



FINDING THE
PATHWAY TO
ASSAY OPTIMIZATION
IS EASY

LANCE *Ultra* Serine/Threonine Kinase Selection Guide

LANCE® *Ultra* TR-FRET reagents comprise the widest portfolio of validated kinase assay offerings available for rapid, sensitive and robust screening of purified kinase targets in a biochemical format.

- We provide S/B ratiometric data for each LANCE *Ultra* assay to guide you to the best performing solution for your assay.
- Rapid assay optimization every time.
- Our selection guides contain over 300 kinases from a variety of suppliers:
 - 225 Serine/Threonine kinases validated on LANCE *Ultra* reagents
 - 85 Tyrosine kinases validated on LANCE *Ultra* reagents

How to use this guide:

1. Locate your kinase
 - In many cases, up to three commercial kinase vendors have been tested.
 - Many common aliases are shown in parenthesis.
2. Best performing *ULight*™ substrates are listed for each enzyme according to performance
 - Signal to background (S/B) ratios (Signal at 665 nm / minus ATP control at 665 nm) are indicated in parenthesis.
 - All S/B ratios were obtained at fixed experimental conditions unless otherwise noted (see page 10).
3. Based on your substrate choice, find the corresponding Europium-labeled anti-phospho antibody on page 11 (**i.e. LANCE *Ultra* products used for this study**) to identify the TR-FRET donor anti-phospho antibody for your LANCE *Ultra* assay.

If you cannot find your kinase of interest, please ask your PerkinElmer sales specialist, as our list continues to expand. Two kits are available for testing purposes:

- **KinaSelect Ser/Thr kit** (5 x 250 data points, TRF0300-C)
 - 5 *ULight*-labeled Ser/Thr kinase specific substrates + 5 matching Europium-labeled anti-phospho antibodies
- **KinaSelect TK kit** (1,000 data points, TRF0301-D)
 - 1 *ULight*-labeled kinase specific substrate + 1 matching Europium-labeled anti-phospho antibody

LANCE[®] Ultra Reagents for Ser/Thr Kinase Assays

Up to three kinase substrates are listed based on signal to background (S/B) ratios obtained with commercially available enzymes.

S/B ratios (Signal at 665 nm / minus ATP control at 665 nm) are indicated in parenthesis.

Kinase	ULight Substrate 1	ULight Substrate 2	ULight Substrate 3	Kinase Supplier	Supplier Cat. No.
ACTR2B (ACVR2B)	ULight-Histone H3 (Thr3; 10.4)	ULight-Topo II α (7.2)		Carna Biosciences	09-132
ACV-R1 (ALK2)	ULight-Topo II α (10.9)			ProQinase	0372-0000-1
ALK2 (ACV-R1)	ULight-Topo II α (Mn ²⁺ ; 21.5)			Carna Biosciences	09-134
ACVR2A	ULight-Histone H3 (Thr3; 9.4)	ULight-CREBtide (5.7)		Carna Biosciences	09-131
ACVRL1 (ALK1)	ULight-CREBtide (14.2)	ULight-Topo II α (5.6)	ULight-PLK (5.4)	Invitrogen	PV4883
BARK1 (ADRBK1, GRK2)	ULight-Topo II α (22.9)			Carna Biosciences	01-111
ADRBK2 (BARK2, GRK3)	ULight-Topo II α (27.9)			Invitrogen	PV3827
BARK2 (ADRBK2, GRK3)	ULight-Topo II α (22.9)	ULight-Histone H3 (Thr3; 10.1)		Carna Biosciences	01-112
AKT1	ULight-CREBtide (32.0)	ULight-rpS6 (20.5)	ULight-PLK (19.1)	Carna Biosciences	01-101
AKT2	ULight-CREBtide (32.4)	ULight-rpS6 (21.7)	ULight-PLK (20.1)	Carna Biosciences	01-102
AKT3	ULight-CREBtide (32.1)	ULight-rpS6 (21.6)	ULight-PLK (20.7)	Carna Biosciences	01-103
ALK4 (ACVR1B)	ULight-Topo II α (20.6)			Carna Biosciences	09-135
AMPK-alpha1 fl	ULight-CREBtide (9.6)	ULight-Histone H3 (Thr3; 5.3)		ProQinase	0289-0000-1
AMPKα1/β1/γ1 (PRKAA1/B1/G1)	ULight-CREBtide (31.9)	ULight-Acetyl-CoA Carboxylase (30.5)	ULight-PLK (15.1)	Carna Biosciences	02-113
AMPKα2/β1/γ1 (PRKAA2/B1/G1)	ULight-CREBtide (30.3)	ULight-Acetyl-CoA Carboxylase (29.9)	ULight-PLK (11.5)	Carna Biosciences	02-114
ARK5 (NuaK1)	ULight-CREBtide (18.8)	ULight-Topo II α (7.7)		ProQinase	0300-0000-1
NuaK1 (ARK5)	ULight-CREBtide (22.8)	ULight-Topo II α (3.1)		Carna Biosciences	02-126
AurA (Aurora-A)	ULight-PLK (20.5)	ULight-Histone H3 (Ser10; 13.0)		Carna Biosciences	05-101
AurB (AURKB)/INCENP	ULight-CREBtide (29.8)	ULight-rpS6 (21.0)	ULight-PLK (17.6)	Carna Biosciences	05-102
Aurora-B	ULight-CREBtide (13.4)	ULight-Histone H3 (Ser10; 12.7)	ULight-PLK (7.6)	ProQinase	0190-0000-1
AurC (AURKC)	ULight-PLK (16.2)	ULight-Histone H3 (Ser10; 12.1)	ULight-CREBtide (11.7)	Carna Biosciences	05-103
Aurora-C	ULight-CREBtide (8.9)	ULight-Histone H3 (Ser10; 8.4)	ULight-PLK (3.8)	ProQinase	0315-0000-1
BMPR1B	ULight-Topo II α (18.7)			Carna Biosciences	09-138
BMPR2	ULight-Histone H3 (Thr3; 11.0)			Carna Biosciences	09-139
BRAF	GST-MAP2K1/ ULight anti-GST (6.1)			Carna Biosciences	09-122
BRAF [V600E]	GST-MAP2K1/ ULight anti-GST (10.5)			Carna Biosciences	09-144
BRSK1	ULight-CDC25 (7.6)	ULight-Acetyl-CoA Carboxylase (5.2)		Carna Biosciences	02-115
BRSK2	ULight-CDC25 (8.4)	ULight-Acetyl-CoA Carboxylase (7.9)		Carna Biosciences	02-116
CaMK1α (CAMK1)²	ULight-CREBtide (28.4)			Carna Biosciences	02-104
CaMK1β (PNCK)²	ULight-CREBtide (29.6)			Carna Biosciences	02-105
CaMK1δ (CAMK1D)²	ULight-CREBtide (30.5)			Carna Biosciences	02-106
CaMK2α (CAMK2A)²	ULight-CREBtide (26.1)	ULight-rpS6 (22.3)	ULight-PKC (16.1)	Carna Biosciences	02-109
CaMK2β (CAMK2B)²	ULight-CREBtide (30.7)	ULight-rpS6 (23.6)	ULight-mTOR (12.0)	Carna Biosciences	02-110
CaMK2δ (CAMK2D)²	ULight-rpS6 (25.4)	ULight-CREBtide (23.8)	ULight-PLK (14.0)	Carna Biosciences	02-111
CaMK2γ (CAMK2G)²	ULight-CREBtide (26.2)	ULight-rpS6 (18.2)	ULight-PKC (15.6)	Carna Biosciences	02-112

Newly added Kinases highlighted in Green

Kinase	ULight Substrate 1	ULight Substrate 2	ULight Substrate 3	Kinase Supplier	Supplier Cat. No.
CaMK4²	ULight-CREBtide (33.5)	ULight-mTOR (8.6)	ULight-PLK (6.0)	Carna Biosciences	02-108
CAMKK1²	ULight-p70S6K (25.1)	ULight-CREBtide (19.6)		Carna Biosciences	05-107
CAMKK2	ULight-Histone H3 (Thr3; 12.2)			Carna Biosciences	05-108
CAMKK2²	ULight-Histone H3 (Thr3; 12.0)	ULight-p70S6K (5.5)		Carna Biosciences	05-108
CDC2/CycB1	ULight-MBP (43.2)	ULight-4E-BP1 (37.2)		Carna Biosciences	04-102
CDC2L6/CycC	ULight-Histone H3 (Thr3; 10.0)			Carna Biosciences	04-112
CDC42BPB (MRCKβ)	ULight-Histone H3 (Ser10; 6.7)			ProQinase	0382-0000-1
MRCKβ (CDC42BPB)	ULight-Histone H3 (Ser10; 6.9)	ULight-CREBtide (6.3)	ULight-PLK (3.3)	Carna Biosciences	01-108
CDC7/ASK	ULight-Topo IIα (14.6)			Carna Biosciences	05-109
CDK1/CycA	ULight-4E-BP1 (37.9)	ULight-MBP (21.9)		ProQinase	0134-0054-1
CDK1/CycB1	ULight-4E-BP1 (39.6)	ULight-MBP (27.8)		ProQinase	0134-0135-1
CDK1/CycE	ULight-4E-BP1 (39.2)	ULight-MBP (21.5)		ProQinase	0134-0055-1
CDK2/CycA	ULight-MBP (39.9)	ULight-4E-BP1 (36.7)		Carna Biosciences	04-103
CDK2/CycE1	ULight-4E-BP1 (33.5)	ULight-MBP (28.5)		Carna Biosciences	04-165
CDK3/CycE1	ULight-MBP (38.9)	ULight-4E-BP1 (23.3)		Carna Biosciences	04-104
CDK4/CycD1	ULight-4E-BP1 (38.7)	ULight-MBP (21.6)		ProQinase	0142-0143-1
CDK4/CycD3	ULight-MBP (37.2)	ULight-4E-BP1 (32.3)		Carna Biosciences	04-105
CDK5/p25	ULight-MBP (37.1)	ULight-4E-BP1 (36.5)		Carna Biosciences	04-106
CDK5/p25NCK	ULight-4E-BP1 (34.2)	ULight-MBP (24.9)		ProQinase	0356-0389-1
CDK5/p35NCK	ULight-4E-BP1 (40.3)	ULight-MBP (22.9)		ProQinase	0356-0355-1
CDK6/CycD1	ULight-4E-BP1 (39.6)	ULight-MBP (17.0)		ProQinase	0051-0143-1
CDK6/CycD3	ULight-MBP (35.7)	ULight-4E-BP1 (35.4)		Carna Biosciences	04-107
CDK7/CycH/MAT1	ULight-MBP (19.0)			Carna Biosciences	04-108
CDK8/CycC	ULight-CREBtide (7.3)	ULight-GS (5.0)	ULight-rpS6 (4.7)	ProQinase	0376-0390-1
CDK9/CyclinK	ULight-GS (9.3)			Invitrogen	PV4335
CDK9/CycT1	ULight-4E-BP1 (28.1)	ULight-MBP (14.4)		Carna Biosciences	04-110
CGK2 (PKG2, PRKG2)	ULight-CREBtide (35.8)	ULight-PLK (14.1)		Carna Biosciences	01-143
CHK1 (CHEK1)	ULight-CREBtide (30.4)	ULight-PKC (15.7)	ULight-Acetyl-CoA Carboxylase (8.1)	Carna Biosciences	02-117
CHK2 (CHEK2)	ULight-CREBtide (31.8)	ULight-PLK (7.3)	ULight-rpS6 (6.4)	Carna Biosciences	02-162
CK1α (CSNK1A1)	ULight-Topo IIα (13.7)			Carna Biosciences	03-101
CK1-alpha1	ULight-Topo IIα (15.0)			ProQinase	0406-0000-1
CK1δ (CSNK1D)	ULight-Topo IIα (23.5)	ULight-GS (12.5)		Carna Biosciences	03-103
CK1ε (CSNK1E)	ULight-Topo IIα (23.7)			Carna Biosciences	03-104
CK1γ1 (CSNK1G1)	ULight-Histone H3 (Thr3; 14.6)			Carna Biosciences	03-105
CK1γ2 (CSNK1G2)	ULight-Histone H3 (Thr3; 10.1)	ULight-Topo IIα (7.2)		Carna Biosciences	03-106
CK1γ3 (CSNK1G3)	ULight-Histone H3 (Thr3; 12.9)			Carna Biosciences	03-107
CK2-alpha1	ULight-Topo IIα (22.0)			ProQinase	0124-0000-1
CK2α1/β (CSNK2A1/B)	ULight-IκBα (28.7)	ULight-Topo IIα (13.8)	ULight-Histone H3 (Thr3; 10.9)	Carna Biosciences	05-184
CK2-alpha2	ULight-Topo IIα (21.4)			ProQinase	0412-0000-1
CK2α2/β (CSNK2A2/B)	ULight-IκBα (29.6)	ULight-Topo IIα (14.6)	ULight-Histone H3 (Thr3; 10.1)	Carna Biosciences	05-185
CLK1	ULight-MBP (41.2)	ULight-4E-BP1 (25.7)	ULight-GS (20.1)	Carna Biosciences	04-126
CLK2	ULight-CREBtide (19.1)	ULight-MBP (11.9)	ULight-Histone H3 (Ser10; 8.3)	Carna Biosciences	04-127

Newly added Kinases highlighted in Green

Kinase	ULight Substrate 1	ULight Substrate 2	ULight Substrate 3	Kinase Supplier	Supplier Cat. No.
CLK3	ULight-CREBtide (26.2)	ULight-GS (14.1)	ULight-rpS6 (8.5)	Carna Biosciences	04-128
COT (MAP3K8)	ULight-p70S6K (Mn ²⁺ ; 11.0)	ULight-Acetyl-CoA Carboxylase (Mn ²⁺ ; 7.8)	GST-MAP2K1 / ULight-anti-GST (Mn ²⁺ ; 7.8)	Carna Biosciences	07-301
COT	GST-MAP2K1 / ULight-anti-GST (Mn ²⁺ ; 8.0)	ULight-p70S6K (Mn ²⁺ ; 5.3)	ULight-Acetyl-CoA Carboxylase (Mn ²⁺ ; 4.3)	ProQinase	0180-0000-1
CRIK (CIT)	ULight-Histone H3 (Ser10; 8.3)			Carna Biosciences	01-104
DAPK1	ULight-CREBtide (23.7)	ULight-PLK (18.1)	ULight-Histone H3 (Ser10; 9.3)	Carna Biosciences	02-134
DAPK1	ULight-CREBtide (10.5)	ULight-Histone H3 (Thr3; 9.8)		ProQinase	0332-0000-1
DAPK2	ULight-CREBtide (6.7)	ULight-PLK (6.4)		Invitrogen	PV3614
DAPK3	ULight-CREBtide (13.8)	ULight-Histone H3 (Thr3; 6.6)	ULight-Histone H3 (Ser10; 6.3)	Carna Biosciences	02-136
DCAMKL1	ULight-CREBtide (34.8)			Carna Biosciences	02-139
DCAMKL2	ULight-CREBtide (31.4)			Carna Biosciences	02-140
DLK (MAP3K12)	ULight-CREBtide (36.4)	ULight-PKC (11.6)	ULight-Histone H3 (Thr3; 10.9)	Carna Biosciences	09-111
DNA PK ³	ULight-mTOR (40 U; S/B +/- DNA: 6.6)			Promega	V7870
DRAK1 (STK17A)	ULight-CREBtide (9.2)	ULight-Histone H3 (Thr3; 6.2)		Carna Biosciences	02-137
DYRK1A	ULight-GS (20.1)	ULight-MBP (18.5)	ULight-4E-BP1 (7.4)	Carna Biosciences	04-130
DYRK1B	ULight-4E-BP1 (24.6)	ULight-MBP (23.2)	ULight-GS (19.2)	Carna Biosciences	04-131
DYRK2	ULight-MBP (33.4)	ULight-4E-BP1 (30.0)	ULight-GS (19.9)	Carna Biosciences	04-132
DYRK3	ULight-4E-BP1 (39.9)	ULight-MBP (22.0)	ULight-GS (18.3)	Carna Biosciences	04-133
DYRK4	ULight-4E-BP1 (36.3)	ULight-MBP (26.7)	ULight-GS (20.2)	Invitrogen	PV3871
Erk1 (MAPK3)	ULight-4E-BP1 (37.9)	GST-ATF-2 / ULight-anti-GST (37.6)	ULight-MBP (26.6)	Carna Biosciences	04-142
Erk2 (MAPK1)	ULight-4E-BP1 (37.1)	GST-ATF-2 / ULight-anti-GST (35.1)	ULight-MBP (28.0)	Carna Biosciences	04-143
ERK2	GST-ATF-2 / ULight-anti-GST (40.0)	ULight-4E-BP1 (31.9)	ULight-MBP (19.4)	ProQinase	0634-0000-7
Erk5 (MAPK7)	ULight-4E-BP1 (22.4)			Carna Biosciences	04-146
Erk7 (MAPK15)	ULight-4E-BP1 (22.3)			Carna Biosciences	04-147
GCN2	ULight-CREBtide (13.5)	ULight-Histone H3 (Thr3; 12.3)		Carna Biosciences	05-153
GPRK4 (GRK4)	ULight-Topo II α (18.8)	ULight-CREBtide (15.7)	ULight-p70S6K (14.2)	Carna Biosciences	01-313
GPRK6 (GRK6)	ULight-Histone H3 (Thr3; 10.8)	ULight-Topo II α (4.3)		Carna Biosciences	01-315
GPRK7 (GRK7)	ULight-Histone H3 (Thr3; 10.2)	ULight-Topo II α (5.9)		Carna Biosciences	01-116
GRK5	ULight-I κ B α (26.5)	ULight-Topo II α (26.3)	ULight-Histone H3 (Thr3; 11.7)	Invitrogen	PV3824
GSK3 α (GSK3A)	ULight-4E-BP1 (34.5)	ULight-GS (21.5)		Carna Biosciences	04-140
GSK3 β (GSK3B)	ULight-4E-BP1 (35.9)	ULight-GS (21.9)		Carna Biosciences	04-141
Haspin (GSG2)	ULight-Histone H3 (Thr3; 15.5)			Carna Biosciences	05-111
HGK (MAP4K4)	ULight-p70S6K (23.8)			Carna Biosciences	07-137
HIPK1	ULight-4E-BP1 (30.8)	ULight-MBP (22.9)	ULight-GS (20.1)	Carna Biosciences	04-135
HIPK2	ULight-MBP (37.4)	ULight-GS (17.4)		Carna Biosciences	04-136
HIPK3	ULight-4E-BP1 (36.9)	ULight-MBP (22.9)	ULight-GS (21.3)	Carna Biosciences	04-137
HIPK4	ULight-4E-BP1 (37.7)	ULight-MBP (21.2)	ULight-GS (20.5)	Carna Biosciences	04-138
HRI	ULight-CREBtide (13.3)	ULight-PLK (6.2)		ProQinase	0444-0000-1
ICK	ULight-MBP (33.4)	ULight-4E-BP1 (24.7)	ULight-GS (12.6)	Carna Biosciences	04-156
IKK α (CHUK)	ULight-I κ B α (22.4)	ULight-rpS6 (17.9)	ULight-Acetyl-CoA Carboxylase (11.8)	Carna Biosciences	05-112
IKK β	ULight-p70S6K (30.4)	ULight-I κ B α (25.6)	ULight-rpS6 (22.1)	Carna Biosciences	05-084
IKK-beta	ULight-I κ B α (25.5)			ProQinase	0258-0000-1
IKK ϵ (IKBKE)	ULight-p70S6K (22.1)	ULight-rpS6 (20.2)	ULight-PLK (15.8)	Carna Biosciences	05-114

Newly added Kinases highlighted in Green

Kinase	ULight Substrate 1	ULight Substrate 2	ULight Substrate 3	Kinase Supplier	Supplier Cat. No.
IKK-epsilon	ULight-rpS6 (22.0)	ULight-p70S6K (15.5)	ULight-PLK (12.5)	ProQinase	0320-0000-1
IRAK1	ULight-p70S6K (28.3)	ULight-Acetyl-CoA Carboxylase (17.7)	ULight-Histone H3 (Thr3; 14.4)	Carna Biosciences	09-101
IRAK4	ULight-p70S6K (Mn ²⁺ ; 32.4)	ULight-Acetyl-CoA Carboxylase (31.9)		Carna Biosciences	09-145
IRAK4	ULight-p70S6K (Mn ²⁺ ; 28.1)	ULight-Acetyl-CoA Carboxylase (23.9)		ProQinase	0586-0000-1
JNK1 (MAPK8)	ULight-4E-BP1 (34.5)	GST-ATF-2 / ULight-anti-GST (32.0)	ULight-MBP (21.4)	Carna Biosciences	04-163
JNK2 (MAPK9)	ULight-4E-BP1 (35.0)	GST-ATF-2 / ULight-anti-GST (32.8)	ULight-MBP (20.8)	Carna Biosciences	04-164
JNK3 (MAPK10)	GST-ATF-2 / ULight-anti-GST (33.7)	ULight-4E-BP1 (32.8)	ULight-MBP (19.8)	Carna Biosciences	04-150
LATS2	ULight-CREBtide (14.8)	ULight-mTOR (5.0)		Carna Biosciences	01-124
LRRK2	ULight-CREBtide (24.2)	ULight-PLK (19.9)	ULight-Histone H3 (Thr3; 10.4)	Carna Biosciences	09-110
LRRK2 [G2019S]	ULight-Histone H3 (Thr3; 15.4)			Invitrogen	PV4881
LRRK2 [G2019S]	ULight-Histone H3 (Thr3; 15.3)	ULight-CREBtide (8.4)		Carna Biosciences	09-146
LZK	ULight-CREBtide (17.9)	ULight-Histone H3 (Thr3; 8.3)		Carna Biosciences	09-114
MAP2K3	GST-p38 α / ULight-anti-GST (19.8)			Carna Biosciences	07-048
MAP2K4	GST-p38 α / ULight-anti-GST (22.1)			Carna Biosciences	07-044
MAP2K6 (MKK6)	GST-p38 α / ULight-anti-GST (23.1)			Carna Biosciences	07-046
MAP3K1	ULight-Acetyl-CoA Carboxylase (5.3)			Carna Biosciences	07-103
MAP3K2	GST-MAP2K1 / ULight-anti-GST (5.9)			Carna Biosciences	07-004
MAP3K6	ULight-CREBtide (6.5)			Carna Biosciences	07-108
MAP3K14 (NIK)	ULight-CREBtide (9.3)			Carna Biosciences	07-102
NIK (MAP3K14)	ULight-CREBtide (8.5)			ProQinase	0344-0000-1
MAP4K2	ULight-rpS6 (18.3)	ULight-CREBtide (16.0)	ULight-p70S6K (9.2)	Carna Biosciences	07-111
MAP4K5 (KHS1)	ULight-p70S6K (35.6)	ULight-rpS6 (24.9)	ULight-Acetyl-CoA Carboxylase (23.8)	Invitrogen	PV3682
MAPKAPK2	ULight-4E-BP1 (32.2)	ULight-MBP (31.4)	ULight-CREBtide (29.1)	Carna Biosciences	02-142
MAPKAPK3	ULight-CREBtide (27.1)	ULight-rpS6 (13.2)	ULight-PKC (12.3)	Carna Biosciences	02-143
MAPKAPK3	ULight-CREBtide (26.1)	ULight-mTOR (11.8)	ULight-CDC25 (8.2)	ProQinase	0633-0000-1
MAPKAPK5	ULight-MBP (11.1)	ULight-4E-BP1 (10.1)		Carna Biosciences	02-144
MAPKAPK5	ULight-Topo II α (3.6)	ULight-PLK (3.6)		ProQinase	0380-0000-1
MARK1	ULight-PLK (18.1)	ULight-Acetyl-CoA Carboxylase (13.9)	ULight-CREBtide (8.9)	Carna Biosciences	02-120
MARK1	ULight-Acetyl-CoA Carboxylase (9.4)	ULight-PLK (9.3)	ULight-CREBtide (8.0)	ProQinase	0432-0000-1
MARK2 (EMK1)	ULight-PLK (18.0)	ULight-Acetyl-CoA Carboxylase (15.6)	ULight-CREBtide (8.5)	Carna Biosciences	02-121
MARK3 (C-TAK1)	ULight-PLK (12.3)	ULight-Acetyl-CoA Carboxylase (11.9)	ULight-CDC25 (7.6)	Carna Biosciences	02-122
MARK3 (C-TAK1)	ULight-Acetyl-CoA Carboxylase (15.1)	ULight-PLK (13.2)	ULight-CDC25 (7.1)	ProQinase	0433-0000-1
MARK4 (MARKL1)	ULight-Acetyl-CoA Carboxylase (25.7)	ULight-CREBtide (21.0)	ULight-PLK (18.8)	Carna Biosciences	02-123
MELK	ULight-CREBtide (32.9)			Carna Biosciences	02-124
MGC42105 (B3KVM1)	ULight-CREBtide (25.8)	ULight-PLK (10.8)	ULight-CDC25 (7.4)	Carna Biosciences	02-125
MINK (MINK1)	ULight-p70S6K (55.1)	ULight-PKC (14.5)	ULight-rpS6 (11.8)	Carna Biosciences	07-139
MLK1 (MAP3K9)	GST-MAP2K1 / ULight-anti-GST (11.4)	ULight-rpS6 (5.4)		Carna Biosciences	09-015
MLK2 (MAP3K10)	ULight-Histone H3 (Thr3; 11.0)	GST-MAP2K1 / ULight-anti-GST (3.2)		Carna Biosciences	09-116
MLK3 (MAP3K11)	GST-MAP2K1 / ULight-anti-GST (6.4)			Carna Biosciences	09-017
MNK1 (MKNK1)	ULight-CREBtide (36.8)	ULight-Histone H3 (Ser10; 9.9)		Carna Biosciences	02-145
MNK2 (MKNK2)	ULight-CREBtide (30.5)	ULight-rpS6 (18.9)	ULight-Histone H3 (Ser10; 13.2)	Carna Biosciences	02-146
MOS	ULight-Topo II α (9.1)	ULight-CREBtide (6.6)	GST-MAP2K1 / ULight-anti-GST (6.3)	Carna Biosciences	05-118

Newly added Kinases highlighted in Green

Kinase	ULight Substrate 1	ULight Substrate 2	ULight Substrate 3	Kinase Supplier	Supplier Cat. No.
MRCKα (CDC42BPA)	ULight-Histone H3 (Ser10; 7.5)	ULight-CREBtide (6.7)		Carna Biosciences	01-107
MSK1 (RPS6KA5)	ULight-CREBtide (28.5)	ULight-rpS6 (26.4)	ULight-PLK (20.6)	Carna Biosciences	01-147
MSK2 (RPS6KA4)	ULight-CREBtide (31.1)	ULight-rpS6 (25.0)	ULight-PLK (19.8)	Carna Biosciences	01-148
MST1 (STK4)	ULight-p70S6K (13.3)	ULight-PKC (12.8)	ULight-Histone H3 (Thr3; 8.9)	Millipore	14-624
MST1 (STK4)	ULight-PKC (11.9)	ULight-Histone H3 (Thr3; 8.4)	ULight-p70S6K (6.5)	Carna Biosciences	07-116
MST1 (STK4)	ULight-PKC (14.0)	ULight-Histone H3 (Thr3; 6.5)	ULight-rpS6 (5.5)	ProQinase	0667-0000-1
MST2 (STK3)	ULight-Histone H3 (Thr3; 8.0)	ULight-PKC (5.2)	ULight-p70S6K (4.4)	Carna Biosciences	07-117
MST2 (STK3)	ULight-p70S6K (12.5)	ULight-PKC (9.0)	ULight-Histone H3 (Thr3; 6.2)	ProQinase	0699-0000-1
MST3 (STK24)	ULight-CREBtide (14.7)	ULight-PKC (9.3)	ULight-rpS6 (8.9)	Carna Biosciences	07-118
MST4 (MASK)	ULight-PKC (14.6)	ULight-rpS6 (8.5)		Carna Biosciences	07-119
mTOR (1362-end)	ULight-4E-BP1 (Mn ²⁺ ; 36.9)	ULight-p70S6K (Mn ²⁺ ; 18.3)		Millipore	14-770
MYT1 (PKMYT1)	ULight-CREBtide (10.6)			Carna Biosciences	05-176
NDR1 (STK38)	ULight-CREBtide (10.5)	ULight-Histone H3 (Ser10; 8.7)		Carna Biosciences	01-125
NDR2	ULight-Histone H3 (Ser10; 8.0)	ULight-CREBtide (7.0)		Carna Biosciences	01-126
NEK1	ULight-p70S6K (60.0)	ULight-Acetyl-CoA Carboxylase (24.0)	ULight-rpS6 (18.6)	Carna Biosciences	05-123
NEK2	ULight-p70S6K (43.3)	ULight-CREBtide (31.2)	ULight-rpS6 (18.2)	Carna Biosciences	05-226
NEK3	ULight-p70S6K (26.9)	ULight-4E-BP1 (18.2)		Carna Biosciences	05-127
NEK4	ULight-p70S6K (40.1)			Carna Biosciences	05-128
NEK6	ULight-p70S6K (32.0)			Carna Biosciences	05-130
NEK7	ULight-p70S6K (33.4)			Carna Biosciences	05-131
NEK9	ULight-p70S6K (48.9)	ULight-rpS6 (16.5)	ULight-Acetyl-CoA Carboxylase (13.0)	Carna Biosciences	05-133
NEK11	ULight-p70S6K (20.0)	ULight-Histone H3 (Thr3; 14.9)		Carna Biosciences	05-125
NLK	ULight-CREBtide (9.4)	ULight-PLK (1.3)		Carna Biosciences	04-151
NLK	ULight-CREBtide (15.4)	ULight-PLK (6.0)		ProQinase	0253-0000-1
Nuak2 (SNARK)	ULight-CREBtide (23.9)	ULight-Histone H3 (Thr3; 7.2)		Carna Biosciences	02-127
SNARK (Nuak2)	ULight-CREBtide (14.8)	ULight-Histone H3 (Thr3; 5.8)	ULight-PLK (5.5)	ProQinase	0414-0000-1
OSR1 (OXSR1)	ULight-Histone H3 (Thr3; 5.6)			Carna Biosciences	07-122
p38α (MAPK14)	ULight-4E-BP1 (37.0)	GST-ATF-2 / ULight-anti-GST (32.1)	ULight-MBP (27.9)	Carna Biosciences	04-152
p38-alpha (MAPK14)	GST-ATF-2 / ULight-anti-GST (36.7)	ULight-4E-BP1 (33.1)	ULight-MBP (5.4)	ProQinase	0443-0000-3
p38β (MAPK11)	ULight-MBP (40.6)	GST-ATF-2 / ULight-anti-GST (36.9)	ULight-4E-BP1 (32.6)	Carna Biosciences	04-153
p38-beta (MAPK11)	GST-ATF-2 / ULight-anti-GST (36.8)	ULight-4E-BP1 (35.8)	ULight-MBP (14.2)	ProQinase	0455-0000-3
p38δ (MAPK13)	ULight-MBP (41.2)	GST-ATF-2 / ULight-anti-GST (35.1)	ULight-4E-BP1 (30.7)	Carna Biosciences	04-154
p38γ (MAPK12)	ULight-4E-BP1 (37.7)	GST-ATF-2 / ULight-anti-GST (37.0)	ULight-MBP (33.6)	Carna Biosciences	04-155
p70S6K (S6K; RPS6KB1)	ULight-CREBtide (30.2)	ULight-rpS6 (18.1)	ULight-Histone H3 (Ser10; 9.4)	Carna Biosciences	01-154
p70S6Kβ (RPS6KB2)	ULight-CREBtide (28.6)	ULight-rpS6 (23.0)	ULight-Crosstide (13.9)	Carna Biosciences	01-155
PAK1	ULight-PLK (12.3)	ULight-Histone H3 (Ser10; 4.5)		Carna Biosciences	07-123
PAK1	ULight-PLK (15.6)			ProQinase	0357-0000-1
PAK2	ULight-PLK (16.7)	ULight-Histone H3 (Ser10; 4.9)		Carna Biosciences	07-124
PAK3	ULight-PLK (19.9)	ULight-Histone H3 (Ser10; 12.2)	ULight-GS (9.2)	Carna Biosciences	07-125
PAK4	ULight-CREBtide (12.2)	ULight-PLK (4.3)		ProQinase	0365-0000-1
PAK5 (PAK7)	ULight-PLK (18.5)			Carna Biosciences	07-127
PAK6 ¹	ULight-PLK (5h; 7.0)			Carna Biosciences	07-128

Newly added Kinases highlighted in Green

Kinase	ULight Substrate 1	ULight Substrate 2	ULight Substrate 3	Kinase Supplier	Supplier Cat. No.
PAK6	ULight-Histone H3 (Thr3; 8.5)	ULight-PLK (5.5)		ProQinase	0423-0000-1
PASK	ULight-CREBtide (31.0)	ULight-Crossside (12.6)	ULight-mTOR (10.4)	Carna Biosciences	02-128
PBK	ULight-CREBtide (16.3)			ProQinase	0185-0000-1
PBK'	ULight-Acetyl-CoA Carboxylase (5 h; 7.1)			Carna Biosciences	05-168
PEK (EIF2AK3)	ULight-p70S6K (51.9)	ULight-Topo II α (18.0)	ULight-Acetyl-CoA Carboxylase (15.4)	Carna Biosciences	05-155
PGK (PRKG1)	ULight-CREBtide (37.0)	ULight-PLK (11.1)		Carna Biosciences	01-142
PHKG1	ULight-CREBtide (31.3)	ULight-Histone H3 (Thr3; 8.5)	ULight-rpS6 (7.0)	Carna Biosciences	02-152
PHKG2	ULight-CREBtide (31.7)	ULight-rpS6 (15.6)	ULight-mTOR (9.7)	Carna Biosciences	02-153
PIM1	ULight-CREBtide (34.7)	ULight-mTOR (8.5)	ULight-rpS6 (8.2)	Carna Biosciences	02-054
PIM1	ULight-CREBtide (31.2)	ULight-rpS6 (21.5)	ULight-mTOR (12.6)	ProQinase	0186-0000-1
PIM2	ULight-CREBtide (30.3)	ULight-rpS6 (20.9)	ULight-mTOR (11.3)	Carna Biosciences	02-155
PIM2	ULight-CREBtide (14.6)	ULight-rpS6 (10.4)	ULight-mTOR (6.6)	ProQinase	0223-0000-1
PIM3	ULight-CREBtide (31.0)	ULight-rpS6 (24.7)	ULight-mTOR (11.7)	Carna Biosciences	02-156
PKACα (PRKACA)	ULight-CREBtide (24.3)	ULight-rpS6 (16.8)	ULight-PLK (16.6)	Carna Biosciences	01-127
PKACβ (PRKACB)	ULight-rpS6 (23.7)	ULight-PLK (20.8)	ULight-CREBtide (15.7)	Carna Biosciences	01-128
PKCα (PRKCA)	ULight-CREBtide (28.1)	ULight-rpS6 (19.4)	ULight-PKC (14.5)	Carna Biosciences	01-133
PKCβ1 (PRKCB1)	ULight-CREBtide (30.5)	ULight-PKC (15.6)		Carna Biosciences	01-134
PKCβ2 (PRKCB2)	ULight-CREBtide (26.1)	ULight-rpS6 (19.1)	ULight-PKC (14.0)	Carna Biosciences	01-165
PKC-beta2 (PRKCB2)	ULight-CREBtide (31.4)	ULight-PKC (16.2)	ULight-rpS6 (2.9)	ProQinase	0116-0000-1
PKCδ (PRKCD)	ULight-CREBtide (29.4)	ULight-PKC (14.8)		Carna Biosciences	01-135
PKCϵ (PRKCE)	ULight-CREBtide (31.0)	ULight-PKC (14.9)		Carna Biosciences	01-136
PKACγ	ULight-CREBtide (33.4)	ULight-rpS6 (24.2)	ULight-PLK (21.3)	Carna Biosciences	01-129
PKCγ (PRKCG)	ULight-CREBtide (29.7)	ULight-PKC (15.6)	ULight-rpS6 (9.1)	Carna Biosciences	01-137
PKC-gamma (PRKCG)	ULight-CREBtide (26.1)	ULight-PKC (13.5)	ULight-rpS6 (10.2)	ProQinase	0204-0000-1
PKCη (PRKCH)	ULight-CREBtide (29.5)	ULight-PKC (14.3)	ULight-rpS6 (9.5)	Carna Biosciences	01-138
PKC-eta (PRKCH)	ULight-rpS6 (22.4)	ULight-PLK (13.2)	ULight-PKC (10.6)	ProQinase	0420-0000-1
PKCι (PRKCI)	ULight-CREBtide (29.4)	ULight-PKC (15.4)	ULight-rpS6 (8.9)	Carna Biosciences	01-139
PKCθ (PRKCQ)	ULight-CREBtide (30.4)	ULight-PKC (15.1)	ULight-rpS6 (12.3)	Carna Biosciences	01-140
PKCζ (PRKCZ)	ULight-CREBtide (22.4)	ULight-PKC (14.1)	ULight-rpS6 (12.9)	Carna Biosciences	01-141
PKC-zeta	ULight-CREBtide (18.6)	ULight-PKC (14.1)		ProQinase	0117-0000-1
PKC-mu (PKD-1, PRKD1)	ULight-CREBtide (23.2)	ULight-PLK (8.4)	ULight-PKC (5.6)	ProQinase	0115-0000-1
PKD1 (PRKD1, PKC-mu)	ULight-CREBtide (21.6)	ULight-PLK (14.4)		Carna Biosciences	02-157
PKC-nu (PRKD3, EPK2)	ULight-CREBtide (23.1)	ULight-PLK (5.4)		ProQinase	0661-0000-1
PKD3 (PRKD3, PKC-nu)	ULight-CREBtide (31.4)	ULight-Histone H3 (Thr3; 8.8)	ULight-PLK (6.0)	Carna Biosciences	02-159
PKD2 (PRKD2)	ULight-PLK (10.3)	ULight-CREBtide (9.4)		Carna Biosciences	02-158
PKN1 (PRK1)	ULight-CREBtide (32.6)	ULight-PKC (10.5)	ULight-rpS6 (7.5)	Carna Biosciences	01-144
PRK1 (PKN1)	ULight-CREBtide (31.8)	ULight-rpS6 (17.9)	ULight-PKC (14.0)	ProQinase	0207-0000-1
PKN2	ULight-CREBtide (32.3)			Carna Biosciences	01-145
PKN3	ULight-CREBtide (33.5)	ULight-rpS6 (20.0)	ULight-PKC (15.4)	Carna Biosciences	01-146
PKR (EIF2AK2)	ULight-Histone H3 (Thr3; 10.8)	ULight-CREBtide (6.7)		Carna Biosciences	05-156
PLK1	ULight-p70S6K (24.8)	ULight-Topo II α (23.0)	ULight-Histone H3 (Thr3; 13.4)	Carna Biosciences	05-157
PLK1	ULight-Topo II α (7.0)	ULight-Histone H3 (Thr3; 5.7)		ProQinase	0183-0000-1

Newly added Kinases highlighted in Green

Kinase	ULight Substrate 1	ULight Substrate 2	ULight Substrate 3	Kinase Supplier	Supplier Cat. No.
PLK2 (SNK)	ULight-Topo II α (22.9)	ULight-CREBtide (11.6)		Carna Biosciences	05-158
PLK3	ULight-I κ B α (27.5)	ULight-Topo II α (20.4)	ULight-4E-BP1 (15.0)	Carna Biosciences	05-159
PLK3	ULight-Topo II α (18.6)	ULight-Histone H3 (Thr3; 6.1)	ULight-4E-BP1 (5.1)	ProQinase	0437-0000-1
PLK4 (SAK)	ULight-CREBtide (10.4)	ULight-PLK (1.9)		Carna Biosciences	05-160
SAK (PLK4)	ULight-CREBtide (11.4)	ULight-PLK (5.8)		ProQinase	0306-0000-1
PRKX	ULight-CREBtide (34.1)	ULight-PLK (19.7)	ULight-PKC (13.7)	Carna Biosciences	01-130
QIK (SNF1LK2)	ULight-CREBtide (29.6)	ULight-Acetyl-CoA Carboxylase (28.8)	ULight-PLK (14.1)	Carna Biosciences	02-129
SNF1LK2 (QIK)	ULight-CREBtide (32.2)	ULight-Acetyl-CoA Carboxylase (24.8)	ULight-PLK (14.5)	Invitrogen	PV4792
RAF1	GST-MAP2K1/ ULight-anti-GST (9.3)			Carna Biosciences	09-125
RIPK2	ULight-CREBtide (8.4)			Carna Biosciences	09-128
RIPK5	ULight-CREBtide (9.7)	ULight-p70S6K (5.7)		Invitrogen	PV4678
ROCK1	ULight-CREBtide (34.8)	ULight-rpS6 (23.4)	ULight-PLK (19.6)	Carna Biosciences	01-109
ROCK2	ULight-CREBtide (32.7)	ULight-rpS6 (20.0)	ULight-PLK (16.9)	Carna Biosciences	01-110
RSK1 (RPS6KA1)	ULight-CREBtide (32.1)	ULight-rpS6 (22.0)	ULight-PLK (20.5)	Carna Biosciences	01-149
RSK2 (RPS6KA3)	ULight-CREBtide (30.0)	ULight-rpS6 (20.9)	ULight-Crosstide (18.8)	Carna Biosciences	01-150
RSK3 (RPS6KA2)	ULight-CREBtide (32.0)	ULight-rpS6 (25.9)	ULight-PLK (18.5)	Carna Biosciences	01-151
RSK4 (RPS6KA6)	ULight-CREBtide (32.0)	ULight-rpS6 (23.8)	ULight-PLK (18.4)	Carna Biosciences	01-152
SGK	ULight-CREBtide (32.7)	ULight-rpS6 (20.8)	ULight-PLK (20.6)	Carna Biosciences	01-158
SGK2	ULight-CREBtide (32.5)	ULight-PLK (21.3)	ULight-rpS6 (21.1)	Carna Biosciences	01-159
SGK3 (SGKL)	ULight-CREBtide (28.0)	ULight-rpS6 (22.7)	ULight-PLK (17.7)	Carna Biosciences	01-160
SIK	ULight-CREBtide (17.8)	ULight-Acetyl-CoA Carboxylase (9.2)	ULight-PLK (7.4)	Carna Biosciences	02-131
SLK	ULight-CREBtide (31.0)			Carna Biosciences	07-129
skMLCK (MYLK) ²	ULight-CREBtide (35.8)			Carna Biosciences	02-150
SRPK1	ULight-CREBtide (20.0)			ProQinase	0434-0000-1
SRPK2	ULight-CREBtide (14.3)			ProQinase	0381-0000-1
STK33	ULight-rpS6 (13.1)	ULight-mTOR (9.5)	ULight-CREBtide (8.0)	Millipore	14-671
STK33	ULight-CREBtide (8.3)			Carna Biosciences	02-301
TAK1-TAB1 (MAP3K7)	ULight-p70S6K (5.6)			Carna Biosciences	09-019
TAOK2	ULight-p70S6K (15.6)	ULight-CREBtide (9.0)	ULight-PKC (5.7)	Carna Biosciences	07-133
TAOK3	ULight-CREBtide (21.2)	ULight-Histone H3 (Thr3; 9.3)	ULight-p70S6K (7.9)	Carna Biosciences	07-135
TBK1	ULight-p70S6K (34.5)	ULight-rpS6 (24.8)	ULight-Acetyl-CoA Carboxylase (24.5)	Carna Biosciences	05-115
TGF β R1 (TGFBR1)	ULight-Topo II α (21.3)			Carna Biosciences	09-141
TGF β R2 (TGFBR2)	ULight-CREBtide (6.7)			Carna Biosciences	09-142
TLK1	ULight-Topo II α (17.4)	ULight-Histone H3 (Thr3; 15.2)	ULight-p70S6K (9.4)	Carna Biosciences	05-166
TLK2	ULight-Topo II α (17.9)	ULight-Histone H3 (Thr3; 17.2)	ULight-p70S6K (13.8)	Carna Biosciences	05-167
TSK2 (TSSK2)	ULight-CREBtide (32.1)	ULight-PLK (20.2)	ULight-Acetyl-CoA Carboxylase (15.6)	Carna Biosciences	02-165
TSSK2 (TSK2)	ULight-CREBtide (31.0)	ULight-Acetyl-CoA Carboxylase (17.9)	ULight-PLK (16.2)	ProQinase	0220-0000-1
TSSK1	ULight-CREBtide (20.4)	ULight-PLK (17.9)	ULight-Acetyl-CoA Carboxylase (16.2)	Carna Biosciences	02-364
TSSK3	ULight-CREBtide (32.5)	ULight-Acetyl-CoA Carboxylase (27.3)	ULight-PLK (20.0)	Carna Biosciences	02-166
TTBK1	ULight-Topo II α (24.9)	ULight-Histone H3 (Thr3; 17.8)	ULight-p70S6K (13.4)	Carna Biosciences	03-108
TTBK2	ULight-Topo II α (24.2)	ULight-Histone H3 (Thr3; 17.4)	ULight-rpS6 (10.3)	Carna Biosciences	03-109
ULK3	ULight-Histone H3 (Thr3; 6.5)			Carna Biosciences	05-173

Newly added Kinases highlighted in Green

Kinase	<i>ULight</i> Substrate 1	<i>ULight</i> Substrate 2	<i>ULight</i> Substrate 3	Kinase Supplier	Supplier Cat. No.
VRK1	<i>ULight</i> -CREBtide (17.0)	<i>ULight</i> -Histone H3 (Thr3; 8.7)		ProQinase	0302-0000-1
VRK2	<i>ULight</i> -Histone H3 (Thr3; 15.1)			Carna Biosciences	03-111
WEE	<i>ULight</i> -CREBtide (10.0)			Carna Biosciences	05-177
WNK1	<i>ULight</i> -CREBtide (7.4)			Carna Biosciences	05-179
WNK2	<i>ULight</i> -CREBtide (21.4)			Carna Biosciences	05-180
WNK3	<i>ULight</i> -CREBtide (4.8)			Carna Biosciences	05-181
WNK4	<i>ULight</i> -CREBtide (10.3)			Carna Biosciences	05-182
YSK1 (STK25)	<i>ULight</i> -CREBtide (21.8)	<i>ULight</i> -rpS6 (14.3)	<i>ULight</i> -p70S6K (5.7)	Carna Biosciences	07-136
ZAK	<i>ULight</i> -p70S6K (36.1)	<i>ULight</i> -Histone H3 (Thr3; 15.5)	<i>ULight</i> -mTOR (11.4)	Carna Biosciences	09-120

¹ Kinase reaction time is 5h

² CaCl₂ and Calmodulin at 1 mM and 0.5 μM, respectively, are added to the kinase reactions

³ DNA PK: assay buffer and conditions as recommended by Promega. ATP: 200 μM final, kinase reaction incubation time 1 h

Kinases were assayed in standard conditions, using reagent concentrations and kinase buffer described below. All modifications to standard assay conditions are indicated in the table.

Kinase assay components:

Kinases: 20 nM (various suppliers)

ATP: 200 μM

ULight substrates in kinase reactions: 50 nM (100 nM for *ULight*-CDC25)

GST-protein substrates in kinase reactions: 30 nM (when indicated)

ULight-anti-GST antibody in assay: 30 nM (when indicated)

Europium anti-phospho-substrate antibodies in assay: 2 nM

Kinase buffer (pH 7.5):

50 mM HEPES

10 mM MgCl₂

3 mM MnCl₂ (when indicated)

1 mM EGTA

2 mM DTT and 0.01% Tween 20

After incubation at 23°C for 1 h (or 5 h when indicated), kinase reactions were stopped with EDTA. Antibodies were added and incubated for 1 h prior to detection with the EnVision.

NOTE: All kinases were sourced from commercial vendors from commercially available lots. In many cases, the same kinase was tested from multiple vendors. If the results obtained with kinases from different vendors were very different in our testing, we have shown all suppliers' data. If the results were similar, we have shown only one representative set of test results. We encourage you to qualify your kinase activity to ensure that that the assay signal is specific to the enzyme tested.

LANCE® Ultra products used for this study:

Labeled Antibody	Description	Catalog No.	Phospho-Motif
<i>ULight</i> -CREBtide Europium-anti-phospho-CREB	<i>ULight</i> -CREBtide (Ser133) Europium-anti-phospho-CREB (Ser133)	TRF0107 TRF0200	RRP <u>S</u> YRK
<i>ULight</i> -MBP Europium-anti-phospho-MBP	<i>ULight</i> -Myelin Basic Protein Peptide Europium-anti-phospho-Myelin Basic Protein	TRF0109 TRF0201	VTPR <u>T</u> PPP
<i>ULight</i> -Crosstide Europium-anti-phospho-Crosstide	<i>ULight</i> -Crosstide (GSK-3α Ser21) Europium-anti-phospho-Crosstide (GSK-3α Ser21)	TRF0106 TRF0202	PRT <u>S</u> SFAE
<i>ULight</i> -PLK Europium-anti-phospho-PLK	<i>ULight</i> -PLK (Ser137) Peptide Europium-anti-phospho-PLK (Ser137)	TRF0110 TRF0203	RRR <u>S</u> LLE
<i>ULight</i> -PKC Europium anti-phospho-PKC	<i>ULight</i> -PKC Substrate (Ala25Ser) Europium anti-phospho-PKC Peptide (Ala25Ser)	TRF0108 TRF0207	RKGS <u>L</u> RQ
<i>ULight</i> -IκBα Europium-anti-phospho-IκBα	<i>ULight</i> -IκappaB-alpha (Ser32/36) Peptide Europium-anti-phospho-IκappaB-alpha (Ser32/36)	TRF0113 TRF0206	RHD <u>S</u> GLD <u>S</u> M
<i>ULight</i> -Histone H3 (Thr3/Ser10) Europium-anti-phospho-Histone H3 (Ser10) Europium-anti-phospho-Histone H3 (Thr3)	<i>ULight</i> -Histone H3 (Thr3/Ser10) Peptide Europium-anti-phospho-Histone H3 (Ser10) Europium-anti-phospho-Histone H3 (Thr3)	TRF0125 TRF0210 TRF0211	ARTKQARK <u>S</u> TG
<i>ULight</i> -mTOR Europium-anti phospho-mTOR	<i>ULight</i> -mTOR (Ser2448) Peptide Europium-anti phospho-mTOR (Ser2448)	TRF0119 TRF0209	TRTD <u>S</u> YSAG
<i>ULight</i> -p70S6K Europium-anti-phospho-p70S6K	<i>ULight</i> -p70S6K (Thr389) Peptide Europium-anti-phospho-p70S6K (Thr389)	TRF0126 TRF0214	FLGF <u>T</u> YVAP
<i>ULight</i> -Acetyl-CoA Carboxylase Europium-anti-phospho-Acetyl-CoA Carboxylase	<i>ULight</i> -Acetyl-CoA Carboxylase (Ser79) SAMS Peptide Europium-anti-phospho-Acetyl-CoA Carboxylase (Ser79)	TRF0133 TRF0208	RSAM <u>S</u> GLHL
<i>ULight</i> -Cdc25C Europium-anti-phospho-(Ser) 14-3-3 binding motif	<i>ULight</i> -Cdc25C (Ser216) Peptide Europium-anti-phospho-(Ser) 14-3-3 binding motif, mAb 4E2	TRF0123 AD0192	YRSP <u>S</u> MPEN (R/K)XX <u>S</u> XP
<i>ULight</i> -4E-BP1 Europium-anti-phospho-4E-BP1	<i>ULight</i> -eIF4E-binding protein 1 (Thr37/46) Peptide Europium-anti-phospho-eIF4E-binding protein 1 (Thr37/46)	TRF0128 TRF0216	DY <u>S</u> TIPGGTLF <u>S</u> TIPGTRI
<i>ULight</i> -rpS6 Europium-anti-phospho-rpS6	<i>ULight</i> -40S Ribosomal Protein S6 (pSer235/Ser236) Peptide Europium-anti-phospho-40S Ribosomal Protein S6 (Ser235/236)	TRF0129 TRF0217	KRRRLp <u>S</u> SSLRAS
<i>ULight</i> -Topo IIα Europium-anti-phospho-Topo IIα	<i>ULight</i> -DNA Topoisomerase 2-alpha (Thr1342) Peptide Europium-anti-phospho-DNA Topoisomerase 2-alpha (Thr1342)	TRF0130 TRF0218	FDEK <u>T</u> DEDF
<i>ULight</i> -anti-GST Europium-anti-phospho-ATF-2	<i>ULight</i> -anti-GST ATF-2 Fusion Protein	TRF0104 TRF0212	
Europium-anti-phospho-p38a	Europium-anti-phospho-MAP Kinase p38-alpha (Thr180/Tyr182) GST-p38α (MAPK14), inactive	TRF0219 Carna BioSciences cat. 04-152-10	
Europium-anti-phospho-MEK1/2	Europium-anti-phospho-MEK1/2 (Ser217/221) GST-MAP2K1, inactive	TRF0213 Carna BioSciences cat. 07-141-10	
<i>ULight</i> -Glycogen Synthase Europium anti-phospho-Glycogen Synthase	<i>ULight</i> -Glycogen Synthase (Ser641/pSer657) Peptide Europium anti-phospho-Glycogen Synthase (Ser641)	TRF0131 TRF0220	P <u>S</u> VPPSPSLSRHSSPHQ(p <u>S</u>)ED

LANCE *Ultra* Tyrosine Kinase Selection Guide

How to use this guide:

1. Locate your kinase
 - In many cases, up to three commercial kinase vendors have been tested.
 - Many common aliases are shown in parenthesis.
2. Best performing *ULight*™ substrates are listed for each enzyme according to performance criteria where signal to background (S/B) ratios are greater than 3.0
 - S/B ratios (Signal at 665 nm / minus ATP control at 665 nm) are indicated in parenthesis.
 - All S/B ratios were obtained at fixed experimental conditions unless otherwise noted (see page 16).
3. Based on your substrate choice, find the corresponding Europium-labeled anti-phospho antibody on page 16 (**LANCE *Ultra* products used for this study**) to identify the TR-FRET donor anti-phospho antibody for your LANCE *Ultra* assay.

If you cannot find your kinase of interest, please ask your PerkinElmer sales specialist, as our list continues to expand. Two kits are available for testing purposes:

- **KinaSelect Ser/Thr kit** (5 x 250 data points, TRF0300-C)
 - 5 *ULight*-labeled Ser/Thr kinase specific substrates + 5 matching Europium-labeled anti-phospho antibodies
- **KinaSelect TK kit** (1,000 data points, TRF0301-D)
 - 1 *ULight*-labeled kinase specific substrate + 1 matching Europium-labeled anti-phospho antibody

LANCE[®] Ultra Reagents for Tyr Kinase Assays

Up to three kinase substrates are listed based on signal to background (S/B) ratios obtained with commercially available enzymes.

S/B ratios (Signal at 665 nm / minus ATP control at 665 nm) are indicated in parentheses.

Kinase [Concentration, nM]	ULight Substrate 1	ULight Substrate 2	ULight Substrate 3	Kinase Supplier	Supplier Cat. No.
ABL [0.25]	ULight-poly GT (13.1)	ULight-poly GAT (11.1)	ULight-TK (4.1)	Carna Biosciences	08-001
ABL (T315I, ABL1) [0.5]	ULight-poly GT (6.6)	ULight-poly GAT (6.4)	ULight-TK (4.8)	Carna Biosciences	08-093
ACK [20]	ULight-poly GT (27.3)	ULight-poly GAT (27.2)	ULight-TK (17.3)	Carna Biosciences	08-103
ALK [4]	ULight-IRS-1 (16.8)	ULight-poly GT (9.8)	ULight-TK (8.8)	Carna Biosciences	08-105
ARG [0.5]	ULight-poly GT (13.2)	ULight-poly GAT (12.7)	ULight-TK (10.6)	Carna Biosciences	08-102
AXL [4]	ULight-poly GT (9.8)	ULight-poly GAT (5.6)		Carna Biosciences	08-107
BLK [0.5]	ULight-TK (31.0)	ULight-poly GT (16.5)	ULight-CDK1 (9.6)	Carna Biosciences	08-164
BMX [0.5]	ULight-poly GT (13.2)	ULight-poly GAT (9.0)	ULight-TK (7.1)	Carna Biosciences	08-179
BRK [3]	ULight-poly GT (17.4)	ULight-poly GAT (3.0)		Carna Biosciences	08-165
BTK [0.25]	ULight-poly GAT (19.6)	ULight-poly GT (11.8)	ULight-TK (6.8)	Carna Biosciences	08-080
CSK [20]	ULight-TK (27.2)	ULight-poly GAT (20.3)	ULight-poly GT (10.4)	Carna Biosciences	08-111
CTK [20]	ULight-poly GAT (18.8)	ULight-poly GT (12.6)		Carna Biosciences	08-012
DDR1 [0.5]	ULight-poly GAT (3.0)			Carna Biosciences	08-113
DDR2 [0.5]	ULight-poly GAT (5.1)	ULight-IRS-1 (4.9)	ULight-poly GT (4.1)	Carna Biosciences	08-114
EGFR [0.5]	ULight-JAK-1 (19.0)	ULight-TK (10.0)	ULight-poly GAT (5.0)	Carna Biosciences	08-115
EGFR (T790M) [0.5]	ULight-poly GT (18.1)	ULight-poly GAT (10.8)	ULight-JAK-1 (3.9)	Carna Biosciences	08-194
EphA1 [0.5]	ULight-poly GT (24.1)	ULight-poly GAT (11.4)	ULight-TK (10.8)	Carna Biosciences	08-120
EphA2 [0.25]	ULight-TK (26.9)	ULight-poly GT (12.3)	ULight-poly GAT (7.1)	Carna Biosciences	08-121
EphA3 [0.5]	ULight-TK (22.4)	ULight-poly GT (17.4)	ULight-poly GAT (8.0)	Carna Biosciences	08-122
EphA4 [0.5]	ULight-TK (31.5)	ULight-poly GT (12.6)	ULight-poly GAT (11.3)	Carna Biosciences	08-123
EphA5 [1]	ULight-TK (35.5)	ULight-poly GAT (21.9)	ULight-JAK-1 (21.2)	Carna Biosciences	08-124
EphA6 [0.5]	ULight-poly GAT (15.5)	ULight-poly GT (14.2)	ULight-TK (5.4)	Carna Biosciences	08-125
EphA7 [0.5]	ULight-poly GT (22.7)	ULight-TK (17.2)	ULight-poly GAT (11.1)	Carna Biosciences	08-126
EphA8 [0.25]	ULight-TK (32.3)	ULight-poly GT (16.4)	ULight-poly GAT (7.8)	Carna Biosciences	08-127
EphB1 [0.5]	ULight-TK (29.9)	ULight-poly GT (25.1)	ULight-CDK1 (14.1)	Carna Biosciences	08-128
EphB2 [0.25]	ULight-TK (28.8)	ULight-poly GT (27.9)	ULight-poly GAT (13.2)	Carna Biosciences	08-129
EphB3 [0.1]	ULight-poly GT (29.0)	ULight-TK (24.7)	ULight-poly GAT (11.2)	Carna Biosciences	08-130
EphB4 [0.5]	ULight-TK (29.8)	ULight-poly GT (13.7)	ULight-CDK1 (12.6)	Carna Biosciences	08-131
FAK [3]	ULight-poly GT (20.0)	ULight-poly GAT (13.0)		Carna Biosciences	08-037
FER [0.25]	ULight-TK (31)	ULight-poly GAT (17.1)	ULight-CDK1 (16.1)	Carna Biosciences	08-139
FES [1]	ULight-TK (29.4)	ULight-poly GAT (19.0)	ULight-poly GT (17.1)	Carna Biosciences	08-140

Kinase [Concentration, nM]	ULight Substrate 1	ULight Substrate 2	ULight Substrate 3	Kinase Supplier	Supplier Cat. No.
FGFR1 [0.5]	ULight-JAK-1 (30.8)	ULight-TK (26.4)	ULight-IRS-1 (13.5)	Carna Biosciences	08-133
FGFR2 [0.25]	ULight-JAK-1 (33.2)	ULight-TK (27.1)	ULight-IRS-1 (15.5)	Carna Biosciences	08-134
FGFR3 [0.25]	ULight-JAK-1 (27.6)	ULight-TK (24.4)	ULight-poly GT (16.0)	Carna Biosciences	08-135
FGFR4 [3]	ULight-JAK-1 (20.8)	ULight-TK (17.7)	ULight-poly GT (9.2)	Carna Biosciences	08-136
FGR [0.1]	ULight-TK (29.3)	ULight-poly GT (25.1)	ULight-poly GAT (17.7)	Carna Biosciences	08-166
FLT1 [0.25]	ULight-poly GT (22.2)	ULight-poly GAT (15.4)	ULight-JAK-1 (10.0)	Carna Biosciences	08-189
FLT3 [0.1]	ULight-TK (25.9)	ULight-JAK-1 (25.0)	ULight-poly GT (20.8)	Carna Biosciences	08-154
FLT4 [0.25]	ULight-JAK-1 (36.9)	ULight-TK (20.0)	ULight-IRS-1 (11.4)	Carna Biosciences	08-190
FMS (CSFR) [0.25]	ULight-poly GT (14.6)	ULight-JAK-1 (6.3)	ULight-poly GAT (6.2)	Carna Biosciences	08-155
FRK [0.5]	ULight-poly GAT (22.9)	ULight-poly GT (20.8)	ULight-TK (9.7)	Carna Biosciences	08-167
FYN [0.25]	ULight-TK (25.9)	ULight-CDK1 (19.7)	ULight-poly GT (12.8)	Carna Biosciences	08-068
HCK [0.25]	ULight-TK (29.7)	ULight-poly GT (21.3)	ULight-poly GAT (13.2)	Carna Biosciences	08-169
HER2 [10]	ULight-poly GT (9.3)	ULight-poly GAT (8.4)		Carna Biosciences	08-166
HER4 (ERBB4) [0.1]	ULight-poly GT (25.2)	ULight-poly GAT (14.4)	ULight-TK (3.1)	Carna Biosciences	08-118
IGF1R [0.25]	ULight-TK (25.1)	ULight-poly GT (21.8)	ULight-IRS-1 (15.2)	Carna Biosciences	08-141
INSR [20]	ULight-poly GAT (25.4)	ULight-poly GT (18.3)	ULight-TK (4.0)	Carna Biosciences	08-242
IRR [0.5]	ULight-poly GT (21.6)	ULight-TK (19.2)	ULight-IRS-1 (15.6)	Carna Biosciences	08-143
ITK [0.5]	ULight-poly GT (9.8)	ULight-poly GAT (8.5)	ULight-TK (8.4)	Carna Biosciences	08-181
JAK1 [7]	ULight-JAK-1 (19.5)	ULight-poly GT (17.6)	ULight-poly GAT (16.4)	Carna Biosciences	08-144
JAK2 [1]	ULight-JAK-1 (41.8)	ULight-TK (35.5)	ULight-IRS-1 (21.4)	Carna Biosciences	08-045
JAK3 [0.5]	ULight-JAK-1 (37.3)	ULight-TK (16.1)	ULight-poly GAT (6.9)	Carna Biosciences	08-046
KDR [0.25]	ULight-JAK-1 (30.8)	ULight-TK (16.9)	ULight-poly GT (8.6)	Carna Biosciences	08-191
KIT [2]	ULight-poly GAT (21.7)	ULight-poly GT (13.0)	ULight-JAK-1 (3.3)	Carna Biosciences	08-056
LCK [0.5]	ULight-poly GAT (16.5)	ULight-TK (12.3)	ULight-poly GT (10.4)	Carna Biosciences	08-170
LTK [1]	ULight-poly GAT (25.1)	ULight-poly GT (21.3)	ULight-TK (13.7)	Carna Biosciences	08-106
LYNα [0.5]	ULight-TK (32.5)	ULight-poly GT (15.6)	ULight-CDK1 (14.3)	Carna Biosciences	08-171
LYNβ [1]	ULight-TK (33.1)	ULight-CDK1 (24.0)	ULight-poly GT (18.6)	Carna Biosciences	08-172
MATK (Hyl) [1]	ULight-poly GT (20.7)	ULight-poly GAT (8.8)		Invitrogen	PV3370
MER [0.25]	ULight-poly GT (29.2)	ULight-poly GAT (15.9)	ULight-TK (12.9)	Carna Biosciences	08-108
MET [0.5]	ULight-TK (24.2)	ULight-JAK-1 (19.7)	ULight-poly GT (17.0)	Carna Biosciences	08-151
MUSK [1]	ULight-poly GAT (10.6)	ULight-JAK-1 (3.9)	ULight-TK (3.1)	Carna Biosciences	08-153
PDGFRα [0.5]	ULight-poly GT (17.8)	ULight-poly GAT (10.6)	ULight-JAK-1 (9.0)	Carna Biosciences	08-157
PDGFRβ [0.25]	ULight-poly GAT (12.5)	ULight-poly GT (11.2)	ULight-TK (4.7)	Carna Biosciences	08-158
PTK2B (FAK2) [0.25]	ULight-polyGT (19.2)	ULight-poly GAT (12.3)		Invitrogen	PV4567
PYK2 [0.25]	ULight-poly GT (15.5)	ULight-poly GAT (7.7)		Carna Biosciences	08-138

Kinase [Concentration, nM]	ULight Substrate 1	ULight Substrate 2	ULight Substrate 3	Kinase Supplier	Supplier Cat. No.
RET [0.5]	ULight-JAK-1 (23.6)	ULight-TK (20.3)	ULight-IRS-1 (6.9)	Carna Biosciences	08-159
RON [0.25]	ULight-poly GT (27.7)	ULight-poly GAT (25.7)	ULight-JAK-1 (4.9)	Carna Biosciences	08-152
ROR1 [20]	ULight-poly GT (3.4)			Carna Biosciences	08-160
ROR2 [20]	ULight-poly GT (4.2)			Carna Biosciences	08-161
ROS [0.25]	ULight-TK (24.5)	ULight-poly GT (23.8)	ULight-IRS-1 (20.5)	Carna Biosciences	08-163
SRC [0.5]	ULight-TK (31.7)	ULight-poly GAT (18.4)	ULight-CDK1 (16.6)	Carna Biosciences	08-173
SRM [0.5]	ULight-TK (32.5)	ULight-poly GAT (20.1)	ULight-poly GT (18.3)	Carna Biosciences	08-174
SYK [0.5]	ULight-TK (24.6)	ULight-JAK-1 (20.0)	ULight-poly GAT (4.1)	Carna Biosciences	08-176
TEC [0.5]	ULight-poly GT (25.4)	ULight-TK (18.6)	ULight-poly GAT (15.4)	Carna Biosciences	08-182
TIE2 [0.5]	ULight-poly GT (19.3)	ULight-TK (17.7)	ULight-poly GAT (9.4)	Carna Biosciences	08-185
TNK1 [1]	ULight-poly GAT (15.2)	ULight-poly GT (9.3)	ULight-TK (6.8)	Carna Biosciences	08-104
TRKA (NTRK1) [0.5]	ULight-TK (23.2)	ULight-poly GAT (17.5)	ULight-poly GT (16.3)	Carna Biosciences	08-186
TRKB (NTRK2) [0.5]	ULight-TK (28.0)	ULight-poly GAT (26.3)	ULight-poly GT (22.9)	Carna Biosciences	08-187
TRKC (NTRK3) [0.5]	ULight-poly GT (34.1)	ULight-poly GAT (22.3)	ULight-TK (6.4)	Carna Biosciences	08-188
TXK [3]	ULight-poly GAT (18.9)	ULight-poly GT (11.0)	ULight-TK (5.9)	Carna Biosciences	08-183
TYK2 [4]	ULight-JAK-1 (15.2)	ULight-IRS-1 (7.3)	ULight-TK (7.3)	Carna Biosciences	08-147
TYRO3 [0.25]	ULight-poly GT (21.5)	ULight-poly GAT (9.1)	ULight-TK (6.1)	Carna Biosciences	08-109
YES [0.25]	ULight-TK (28.0)	ULight-poly GT (15.3)	ULight-poly GAT (14.0)	Carna Biosciences	08-175
ZAP70 [4]	ULight-poly GAT (15.3)	ULight-poly GT (11.1)	ULight-TK (7.6)	Carna Biosciences	08-077

Kinase assay components:

Kinases: see table for concentration

ATP: 200 µM in kinase reaction

ULight-poly GT, *ULight*-poly GAT and *ULight*-IRS-1:100 nM in kinase reaction*ULight*-JAK-1, *ULight*-TK and *ULight*-CDK1: 50 nM in kinase reaction

Europium anti-phospho-substrate antibodies: 2 nM in final volume

Kinase buffer:

50 mM HEPES pH 7.5

10 mM MgCl₂

1 mM EGTA

2 mM DTT and 0.01% Tween 20

Kinase reactions were performed in 10 µL in white OptiPlates™-384 (cat# 6007290). After 2 h incubation at 23 °C, kinase reactions were stopped with EDTA (10 mM final concentration in 20 µL). Eu-anti-phospho antibodies were added and incubated for one hour prior to detection with the EnVision®. All kinases were sourced from commercial vendors, and from commercially available lots.

LANCE *Ultra* products used for this study:

	Catalog number	Phospho-Motif
<i>ULight</i> -poly GT	TRF0100	[EY(4:1)] _n
<i>ULight</i> -poly GAT	TRF0101	[EAY(1:1:1)] _n
<i>ULight</i> -IRS-1 (Tyr983) Peptide	TRF0120	SRGD <u>Y</u> MTMQ
<i>ULight</i> -JAK-1 (Tyr1023) Peptide	TRF0121	DKEY <u>Y</u> TVKD
<i>ULight</i> -CDK1 (Tyr15) Peptide	TRF0122	GEGT <u>Y</u> VVY
<i>ULight</i> -TK Peptide	TRF0127	<u>Y</u>
Europium-anti-phosphotyrosine (PT66)	AD0068, AD0069	<u>Y</u>
KinaSelect TK kit*	TRF0301-D	<u>Y</u>

*contains *ULight*-TK Peptide, 0.5 nmole, Europium-anti-phosphotyrosine (PT66), 10 µg and Lance Detection Buffer 10X, 1.8 mL

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