

Identification of a Topological Characteristic Responsible for the Biological Robustness of Regulatory Networks

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Table S4: The T cell receptor signaling network (TCR)

(Based on Ref. [1])

bad	\rightarrow	bclxl	cabin1	\rightarrow	calcin
calcin	\rightarrow	nfat	calpr1	\rightarrow	calcin
akap79	\rightarrow	calcin	cam	\rightarrow	calcin
cam	\rightarrow	camk4	cam	\rightarrow	camk2
camk4	\rightarrow	cabin1	card11a	\rightarrow	ikkg
ikkg	\rightarrow	ikkab	pkcth	\rightarrow	ikkg
ccb1p1	\rightarrow	terb	ccb1p1	\rightarrow	zap70
terb	\rightarrow	terp	terb	\rightarrow	dgk
terb	\rightarrow	pag	terb	\rightarrow	fyn
terb	\rightarrow	lckp2	terlig	\rightarrow	terb
zap70	\rightarrow	ccb1p1	zap70	\rightarrow	plcga
zap70	\rightarrow	gab2	zap70	\rightarrow	slp76
zap70	\rightarrow	p38	zap70	\rightarrow	vav1
zap70	\rightarrow	lat	zap70	\rightarrow	itk
zap70	\rightarrow	sh3bp2	terp	\rightarrow	zap70
abl	\rightarrow	zap70	cd28	\rightarrow	cblb
cd28	\rightarrow	x	cblb	\rightarrow	pi3k
dgk	\rightarrow	dag	dag	\rightarrow	pkcth
dag	\rightarrow	rasgrp	plcga	\rightarrow	dag
plcga	\rightarrow	ip3	erk	\rightarrow	shp1
erk	\rightarrow	fos	erk	\rightarrow	rsk
shp1	\rightarrow	lckp1	lckp1	\rightarrow	terp
lckp1	\rightarrow	abl	lckp1	\rightarrow	shp1
lckp1	\rightarrow	fyn	lckp1	\rightarrow	rlk
gab2	\rightarrow	slp76	gab2	\rightarrow	shp2
slp76	\rightarrow	plcga	slp76	\rightarrow	itk
gads	\rightarrow	gab2	gads	\rightarrow	slp76
gsk3	\rightarrow	bcat	gsk3	\rightarrow	cyc1
ikb	\rightarrow	nfbk	ikkab	\rightarrow	ikb
camk2	\rightarrow	ikkab	pkb	\rightarrow	bad
pkb	\rightarrow	gsk3	pkb	\rightarrow	fchr
pkb	\rightarrow	p21c	pkb	\rightarrow	p27k
gadd45	\rightarrow	p38	cd45	\rightarrow	lckp1
cd45	\rightarrow	fyn	cd4	\rightarrow	lckp1
csk	\rightarrow	lckp1	lckr	\rightarrow	lckp1

(Continued on the next page.)

(Table S4 continued)

lckr	$\xrightarrow{+}$	fyn	lckr	$\xrightarrow{+}$	lckp2
pag	$\xrightarrow{+}$	csk	ca	$\xrightarrow{+}$	cam
ccblr	$\xrightarrow{+}$	ccblp1	ccblr	$\xrightarrow{+}$	ccblp2
ccblp2	$\xrightarrow{-}$	plcga	fyn	$\xrightarrow{+}$	tcp
fyn	$\xrightarrow{+}$	abl	fyn	$\xrightarrow{+}$	pag
fyn	$\xrightarrow{+}$	ccblp2	x	$\xrightarrow{+}$	vav1
x	$\xrightarrow{+}$	pi3k	vav1	$\xrightarrow{+}$	pkcth
vav1	$\xrightarrow{+}$	plcga	vav1	$\xrightarrow{+}$	rac1p1
cdc42	$\xrightarrow{+}$	mekk1	cdc42	$\xrightarrow{+}$	sre
mekk1	$\xrightarrow{+}$	p38	mekk1	$\xrightarrow{+}$	jnk
mekk1	$\xrightarrow{+}$	mkk4	creb	$\xrightarrow{+}$	cre
rasgrp	$\xrightarrow{+}$	ras	pdk1	$\xrightarrow{+}$	pkcth
pdk1	$\xrightarrow{+}$	pkb	pdk1	$\xrightarrow{+}$	p70s
fos	$\xrightarrow{+}$	ap1	rsk	$\xrightarrow{+}$	creb
jun	$\xrightarrow{+}$	ap1	lat	$\xrightarrow{+}$	gab2
lat	$\xrightarrow{+}$	gads	lat	$\xrightarrow{+}$	grb2
lat	$\xrightarrow{+}$	hpk1	lat	$\xrightarrow{+}$	plcgb
lat	$\xrightarrow{+}$	sh3bp2	grb2	$\xrightarrow{+}$	gab2
grb2	$\xrightarrow{+}$	sos	hpk1	$\xrightarrow{+}$	mekk1
hpk1	$\xrightarrow{+}$	mlk3	mlk3	$\xrightarrow{+}$	mkk4
ip3	$\xrightarrow{+}$	ca	jnk	$\xrightarrow{+}$	jun
plcgb	$\xrightarrow{+}$	plcga	rlk	$\xrightarrow{+}$	plcga
lckp2	$\xrightarrow{+}$	pi3k	pi3k	$\xrightarrow{+}$	pip3
malt1	$\xrightarrow{+}$	card11a	card11	$\xrightarrow{+}$	card11a
bcl10	$\xrightarrow{+}$	card11a	mek	$\xrightarrow{+}$	erk
mkk4	$\xrightarrow{+}$	jnk	pip3	$\xrightarrow{+}$	pdk1
pip3	$\xrightarrow{+}$	itk	ship1	$\xrightarrow{-}$	pip3
pten	$\xrightarrow{-}$	pip3	itk	$\xrightarrow{+}$	plcga
rac1p1	$\xrightarrow{+}$	mlk3	rac1p2	$\xrightarrow{+}$	mekk1
rac1p2	$\xrightarrow{+}$	sre	rac1r	$\xrightarrow{+}$	rac1p1
rac1r	$\xrightarrow{+}$	rac1p2	vav3	$\xrightarrow{+}$	rac1p2
raf	$\xrightarrow{+}$	mek	ras	$\xrightarrow{+}$	raf
sh3bp2	$\xrightarrow{+}$	vav1	sh3bp2	$\xrightarrow{+}$	vav3
sos	$\xrightarrow{+}$	ras	gap	$\xrightarrow{-}$	ras

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1. Saez-Rodriguez J, Simeoni L, Lindquist JA, Hemenway R, Bommhardt U, et al. (2007) A logical model provides insights into t cell receptor signaling. PLoS Comput Biol 3:e163.