SnapShot: Kinase Inhibitors I

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Molecular Cell

	Kinase name	Tool compound	IC_{50}	Known off targets	Other compounds	CAS number	PubMed ID
AGC	AKT	MK2206	Akt1: 8 nM; Akt2: 12 nM; Akt3: 65 nM		GSK690693 (ATP-competitive)	1032349-93-1, 1032350-13-2 (HCl salt)	20571069
	AKT1	A-674563	Akt1: 11 nM(K_i)	PKA, CDK2		552325-73-2	15956255
	p70S6K	PF-4708671	160 nM	MSK1		1255517-76-0	20704563
	PDK1	GSK2334470	2.5 nM			1227911-45-6	21341675
	PKC	Sotrastaurin	PKCθ: 0.22 nM(K_i); PKCβ: 0.64 nM(K_i); PKCα: 0.95 nM(K_i); PKCη: 1.8 nM(K_i); PKCδ: 2.1 nM(K_i); PKCε: 3.2 nM(K_i)		Go 6983	425637-18-9	19491325
	PKCβ	Enzastaurin	6 nM	PKCα, γ, ε		170364-57-5	16103100
	PKCθ	Compound 41	23 nM	PKCα		1613717-26-2	25000588
	ROCK1/2	GSK269962A	ROCK1: 1.6 nM; ROCK2: 4 nM	MSK1, RSK1	GSK429286A	850664-21-0	17018693
	RSK	BI-D1870	RSK1: 31 nM; RSK2: 24 nM; RSK3: 18 nM; RSK4: 15 nM	MST2	FMK (covalent)	501437-28-1	17040210
	RSK2	BIX 02565	1.1 nM	LRRK2, PRKD1/2/3, RET		1311367-27-7	22056746
	SGK1/2	GSK650394	SGK1: 62 nM; SGK2: 103 nM		EMD638683	890842-28-1	18794135
Atypical	ATM	KU-60019	6.3 nM	PI3K (p110β/p85α), PI3K (p120γ), and PI3K (p110δ/p85α)	KU-55933, CP-466722	925701-49-1	19808981
	ATR	VE-821	13 nM (K_i)		AZ20	1232410-49-9	21490603
	FRAP	AZD2014	2.8 nM		INK128, Torin2, Torin1, KU-0063794, WYE-354, AZD8055	1009298-59-2	23375793
	FRAP	Rapamycin	0.1 nM		Everolimus, Ridaforolimus	53123-88-9	17350953
	PDHK	VER-246608	PDHK1: 35 nM; PDHK2: 84 nM; PDHK3: 40 nM; PDHK4: 91 nM		AZD7545		25404640
CAMK	CaMK2	KN-93	370 nM (K_i)		KN-62, Scios 15b, SMP-114	1188890-40-5, 1188890-41-6 (phosphate salt)	1662507
	CHK1	PF-477736	Chk1: 0.49 nM; Chk2: 47 nM	VEGFR2, FMS, YES	SCH900776, LY2603618, CHIR-124	952021-60-2	18723486
	CHK2	CCT241533	Chk2: 3 nM; Chk1: 190 nM	PHK, MARK3		1262849-73-9	21239475
	MAPKAPK2	PF3644022	5.2 nM	MAPKAPK3, MAPKAPK5		1276121-88-0	20237073
	MELK	OTSSP167	0.41 nM	multiple	MELK-T1	1431697-89-0	23283305
	MLCK	MLCK inhibitor peptide 18	50 nM			224579-74-2	10072688
	NuaK1/2	WZ4003	NUAK1: 20 nM; NUAK2: 100 nM		HTH01-015	1214265-58-3	24171924
	PIM1/2/3	AZD1208	Pim1: 0.4 nM; Pim2: 5 nM; Pim3: 1.9 nM	CDK7, MAPK15	LGB321, CX-6258	1204144-28-4	24363397
	PKD1/2/3	CRT 0066101	PKD1: 1 nM; PKD2: 2.5 nM; PKD3: 2 nM		kb NB 142-70, BPKDi	956123-34-5, 1290629-45-6 (HCl Salt)	20442301
	SIK1/2/3	HG-9-91-01	SIK1: 0.92 nM; SIK2: 6.6 nM; SIK3: 9.6 nM	NUAK2, Src, Yes, EphA4		1456858-58-4	23033494
CK1	CK1ε	PF-4800567	CK1ε: 32 nM; CK1δ: 711 nM	EGFR	D4476, PF-670462	1188296-52-7	19458106
CMGC	CDK1/2	BMS-265246	CDK1: 6 nM; CDK2: 9 nM	CDK4	R-547	582315-72-8	12824044
	CDK4/6	PD0332991	CDK4: 9 nM; CDK6: 15 nM			571190-30-2	15542782
	CDK7	THZ1	3.2 nM		BMS181	1604810-83-4	25043025
	CDK9	NVP-2	0.5 nM		NVP-1, SNS-032	1263373-43-8	*WO 2011012661
	CK2	CX-4945	1 nM		TBB, CX-5011, CX-5279	1009820-21-6	21159648
	CLK1	KH CB19	19.7 nM	CLK4, DYRK1A	TG003	1354037-26-5	21276940
	DYRK1	Harmine	DYRK1A: 33 nM; DYRK1B: 166 nM		TG003	442-51-3	19796173
	DYRK1B	AZ191	17 nM			1594092-37-1	24134204
	ERK1/2	SCH772984	ERK1: 4 nM; ERK2: 1 nM		GDC-0994, FR180204, VTX-11e (Erk2 only)	942183-80-4	23614898
	ERK5	XMD8-92	80 nM (K_d)	DCAMKL1, DCAMKL2	XMD17-109	1234480-50-2	20832753
	GSK3α/β	CHIR-99021	GSK-3α: 10 nM; GSK-3β: 6.7 nM		CHIR-98014, AR-A0144418, SB216763	252917-06-9	22065134
	JNK1/2/3	JNK-IN-8	JNK1: 4.7 nM; JNK2: 18.7 nM; JNK3: 1nM		JNK-9L, AS601245, SP600125	1410880-22-6	22284361
	p38α	VX-745	p38α: 10 nM; p38β: 220 nM		LY2228820, PH-797804, BIRB796 (allosteric)	209410-46-8	24900264
Lipid	PI3K	GDC-0941	p110α: 3 nM; p110β: 33 nM; p110γ: 75 nM; p110δ: 3 nM		NVP-BKM120, XL-147	957054-30-7	18754654
	PI3Kα	BYL-719	p110α: 5 nM; p110β: 1,200 nM; p110γ: 250 nM; p110δ: 290 nM		GDC-0032, INK1117	1217486-61-7	23726034
	PI3Kβ	AZD6482	p110α: 870 nM; p110β: 10 nM; p110γ: 1090 nM; p110δ: 80 nM		TGX-221	1173900-33-8	22906130
	PI3Kδ	CAL-101	p110α: 820 nM; p110β: 565 nM; p110δ: 2.5 nM; p110γ: 89 nM		IC-87114, IPI-145, AMG-319	870281-82-6	20959606
	PI3Kγ	CZC24832	p110γ: 27 nM	PI3Kβ, PIP4K2C	AS-605240	1159824-67-5	22544264
	Vps34	SAR405	1.5 nM (K_d)		VPS34-IN1, PIK-III	1523406-39-4	25326666

See online version for legend and references.

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Selective small-molecule inhibitors of kinases can serve as powerful tools to elucidate biological function. Efforts to develop potential drug candidates have yielded a wealth of kinase inhibitors. However, selecting the optimal kinase inhibitor for a particular application can be challenging. While the optimal inhibitor will be application specific, we have attempted to summarize some of the best reported inhibitors for various kinases.

Typical considerations for selecting kinase inhibitors include requirements for selectivity, potency, cellular and in vivo bioavailability, and commercial accessibility (Knapp et al., 2013; Cohen, 2010). Because most kinase inhibitors target the highly conserved ATP-binding pocket, selectivity data have been emphasized (Davies et al., 2000; Bain et al., 2003, 2007; Davis et al., 2011; Uitdehaag et al., 2012). Users are encouraged to always validate their results with more than one kinase inhibitor at concentrations as low as possible and, ideally, to "rescue" the inhibitor-induced phenomena through expression of an inhibitor-resistant allele of the kinase (Cohen, 2010; Clark et al., 2012).

Kinase inhibitors are grouped by family (Manning et al., 2002). The first column of the table indicates the kinase family names.

Inhibition constant (Ki) or dissociation constant (Kd) is listed for compounds without reported IC_{50}.

*This compound is only disclosed in patent application. Patent publication number is listed instead.

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