	87.01%	100.00%	86.01%	0.5525	83.77%	54.55%	86.01%	0.279
			Low	1.96	82.79%	100.00%	81.47%	0.4889	79.87%	59.09%	81.47%	0.255
			High	3.15	90.41%	100.00%	89.39%	0.6686	80.82%	0.00%	89.39%	-0.106
TK/Eph/EphB2	7	66	Medium	2.58	89.04%	100.00%	87.88%	0.6404	79.45%	0.00%	87.88%	-0.114
			Low	2	84.93%	100.00%	83.33%	0.5693	76.71%	14.29%	83.33%	-0.019
			High	5.01	97.14%	100.00%	96.88%	0.8524	88.57%	0.00%	96.88%	-0.053

TK/Eph/EphA3	3	32	Medium	3.67	91.43%	100.00%	90.62%	0.6731	88.57%	66.67%	90.62%	0.458
			Low	2.67	82.86%	100.00%	81.25%	0.5204	80.00%	66.67%	81.25%	0.319
			High	4.76	94.34%	100.00%	93.88%	0.7324	90.57%	50.00%	93.88%	0.397
TK/Eph/EphB1	4	49	Medium	3.51	94.34%	100.00%	93.88%	0.7324	94.34%	100.00%	93.88%	0.732
			Low	2.76	84.91%	100.00%	83.67%	0.5281	84.91%	100.00%	83.67%	0.528
			High	4.19	94.33%	100.00%	94.01%	0.6751	92.33%	62.50%	94.01%	0.444
TK/Fak	16	284	Medium	3.26	87.00%	100.00%	86.27%	0.5010	85.67%	75.00%	86.27%	0.367
			Low	2.69	80.33%	100.00%	79.23%	0.4111	79.00%	75.00%	79.23%	0.287
			High	3.7	96.47%	100.00%	96.28%	0.7543	93.33%	38.46%	96.28%	0.336
TK/Fak/FAK	13	242	Medium	3.31	93.73%	100.00%	93.39%	0.6470	91.37%	53.85%	93.39%	0.363
			Low	2.39	81.57%	100.00%	80.58%	0.4178	79.61%	61.54%	80.58%	0.225
			High	6.34	95.56%	100.00%	95.24%	0.7559	91.11%	33.33%	95.24%	0.286
TK/Fak/PYK2	3	42	Medium	4.67	88.89%	100.00%	88.10%	0.5748	86.67%	66.67%	88.10%	0.377
			Low	3.34	84.44%	100.00%	83.33%	0.5000	82.22%	66.67%	83.33%	0.312
			High	3.76	95.76%	100.00%	95.28%	0.8201	90.68%	50.00%	95.28%	0.471
TK/Fer	12	106	Medium	2.92	90.68%	100.00%	89.62%	0.6838	85.59%	50.00%	89.62%	0.341
			Low	2.42	85.59%	100.00%	83.96%	0.5894	81.36%	58.33%	83.96%	0.318
			High	5.01	94.59%	100.00%	93.94%	0.7914	86.49%	25.00%	93.94%	0.216
TK/Fer/Fer	4	33	Medium	3.76	91.89%	100.00%	90.91%	0.7207	86.49%	50.00%	90.91%	0.372
			Low	3.01	91.89%	100.00%	90.91%	0.7207	86.49%	50.00%	90.91%	0.372
			High	3.45	98.90%	100.00%	98.78%	0.9429	92.31%	33.33%	98.78%	0.468
TK/Fer/Fes	9	82	Medium	2.78	96.70%	100.00%	96.34%	0.8500	91.21%	44.44%	96.34%	0.457
			Low	2.23	85.71%	100.00%	84.15%	0.5867	80.22%	44.44%	84.15%	0.219
			High	3.01	90.86%	100.00%	89.66%	0.7092	82.23%	26.09%	89.66%	0.155
TK/FGFR/FGFR1	23	174	Medium	2.4	85.28%	100.00%	83.33%	0.6071	76.65%	26.09%	83.33%	0.079
			Low	2.05	78.68%	100.00%	75.86%	0.5181	71.07%	34.78%	75.86%	0.079
			High	3.34	100.00%	100.00%	100.00%	1.0000	71.43%	0.00%	100.00%	NaN
TK/FGFR/FGFR3	6	15	Medium	2.67	100.00%	100.00%	100.00%	1.0000	71.43%	0.00%	100.00%	NaN
			Low	2.17	100.00%	100.00%	100.00%	1.0000	80.95%	33.33%	100.00%	0.513
			High	2.81	94.56%	100.00%	93.44%	0.8414	85.71%	48.00%	93.44%	0.454
TK/InsR/IGF1R	25	122	Medium	2.29	90.48%	100.00%	88.52%	0.7533	81.63%	48.00%	88.52%	0.360
			Low	1.92	86.39%	100.00%	83.61%	0.6815	78.23%	52.00%	83.61%	0.321
			High	2.34	93.71%	100.00%	93.28%	0.6829	88.81%	22.22%	93.28%	0.141
TK/JakA/JAK1	9	134	Medium	1.78	91.61%	100.00%	91.04%	0.6247	87.41%	33.33%	91.04%	0.193

			Low	1.34	88.11%	100.00%	87.31%	0.5498	83.92%	33.33%	87.31%	0.145
			High	3.74	97.60%	100.00%	97.32%	0.8892	89.60%	23.08%	97.32%	0.291
TK/JakA/JAK2	26	224	Medium	3.01	93.20%	100.00%	92.41%	0.7475	88.80%	57.69%	92.41%	0.458
			Low	2.54	88.80%	100.00%	87.50%	0.6491	86.00%	73.08%	87.50%	0.473
			High	4.13	96.63%	100.00%	96.30%	0.8369	95.51%	87.50%	96.30%	0.759
TK/JakA/JAK3	8	81	Medium	3.13	92.13%	100.00%	91.36%	0.6980	91.01%	87.50%	91.36%	0.620
			Low	2.51	91.01%	100.00%	90.12%	0.6713	89.89%	87.50%	90.12%	0.593
			High	3.63	95.83%	100.00%	95.45%	0.7977	91.67%	50.00%	95.45%	0.455
TK/JakA/Tyk2	8	88	Medium	2.76	87.50%	100.00%	86.36%	0.5878	83.33%	50.00%	86.36%	0.270
			Low	2.13	81.25%	100.00%	79.55%	0.4947	77.08%	50.00%	79.55%	0.194
			High	3.39	95.04%	100.00%	94.17%	0.8404	90.07%	66.67%	94.17%	0.608
TK/Met	21	120	Medium	2.67	90.78%	100.00%	89.17%	0.7421	87.23%	76.19%	89.17%	0.576
			Low	2.2	84.40%	100.00%	81.67%	0.6315	82.27%	85.71%	81.67%	0.532
			High	3.3	93.52%	100.00%	92.31%	0.8086	87.96%	64.71%	92.31%	0.557
TK/Met/Met	17	91	Medium	2.59	87.04%	100.00%	84.62%	0.6812	83.33%	76.47%	84.62%	0.514
			Low	2.12	82.41%	100.00%	79.12%	0.6112	80.56%	88.24%	79.12%	0.528
			High	4.51	100.00%	100.00%	100.00%	1.0000	87.88%	0.00%	100.00%	NaN
TK/Met/Ron	4	29	Medium	3.26	93.94%	100.00%	93.10%	0.7878	81.82%	0.00%	93.10%	-0.094
			Low	2.51	87.88%	100.00%	86.21%	0.6565	75.76%	0.00%	86.21%	-0.138
			High	2.65	96.30%	100.00%	95.52%	0.8869	79.01%	0.00%	95.52%	-0.090
TK/Ret	14	67	Medium	2.22	92.59%	100.00%	91.04%	0.7983	76.54%	7.14%	91.04%	-0.024
			Low	1.86	87.65%	100.00%	85.07%	0.7045	71.60%	7.14%	85.07%	-0.086
			High	3.51	95.79%	100.00%	95.40%	0.7975	87.37%	0.00%	95.40%	-0.064
TK/Src/Fgr	8	87	Medium	2.76	94.74%	100.00%	94.25%	0.7616	87.37%	12.50%	94.25%	0.077
			Low	2.26	89.47%	100.00%	88.51%	0.6272	82.11%	12.50%	88.51%	0.009
			High	4.58	96.43%	100.00%	96.10%	0.8202	92.86%	57.14%	96.10%	0.533
TK/Src/Yes	7	77	Medium	3.43	91.67%	100.00%	90.91%	0.6742	88.10%	57.14%	90.91%	0.394
			Low	2.72	85.71%	100.00%	84.42%	0.5577	83.33%	71.43%	84.42%	0.384
			High	3.42	95.45%	100.00%	95.12%	0.7555	89.77%	16.67%	95.12%	0.128
TK/Src/HCK	12	164	Medium	2.76	90.34%	100.00%	89.63%	0.6090	85.23%	25.00%	89.63%	0.116
			Low	2.26	83.52%	100.00%	82.32%	0.4908	78.41%	25.00%	82.32%	0.048
			High	4.51	93.75%	100.00%	91.67%	0.8563	87.50%	75.00%	91.67%	0.667
TK/Src/BLK	4	12	Medium	3.26	87.50%	100.00%	83.33%	0.7454	81.25%	75.00%	83.33%	0.545
			Low	2.51	87.50%	100.00%	83.33%	0.7454	81.25%	75.00%	83.33%	0.545

			High	5.26	100.00%	100.00%	100.00%	1.0000	96.97%	75.00%	100.00%	0.852
TK/Src/Brk	4	29	Medium	4.01	96.97%	100.00%	96.55%	0.8789	93.94%	75.00%	96.55%	0.716
			Low	3.01	93.94%	100.00%	93.10%	0.7878	93.94%	100.00%	93.10%	0.788
			High	3.46	92.42%	100.00%	91.07%	0.7792	84.85%	50.00%	91.07%	0.411
TK/Syk/ZAP70	20	112	Medium	2.66	85.61%	100.00%	83.04%	0.6526	79.55%	60.00%	83.04%	0.364
			Low	2.16	81.82%	100.00%	78.57%	0.5976	76.52%	65.00%	78.57%	0.348
			High	3.62	92.11%	100.00%	91.57%	0.6419	90.32%	72.22%	91.57%	0.473
TK/Tec/BTK	18	261	Medium	2.84	84.95%	100.00%	83.91%	0.5017	83.87%	83.33%	83.91%	0.410
			Low	2.34	81.36%	100.00%	80.08%	0.4538	80.29%	83.33%	80.08%	0.365
			High	3.56	94.85%	100.00%	94.49%	0.7290	88.24%	0.00%	94.49%	-0.062
TK/Tec/ITK	9	127	Medium	2.89	89.71%	100.00%	88.98%	0.5901	83.09%	0.00%	88.98%	-0.090
			Low	2.45	86.03%	100.00%	85.04%	0.5228	80.88%	22.22%	85.04%	0.050
			High	5.26	93.27%	100.00%	93.00%	0.5815	91.35%	50.00%	93.00%	0.294
TK/Tec/Tec	4	100	Medium	4.01	87.50%	100.00%	87.00%	0.4524	85.58%	50.00%	87.00%	0.203
			Low	3.26	83.65%	100.00%	83.00%	0.3976	82.69%	75.00%	83.00%	0.283
			High	5.21	100.00%	100.00%	100.00%	1.0000	96.23%	60.00%	100.00%	0.759
TK/Tec/TXK	5	48	Medium	3.61	98.11%	100.00%	97.92%	0.9033	94.34%	60.00%	97.92%	0.641
			Low	2.61	96.23%	100.00%	95.83%	0.8274	92.45%	60.00%	95.83%	0.558
			High	4.41	97.30%	100.00%	96.88%	0.8985	89.19%	40.00%	96.88%	0.462
TK/Tie	5	32	Medium	3.41	94.59%	100.00%	93.75%	0.8183	89.19%	60.00%	93.75%	0.538
			Low	2.61	86.49%	100.00%	84.38%	0.6495	86.49%	100.00%	84.38%	0.650
			High	3.01	98.99%	100.00%	98.81%	0.9625	92.93%	60.00%	98.81%	0.700
TK/Trk	15	84	Medium	2.34	95.96%	100.00%	95.24%	0.8671	92.93%	80.00%	95.24%	0.733
			Low	1.94	90.91%	100.00%	89.29%	0.7470	87.88%	80.00%	89.29%	0.608
			High	3.61	100.00%	100.00%	100.00%	1.0000	61.54%	0.00%	100.00%	NaN
TK/Trk/TRKA	5	8	Medium	2.61	92.31%	100.00%	87.50%	0.8539	53.85%	0.00%	87.50%	-0.228
			Low	2	84.62%	100.00%	75.00%	0.7319	46.15%	0.00%	75.00%	-0.337
			High	3.21	100.00%	100.00%	100.00%	1.0000	89.53%	10.00%	100.00%	0.299
TK/Trk/TRKB	10	76	Medium	2.51	94.19%	100.00%	93.42%	0.7892	86.05%	30.00%	93.42%	0.259
			Low	2.11	93.02%	100.00%	92.11%	0.7587	86.05%	40.00%	92.11%	0.321
			High	2.69	94.55%	100.00%	93.99%	0.7715	87.62%	26.32%	93.99%	0.220
TK/VEGFR	19	183	Medium	2.22	88.61%	100.00%	87.43%	0.6289	82.67%	36.84%	87.43%	0.199
			Low	1.9	83.66%	100.00%	81.97%	0.5473	78.22%	42.11%	81.97%	0.175
			High	4.26	96.00%	100.00%	95.65%	0.7985	88.00%	0.00%	95.65%	-0.060

TK/VEGFR/FLT1	4	46	Medium	3.26	96.00%	100.00%	95.65%	0.7985	88.00%	0.00%	95.65%	-0.060
			Low	2.51	90.00%	100.00%	89.13%	0.6294	82.00%	0.00%	89.13%	-0.098
			High	4.61	96.23%	100.00%	95.83%	0.8274	92.45%	60.00%	95.83%	0.558
TK/VEGFR/FLT4	5	48	Medium	3.41	88.68%	100.00%	87.50%	0.6307	84.91%	60.00%	87.50%	0.370
			Low	2.61	83.02%	100.00%	81.25%	0.5387	79.25%	60.00%	81.25%	0.288
			High	2.8	94.33%	100.00%	93.89%	0.7222	87.23%	0.00%	93.89%	-0.068
TK/VEGFR/KDR	10	131	Medium	2.21	92.20%	100.00%	91.60%	0.6605	85.11%	0.00%	91.60%	-0.080
			Low	1.8	85.11%	100.00%	83.97%	0.5205	79.43%	20.00%	83.97%	0.028
			High	3.19	97.18%	100.00%	96.83%	0.8801	88.73%	25.00%	96.83%	0.299
TK/PDGFR/PDGFRb	16	126	Medium	2.57	95.07%	100.00%	94.44%	0.8106	89.44%	50.00%	94.44%	0.457
			Low	2.13	90.14%	100.00%	88.89%	0.6885	85.92%	62.50%	88.89%	0.434
			High	4.41	98.57%	100.00%	98.46%	0.9058	94.29%	40.00%	98.46%	0.489
TK/PDGFR/PDGFRa	5	65	Medium	3.41	94.29%	100.00%	93.85%	0.7221	91.43%	60.00%	93.85%	0.462
			Low	2.81	81.43%	100.00%	80.00%	0.4714	78.57%	60.00%	80.00%	0.245
			High	4.01	90.24%	100.00%	89.19%	0.6678	80.49%	0.00%	89.19%	-0.108
TK/PDGFR/FLT3	4	37	Medium	2.76	80.49%	100.00%	78.38%	0.5111	70.73%	0.00%	78.38%	-0.162
			Low	2	70.73%	100.00%	67.57%	0.4110	60.98%	0.00%	67.57%	-0.212
			High	5.01	90.48%	100.00%	89.47%	0.6689	83.33%	25.00%	89.47%	0.131
TK/PDGFR/KIT	4	38	Medium	3.76	85.71%	100.00%	84.21%	0.5804	80.95%	50.00%	84.21%	0.256
			Low	2.76	76.19%	100.00%	73.68%	0.4588	73.81%	75.00%	73.68%	0.309
			High	4.38	88.00%	100.00%	86.57%	0.6383	84.00%	62.50%	86.57%	0.389
TK/PDGFR/CSF1R	8	67	Medium	3.38	82.67%	100.00%	80.60%	0.5541	78.67%	62.50%	80.60%	0.312
			Low	2.63	77.33%	100.00%	74.63%	0.4887	74.67%	75.00%	74.63%	0.332
			High	4.51	99.00%	100.00%	98.98%	0.8123	97.00%	0.00%	98.98%	-0.014
TKL/IRAK	4	196	Medium	3.26	95.50%	100.00%	95.41%	0.5418	93.50%	0.00%	95.41%	-0.031
			Low	2.51	92.50%	100.00%	92.35%	0.4409	91.50%	50.00%	92.35%	0.213
			High	2.11	94.05%	100.00%	93.91%	0.5123	92.60%	36.84%	93.91%	0.183
TKL/MLK	19	805	Medium	1.58	88.35%	100.00%	88.07%	0.3815	86.89%	36.84%	88.07%	0.113
			Low	1.32	82.77%	100.00%	82.36%	0.3118	81.43%	42.11%	82.36%	0.095
			High	3.23	95.81%	100.00%	95.71%	0.5870	94.50%	44.44%	95.71%	0.273
TKL/MLK/ILK	9	373	Medium	2.23	90.31%	100.00%	90.08%	0.4198	89.01%	44.44%	90.08%	0.169
			Low	1.78	85.34%	100.00%	84.99%	0.3430	84.03%	44.44%	84.99%	0.123
			High	2.72	91.32%	100.00%	91.10%	0.4464	89.93%	42.86%	91.10%	0.177
TKL/MLK/TAK1	7	281	Medium	2	86.81%	100.00%	86.48%	0.3668	85.42%	42.86%	86.48%	0.129

			Low	1.72	83.33%	100.00%	82.92%	0.3249	81.94%	42.86%	82.92%	0.104
			High	4.01	97.40%	100.00%	97.35%	0.6459	95.45%	0.00%	97.35%	-0.023
TKL/MLK/MLK/MAP3K11	3	151	Medium	2.34	95.45%	100.00%	95.36%	0.5349	93.51%	0.00%	95.36%	-0.031
			Low	1.67	93.51%	100.00%	93.38%	0.4642	91.56%	0.00%	93.38%	-0.037
			High	3.61	98.43%	100.00%	98.39%	0.7842	97.91%	80.00%	98.39%	0.666
TKL/RAF	5	186	Medium	2	94.76%	100.00%	94.62%	0.5616	94.24%	80.00%	94.62%	0.457
			Low	1.4	92.15%	100.00%	91.94%	0.4794	91.62%	80.00%	91.94%	0.384
			High	2.78	94.17%	100.00%	93.93%	0.6199	92.83%	66.67%	93.93%	0.427
TKL/STKR	9	214	Medium	2.12	91.48%	100.00%	91.12%	0.5412	90.13%	66.67%	91.12%	0.361
			Low	1.78	88.79%	100.00%	88.32%	0.4835	87.44%	66.67%	88.32%	0.313
			High	3.51	97.50%	100.00%	97.37%	0.8057	95.00%	50.00%	97.37%	0.474
Atypical/PDHK	4	76	Medium	2.26	88.75%	100.00%	88.16%	0.5208	86.25%	50.00%	88.16%	0.242
			Low	1.5	81.25%	100.00%	80.26%	0.4111	78.75%	50.00%	80.26%	0.161
			High	2.71	98.49%	100.00%	98.47%	0.6848	97.66%	40.00%	98.47%	0.315
Atypical/PIKK/ATR	10	717	Medium	2	97.39%	100.00%	97.35%	0.5794	96.70%	50.00%	97.35%	0.309
			Low	1.6	96.84%	100.00%	96.79%	0.5416	96.15%	50.00%	96.79%	0.283
			High	3.91	97.83%	100.00%	97.79%	0.6409	97.08%	52.38%	97.79%	0.366
Atypical/PIKK/DNAPK	21	1313	Medium	2.43	94.30%	100.00%	94.21%	0.4516	94.08%	85.71%	94.21%	0.389
			Low	1.96	91.45%	100.00%	91.32%	0.3769	91.30%	90.48%	91.32%	0.340
			High	4.72	97.05%	100.00%	96.96%	0.7090	95.24%	42.86%	96.96%	0.344
Atypical/PIKK/FRAP	14	427	Medium	2.79	93.42%	100.00%	93.21%	0.5509	92.74%	78.57%	93.21%	0.438
			Low	2.08	91.84%	100.00%	91.57%	0.5064	91.61%	92.86%	91.57%	0.471
			High	2.26	96.15%	100.00%	96.04%	0.6365	94.28%	33.33%	96.04%	0.227
Other/AUR/AUR-A	27	935	Medium	1.71	90.64%	100.00%	90.37%	0.4567	89.19%	48.15%	90.37%	0.206
			Low	1.45	85.55%	100.00%	85.13%	0.3721	84.10%	48.15%	85.13%	0.151
			High	2.85	94.62%	100.00%	94.39%	0.6384	92.26%	42.11%	94.39%	0.281
Other/AUR/IPL1-yeast	19	446	Medium	2	86.45%	100.00%	85.87%	0.4461	84.52%	52.63%	85.87%	0.210
			Low	1.64	80.00%	100.00%	79.15%	0.3664	78.49%	63.16%	79.15%	0.200
			High	3.76	96.64%	100.00%	96.52%	0.6947	94.12%	25.00%	96.52%	0.193
Other/CK2/CK2b	4	115	Medium	2.51	89.08%	100.00%	88.70%	0.4568	87.39%	50.00%	88.70%	0.210
			Low	2	84.87%	100.00%	84.35%	0.3916	83.19%	50.00%	84.35%	0.166
			High	2.76	96.81%	100.00%	96.78%	0.4919	96.28%	50.00%	96.78%	0.254
Other/IKK/IKKa	8	745	Medium	1.88	92.03%	100.00%	91.95%	0.3289	91.63%	62.50%	91.95%	0.199
			Low	1.5	86.85%	100.00%	86.71%	0.2546	86.59%	75.00%	86.71%	0.183

			High	2.67	94.29%	100.00%	94.20%	0.4575	92.66%	0.00%	94.20%	-0.032
Other/IKK/IKKb	6	362	Medium	1.84	88.04%	100.00%	87.85%	0.3247	86.68%	16.67%	87.85%	0.017
			Low	1.34	81.79%	100.00%	81.49%	0.2588	81.25%	66.67%	81.49%	0.155
			High	3.01	98.76%	100.00%	98.72%	0.8529	96.04%	21.43%	98.72%	0.265
Other/NEK	14	390	Medium	2.22	95.79%	100.00%	95.64%	0.6572	93.56%	35.71%	95.64%	0.253
			Low	1.76	93.81%	100.00%	93.59%	0.5796	91.58%	35.71%	93.59%	0.204
			High	4.67	98.99%	100.00%	98.96%	0.8615	95.96%	0.00%	98.96%	-0.018
Other/NEK/NEK2	3	96	Medium	3.01	95.96%	100.00%	95.83%	0.6409	92.93%	0.00%	95.83%	-0.036
			Low	2.34	94.95%	100.00%	94.79%	0.5962	91.92%	0.00%	94.79%	-0.041
			High	3.15	99.03%	100.00%	98.96%	0.9305	94.17%	28.57%	98.96%	0.412
Other/NEK/NEK6	7	96	Medium	2.29	93.20%	100.00%	92.71%	0.6808	89.32%	42.86%	92.71%	0.302
			Low	1.72	91.26%	100.00%	90.62%	0.6297	87.38%	42.86%	90.62%	0.263
			High	7.34	100.00%	100.00%	100.00%	1.0000	100.00%	100.00%	100.00%	1.000
Other/NEK/NEK9	3	187	Medium	3.67	97.89%	100.00%	97.86%	0.6476	97.89%	100.00%	97.86%	0.648
			Low	2	95.26%	100.00%	95.19%	0.4878	95.26%	100.00%	95.19%	0.488
			High	5.01	97.39%	100.00%	97.36%	0.5516	97.15%	80.00%	97.36%	0.452
Other/Other-Unique/KIS	5	416	Medium	3.01	92.40%	100.00%	92.31%	0.3532	92.16%	80.00%	92.31%	0.280
			Low	2.21	89.07%	100.00%	88.94%	0.2953	89.07%	100.00%	88.94%	0.295
			High	2.27	99.56%	100.00%	99.53%	0.9678	92.51%	0.00%	99.53%	-0.018
Other/PEK	16	211	Medium	1.82	96.04%	100.00%	95.73%	0.7828	89.43%	6.25%	95.73%	0.025
			Low	1.57	95.15%	100.00%	94.79%	0.7495	89.87%	25.00%	94.79%	0.204
			High	2.38	98.68%	100.00%	98.58%	0.9111	91.63%	0.00%	98.58%	-0.032
Other/PEK/PKR	16	211	Medium	1.88	95.59%	100.00%	95.26%	0.7656	88.99%	6.25%	95.26%	0.018
			Low	1.63	94.71%	100.00%	94.31%	0.7341	90.31%	37.50%	94.31%	0.301
			High	5.01	97.74%	100.00%	97.67%	0.7471	97.74%	100.00%	97.67%	0.747
Other/Wnk	4	129	Medium	2.76	96.24%	100.00%	96.12%	0.6536	96.24%	100.00%	96.12%	0.654
			Low	1.5	93.98%	100.00%	93.80%	0.5592	93.98%	100.00%	93.80%	0.559

Supplementary Table S4. The prediction performance of a large-scale prediction for mammalian sites. Known sub., the known substrates of a PK; Other's sub., the known substrates of other PKs; Unknown sub., the sites without PK information. The PK clusters with low performances (The *Pr* of either Other's sub. or Unknown sub < 50%) were marked in grey and the results were removed for large-scale predictions.

Kinase Group	Cutoff	Known sub.			Other's sub.			Unknown sub.		
		Total	Pre.	*Sn*	Total	Pre.	*Pr*	Total	Pre.	*Pr*
Serine/Threonine Kinase										
AGC	2.72	878	333	37.93%	1421	80	64.48%	9236	1027	82.01%
AGC/AKT	2.56	83	74	89.16%	2216	228	80.56%	9236	977	81.09%
AGC/AKT/AKT2	3.51	4	4	100%	2295	162	71.67%	9236	549	66.35%
AGC/DMPK	1.99	32	32	100%	2267	159	71.48%	9236	387	52.27%
AGC/DMPK/ROCK	2.35	31	31	100%	2268	155	70.74%	9236	396	53.35%
AGC/DMPK/ROCK/ROCK1	4.3	13	13	100%	2286	30	-52.40%	9236	52	-255.23%
AGC/GRK	1.45	75	51	68%	2224	94	52.68%	9236	677	72.71%
AGC/GRK/BARK	3.51	31	13	41.94%	2268	48	5.50%	9236	322	42.63%
AGC/GRK/BARK/GRK-2	2.86	27	26	96.30%	2272	64	29%	9236	484	61.83%
AGC/GRK/BARK/GRK-3	4.51	4	4	100%	2295	67	31.49%	9236	302	38.83%
AGC/GRK/GRK	2.33	25	25	100%	2274	55	17.31%	9236	193	4.29%
AGC/GRK/GRK/GRK-1	4.88	8	8	100%	2291	32	-43.19%	9236	91	-102.99%
AGC/GRK/GRK/GRK-4	4.51	4	4	100%	2295	84	45.36%	9236	315	41.36%
AGC/GRK/GRK/GRK-5	2.19	11	11	100%	2288	79	42.08%	9236	266	30.56%
AGC/PKA	2.54	306	200	65.36%	1993	220	81.88%	9236	959	80.74%
AGC/PKB	2.76	37	29	78.38%	2262	82	44.83%	9236	132	-39.94%
AGC/PKB/PDK1	2.98	34	27	79.41%	2265	78	41.92%	9236	124	-48.97%
AGC/PKC	3.18	356	140	39.33%	1943	189	79.44%	9236	824	77.58%
AGC/PKC/Alpha	3.27	120	68	56.67%	2179	323	86.51%	9236	1150	83.94%
AGC/PKC/Delta	1.9	30	30	100%	2269	275	83.50%	9236	891	79.27%
AGC/PKC/Eta	2.7	13	13	100%	2286	303	84.91%	9236	1193	84.52%
AGC/PKC/Iota	2.91	11	11	100%	2288	163	71.93%	9236	517	64.27%
AGC/PKC/Alpha/PKCa	4.48	112	55	49.11%	2187	303	85.56%	9236	1035	82.15%
AGC/PKC/Alpha/PKCb	3.58	14	14	100%	2285	132	65.38%	9236	657	71.88%
AGC/PKC/Alpha/PKCg	3.01	5	5	100%	2294	114	59.75%	9236	606	69.52%
AGC/PKC/Delta/PKCd	2.05	22	22	100%	2277	236	80.70%	9236	696	73.46%
AGC/PKC/Delta/PKCt	2.51	8	8	100%	2291	191	76.01%	9236	768	75.95%
AGC/PKC/Eta/PKCe	4.12	9	9	100%	2290	315	85.46%	9236	1211	84.75%
AGC/PKC/Eta/PKCh	3.26	4	4	100%	2295	120	61.75%	9236	265	30.29%
AGC/PKC/Iota/PKCz	2.73	11	11	100%	2288	167	72.60%	9236	534	65.41%
AGC/PKG	2.38	32	32	100%	2267	283	83.98%	9236	977	81.09%
AGC/PKG/PKG1	2.47	13	13	100%	2286	279	83.61%	9236	1092	83.08%
AGC/PKG/PKG2	4.01	3	3	100%	2296	204	77.49%	9236	886	79.15%
AGC/RSK	1.72	50	46	92%	2249	280	83.94%	9236	1071	82.75%
AGC/RSK/p70	3.42	12	12	100%	2287	253	81.92%	9236	1040	82.24%
AGC/RSK/MSK/RSK5	4.45	9	9	100%	2290	117	60.85%	9236	397	53.47%

AGC/RSK/RSK	1.48	30	30	100%	2269	549	91.73%	9236	2494	92.59%
AGC/RSK/RSK/RSK1	2.11	10	10	100%	2289	257	82.19%	9236	961	80.78%
AGC/RSK/RSK/RSK2	2.91	10	10	100%	2289	337	86.42%	9236	1265	85.40%
AGC/SGK	3.01	19	19	100%	2280	231	80.26%	9236	937	80.29%
CAMK	1.63	238	140	58.82%	2061	398	89.64%	9236	1586	88.35%
CAMK/CAMK1	2.57	16	16	100%	2283	258	82.30%	9236	731	74.73%
CAMK/CAMK1/CAMK1a	3.26	4	4	100%	2295	196	76.58%	9236	409	54.84%
CAMK/CAMK1/CAMK4	3.56	9	9	100%	2290	152	69.87%	9236	556	66.78%
CAMK/CAMK2	2.61	83	49	59.04%	2216	306	85.52%	9236	1076	82.83%
CAMK/CAMK2/CAMK2a	3.21	29	29	100%	2270	334	86.41%	9236	1074	82.80%
CAMK/CAMKL	1.74	68	58	85.29%	2231	349	87.21%	9236	1123	83.55%
CAMK/CAMKL/AMPK	2.06	37	37	100%	2262	311	85.45%	9236	965	80.86%
CAMK/CAMKL/CHK1	2.43	9	9	100%	2290	314	85.41%	9236	1173	84.25%
CAMK/CAMKL/LKB	2.74	15	15	100%	2284	103	55.65%	9236	170	-8.66%
CAMK/DAPK	3.05	17	16	94.12%	2282	167	72.67%	9236	459	59.76%
CAMK/DAPK/DAPK3	3.18	13	13	100%	2286	196	76.67%	9236	566	67.36%
CAMK/MAPKAPK	2.51	32	30	93.75%	2267	307	85.23%	9236	1416	86.95%
CAMK/MAPKAPK/MAPKAPK	3.81	31	26	83.87%	2268	401	88.69%	9236	1763	89.52%
CAMK/MLCK	3.41	1	1	100%	2298	122	62.33%	9236	355	47.97%
CAMK/PHK	1.96	22	22	100%	2277	204	77.68%	9236	705	73.80%
CAMK/PKD	3.26	8	8	100%	2291	271	83.09%	9236	533	65.34%
CAMK/PKD/PKD1	2.81	5	5	100%	2294	145	68.36%	9236	287	35.64%
CAMK/RAD53	2.36	12	12	100%	2287	229	80.03%	9236	632	70.77%
CK1	2.15	71	42	59.15%	2228	171	73.94%	9236	1468	87.42%
CK1/CK1	2.11	67	48	71.64%	2232	211	78.84%	9236	1726	89.30%
CK1/CK1/CK1a	2	16	16	100%	2283	203	77.51%	9236	1401	86.82%
CK1/CK1/CK1d	2.84	6	6	100%	2293	112	59.05%	9236	608	69.62%
CK1/CK1/CK1e	2.1	11	11	100%	2288	34	-34.59%	9236	153	-20.73%
CK1/VRK	4.51	4	4	100%	2295	50	8.20%	9236	260	28.95%
CMGC	2.59	466	271	58.15%	1833	100	63.34%	9236	2626	92.97%
CMGC/CDK	2.22	285	164	57.54%	2014	145	72.22%	9236	2366	92.19%
CMGC/CDK/CDC2	3.13	186	107	57.53%	2113	217	80.53%	9236	2445	92.44%
CMGC/CDK/CDC2/CDC2	5.52	130	61	46.92%	2169	185	76.55%	9236	1621	88.60%
CMGC/CDK/CDC2/CDK2	5.04	61	49	80.33%	2238	306	85.37%	9236	2537	92.72%
CMGC/CDK/CDK4	3.01	12	12	100%	2287	257	82.20%	9236	1803	89.75%
CMGC/CDK/CDK4/CDK4	3.01	12	12	100%	2287	257	82.20%	9236	1803	89.75%
CMGC/CDK/CDK4/CDK6	5.01	3	3	100%	2296	160	71.30%	9236	845	78.14%
CMGC/CDK/CDK5	4.56	9	9	100%	2290	267	82.85%	9236	1771	89.57%
CMGC/CDK/CDK7	2.17	17	17	100%	2282	211	78.37%	9236	1085	82.98%
CMGC/DYRK	2.09	10	10	100%	2289	275	83.35%	9236	1716	89.24%
CMGC/DYRK/Dyrk1	2.43	5	5	100%	2294	160	71.32%	9236	975	81.05%
CMGC/GSK	2.21	69	60	86.96%	2230	320	86.06%	9236	2501	92.61%
CMGC/GSK/GSK3A	3.67	6	6	100%	2293	174	73.64%	9236	1141	83.81%
CMGC/GSK/GSK3B	2.33	43	41	95.35%	2256	338	86.65%	9236	2528	92.69%
CMGC/MAPK	2.11	237	143	60.34%	2062	169	75.60%	9236	1997	90.75%

CMGC/MAPK/ERK	2.49	115	88	76.52%	2184	255	82.87%	9236	2234	91.73%
CMGC/MAPK/ERK/MAPK1	3.79	82	68	82.93%	2217	271	83.64%	9236	2341	92.11%
CMGC/MAPK/ERK/MAPK3	3.21	60	50	83.33%	2239	287	84.40%	9236	2140	91.37%
CMGC/MAPK/ERK/MAPK7	2.93	13	13	100%	2286	222	79.41%	9236	1376	86.58%
CMGC/MAPK/JNK	2.65	38	37	97.37%	2261	147	69.24%	9236	1179	84.33%
CMGC/MAPK/JNK/MAPK8	8.34	26	22	84.62%	2273	262	82.65%	9236	2030	90.90%
CMGC/MAPK/JNK/MAPK9	3.01	17	17	100%	2282	245	81.37%	9236	1753	89.46%
CMGC/MAPK/JNK/MAPK10	2.76	8	8	100%	2291	253	81.89%	9236	2088	91.15%
CMGC/MAPK/p38	2.65	54	45	83.33%	2245	296	84.83%	9236	2304	91.98%
CMGC/MAPK/p38/MAPK11	3.67	3	3	100%	2296	177	74.06%	9236	830	77.74%
CMGC/MAPK/p38/MAPK12	5.01	3	3	100%	2296	252	81.78%	9236	1947	90.51%
CMGC/MAPK/p38/MAPK13	4.67	3	3	100%	2296	162	71.65%	9236	1121	83.52%
CMGC/MAPK/p38/MAPK14	2.51	46	37	80.43%	2253	252	82.12%	9236	1723	89.28%
STE	2.41	117	64	54.70%	2182	302	85.55%	9236	1486	87.57%
STE/STE7	1.7	51	45	88.24%	2248	205	78.07%	9236	930	80.14%
STE/STE7/MAP2K1	2.72	20	20	100%	2279	240	81.01%	9236	1683	89.02%
STE/STE7/MAP2K2	4.55	10	10	100%	2289	230	80.10%	9236	1112	83.39%
STE/STE7/MAP2K3	3.26	4	4	100%	2295	50	8.20%	9236	130	-42.09%
STE/STE7/MAP2K6	4.01	3	3	100%	2296	62	25.94%	9236	208	11.19%
STE/STE7/MAP2K7	4.17	6	6	100%	2293	91	49.60%	9236	314	41.17%
STE/STE11	2.51	8	8	100%	2291	90	49.09%	9236	368	49.80%
STE/STE20	1.8	58	53	91.38%	2241	242	81.48%	9236	507	63.57%
STE/STE20/PAKA	1.77	49	48	97.96%	2250	288	84.38%	9236	756	75.57%
STE/STE20/PAKA/PAK1	2.15	28	28	100%	2271	330	86.24%	9236	935	80.24%
STE/STE20/PAKA/PAK2	2.58	14	14	100%	2285	104	56.06%	9236	296	37.59%
STE/STE20/PAKA/PAK3	2.34	4	4	100%	2295	148	68.99%	9236	320	42.28%
STE/STE-Unique	2.55	11	11	100%	2288	142	67.77%	9236	501	63.13%
STE/STE-Unique/COT	3.01	7	7	100%	2292	101	54.61%	9236	174	-6.16%
STE/STE-Unique/NIK	3.76	4	4	100%	2295	149	69.19%	9236	955	80.66%
TKL	1.49	36	36	100%	2263	69	34.41%	9236	139	-32.89%
TKL/IRAK	4.51	4	4	100%	2295	48	4.38%	9236	194	4.78%
TKL/MLK	2.11	16	16	100%	2283	158	71.10%	9236	467	60.45%
TKL/MLK/ILK	3.23	6	6	100%	2293	80	42.68%	9236	281	34.26%
TKL/MLK/TAK1	2.72	7	7	100%	2292	192	76.12%	9236	600	69.21%
TKL/MLK/MLK/MAP3K11	4.01	3	3	100%	2296	43	-6.79%	9236	81	-128.05%
TKL/RAF	3.61	5	5	100%	2294	101	54.57%	9236	181	-2.06%
TKL/STKR	2.78	9	9	100%	2290	150	69.47%	9236	651	71.63%
Atypical/PDHK	3.51	4	4	100%	2295	112	59.02%	9236	395	53.24%
Atypical/PIKK	2.79	87	58	66.67%	2212	31	-42.71%	9236	120	-53.93%
Atypical/PIKK/ATM	2.81	55	54	98.18%	2244	59	23.93%	9236	194	4.78%
Atypical/PIKK/ATR	2.71	10	10	100%	2289	50	8.44%	9236	82	-125.27%
Atypical/PIKK/DNAPK	3.91	17	17	100%	2282	68	32.88%	9236	163	-13.33%
Atypical/PIKK/FRAP	4.72	14	14	100%	2285	259	82.36%	9236	1878	90.16%
Other/AUR	1.81	47	37	78.72%	2252	262	82.81%	9236	768	75.95%
Other/AUR/AUR-A	2.26	22	22	100%	2277	191	76.16%	9236	845	78.14%

Other/AUR/AUR-B	3.03	27	25	92.59%	2272	245	81.45%	9236	592	68.80%
Other/CK2	5.14	281	198	70.46%	2018	86	53.07%	9236	2178	91.52%
Other/CK2/CK2a	2.3	107	84	78.50%	2192	198	77.86%	9236	2215	91.66%
Other/CK2/CK2b	3.76	4	4	100%	2295	220	79.14%	9236	1495	87.64%
Other/IKK	1.46	44	44	100%	2255	117	61.45%	9236	792	76.68%
Other/IKK/IKKa	2.76	8	8	100%	2291	169	72.89%	9236	1086	82.99%
Other/IKK/IKKb	2.67	6	6	100%	2293	106	56.74%	9236	737	74.94%
Other/NEK	3.01	14	14	100%	2285	124	63.15%	9236	366	49.53%
Other/NEK/NEK2	4.67	3	3	100%	2296	49	6.29%	9236	260	28.95%
Other/NEK/NEK6	3.15	7	7	100%	2292	107	57.16%	9236	482	61.68%
Other/NEK/NEK9	7.34	3	3	100%	2296	89	48.40%	9236	154	-19.95%
Other/Other-Unique/KIS	5.01	5	5	100%	2294	187	75.47%	9236	1410	86.90%
Other/PEK	2.27	13	13	100%	2286	41	-11.51%	9236	195	5.27%
Other/PEK/PKR	2.38	13	13	100%	2286	38	-20.32%	9236	214	13.68%
Other/PLK	1.5	48	48	100%	2251	257	82.48%	9236	2040	90.95%
Other/PLK/PLK1	1.43	45	45	100%	2254	80	43.65%	9236	665	72.22%
Other/Wnk	5.01	4	4	100%	2295	89	48.43%	9236	152	-21.53%
Tyrosine Kinase										
TK	2.38	619	239	38.61%	5	1	80%	1095	265	83.47%
TK/Abl	2.79	45	34	75.56%	579	129	82.05%	1095	198	77.88%
TK/Abl/Abl	2.65	44	37	84.09%	580	135	82.81%	1095	202	78.32%
TK/Abl/Abl2	4.34	3	3	100%	621	36	31%	1095	53	17.36%
TK/Alk	2.1	22	22	100%	602	57	57.75%	1095	62	29.35%
TK/Axl	3.01	7	7	100%	617	79	68.76%	1095	103	57.48%
TK/Axl/Axl	4.34	3	3	100%	621	77	67.74%	1095	111	60.54%
TK/Axl/Mer	4.34	3	3	100%	621	41	39.41%	1095	48	8.75%
TK/Csk	7.01	5	5	100%	619	29	14.62%	1095	58	24.48%
TK/EGFR	2.8	55	48	87.27%	569	130	82.49%	1095	190	76.95%
TK/EGFR/EGFR	3.23	50	42	84%	574	121	81.02%	1095	175	74.97%
TK/EGFR/ErbB2	4.01	5	5	100%	619	80	69.05%	1095	107	59.07%
TK/Eph	3.05	15	15	100%	609	80	69.55%	1095	101	56.63%
TK/Eph/EphB2	3.15	4	4	100%	620	76	67.37%	1095	116	62.24%
TK/Eph/EphA3	5.01	3	3	100%	621	54	54%	1095	90	51.33%
TK/Eph/EphB1	4.76	2	2	100%	622	70	64.46%	1095	76	42.37%
TK/Fak	4.19	15	15	100%	609	144	83.08%	1095	192	77.19%
TK/Fak/FAK	3.7	12	12	100%	612	124	80.26%	1095	174	74.83%
TK/Fak/PYK2	6.34	3	3	100%	621	107	76.79%	1095	148	70.41%
TK/Fer	3.76	12	12	100%	612	110	77.75%	1095	168	73.93%
TK/Fer/Fer	5.01	4	4	100%	620	78	68.21%	1095	133	67.07%
TK/Fer/Fes	3.45	9	9	100%	615	86	71.40%	1095	141	68.94%
TK/FGFR	2.54	30	30	100%	594	113	78.97%	1095	160	72.62%
TK/FGFR/FGFR1	3.01	23	23	100%	601	99	75.72%	1095	173	74.68%
TK/FGFR/FGFR3	3.34	6	6	100%	618	76	67.47%	1095	72	39.17%
TK/InsR	2.54	55	49	89.09%	569	134	83.01%	1095	204	78.53%
TK/InsR/IGF1R	2.81	20	20	100%	604	99	75.60%	1095	132	66.82%

TK/InsR/InsR	3.32	41	34	82.93%	583	129	81.92%	1095	174	74.83%
TK/JakA	2.68	46	43	93.48%	578	79	70.73%	1095	123	64.39%
TK/JakA/JAK1	2.34	9	9	100%	615	39	36.92%	1095	72	39.17%
TK/JakA/JAK2	3.74	26	26	100%	598	87	72.51%	1095	127	65.51%
TK/JakA/JAK3	4.13	8	8	100%	616	102	75.84%	1095	120	63.50%
TK/JakA/Tyk2	3.63	8	8	100%	616	47	47.57%	1095	56	21.79%
TK/Met	3.39	21	21	100%	603	124	80.55%	1095	128	65.78%
TK/Met/Met	3.3	17	17	100%	607	128	81.03%	1095	134	67.31%
TK/Met/Ron	4.51	4	4	100%	620	71	65.07%	1095	58	24.48%
TK/Ret	2.65	14	14	100%	610	76	67.89%	1095	109	59.82%
TK/Src	2.59	241	133	55.19%	383	94	83.70%	1095	248	82.34%
TK/Src/Fgr	3.51	8	8	100%	616	77	68%	1095	123	64.39%
TK/Src/Fyn	3.54	47	34	72.34%	577	125	81.54%	1095	200	78.10%
TK/Src/Yes	4.58	6	6	100%	618	114	78.32%	1095	145	69.79%
TK/Src/HCK	3.42	11	11	100%	613	114	78.49%	1095	136	67.79%
TK/Src/Lyn	3.13	40	38	95%	584	134	82.57%	1095	153	71.37%
TK/Src/Lck	3.35	46	34	73.91%	578	147	84.27%	1095	231	81.04%
TK/Src/Src	2.77	121	74	61.16%	503	146	86.22%	1095	259	83.09%
TK/Src/BLK	4.51	4	4	100%	620	103	75.92%	1095	145	69.79%
TK/Src/Brk	5.26	4	4	100%	620	81	69.38%	1095	89	50.79%
TK/Syk	2.79	64	57	89.06%	560	134	83.28%	1095	216	79.72%
TK/Syk/Syk	3.71	50	45	90%	574	134	82.87%	1095	199	77.99%
TK/Syk/ZAP70	3.46	20	20	100%	604	164	85.27%	1095	214	79.53%
TK/Tec	3.84	31	30	96.77%	593	116	79.55%	1095	164	73.29%
TK/Tec/BTK	3.62	18	18	100%	606	69	64.87%	1095	123	64.39%
TK/Tec/ITK	3.56	9	9	100%	615	63	60.95%	1095	105	58.29%
TK/Tec/Tec	5.26	4	4	100%	620	29	14.48%	1095	69	36.52%
TK/Tec/TXK	5.21	5	5	100%	619	134	81.52%	1095	167	73.77%
TK/Tie	4.41	5	5	100%	619	61	59.41%	1095	78	43.85%
TK/Trk	3.01	15	15	100%	609	93	73.81%	1095	109	59.82%
TK/Trk/TRKA	3.61	5	5	100%	619	72	65.61%	1095	76	42.37%
TK/Trk/TRKB	3.21	10	10	100%	614	112	78.07%	1095	122	64.10%
TK/VEGFR	2.69	19	19	100%	605	122	80.16%	1095	139	68.49%
TK/VEGFR/FLT1	4.26	4	4	100%	620	27	8.15%	1095	72	39.17%
TK/VEGFR/FLT4	4.61	5	5	100%	619	114	78.28%	1095	132	66.82%
TK/VEGFR/KDR	2.8	10	10	100%	614	91	73.01%	1095	92	52.39%
TK/PDGFR	2.87	43	40	93.02%	581	153	84.81%	1095	199	77.99%
TK/PDGFR/PDGFRb	3.19	16	16	100%	608	122	80.07%	1095	156	71.92%
TK/PDGFR/PDGFRa	4.41	5	5	100%	619	113	78.09%	1095	113	61.24%
TK/PDGFR/FLT3	4.01	4	4	100%	620	61	59.34%	1095	80	45.25%
TK/PDGFR/KIT	5.01	4	4	100%	620	91	72.75%	1095	126	65.24%
TK/PDGFR/CSF1R	4.38	8	8	100%	616	100	75.36%	1095	114	61.58%