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75% waste recycled

Actin Proteins
Motor Proteins
Tubulin Proteins
Small G-proteins
Custom Services
Signal-Seeker™ Kits
GOBlot™ WB Processor
Spirochrome™ Bioprobes
G-LISA™ Activation Assays
Pull-down Activation Assays



*Supporting the
scientific community
for over 25 years*

New Products Inside!

K-Ras4B and GEF Proteins
Signal-Seeker™ Kits
Signal-Seeker™ Antibodies

New Products - 3

Exciting new products to help you discover more about posttranslation modifications and measure GTP exchange on K-Ras.

NEW

Kinesins, Dynein, Myosin - 6

Pure and active kinesin and myosin family proteins, pre-formed microtubules, and F-actin used for motor substrates.



Activation Assays - 8,9

Small GTPase Activation Assays offered in traditional pull-down bead format or advanced ELISA-based G-LISA® format.



Antibodies - 12

Highly characterized with validated applications. Developed in-house and tested for specificity and sensitivity.



Actin Biochem Kits™ - 14

Measure the effects of proteins and modulators on actin polymerization, and binding assays for F-actin.



Tubulin Biochem Kits™ - 16

Measure the effects of proteins and compounds on tubulin and microtubule binding and polymerization.



Molecular Biology Tools - 18

GoBlot Automated Western Blot Processor, Protein Assay Reagents, and ATPase, GTPase and Phosphatase Biochem Kits.



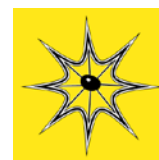
Signal-Seeker ToolKits™ - 4, 5

New Acetyl-Lysine, Ubiquitin, SUMO, and Phosphotyrosine Enrichment Kits for discovering new mechanisms of regulation.



Live Cell Imaging Reagents - 7

Actin, ECM, DNA, lysosome and tubulin bio-probes, and small G-protein activators and inhibitors.



Small G-protein Tools - 10, 11

New GEF proteins, inhibitors, activators (G-Switch modulators), antibodies, and affinity beads for active GTPase pull-down.



Actin Visualization - 13

Exceptionally bright and stable fluorescent phalloidins and Spirochrome™ Bioprobes.



Actin & ECM Proteins - 15

Pure and biologically active proteins, actin binding proteins, fluorescent and biotinylated actins, and antibodies.



Tubulin & FtsZ Proteins - 17

Biologically active proteins, fluorescent and biotin tubulin, antibodies, FtsZ proteins, and pre-formed microtubules.



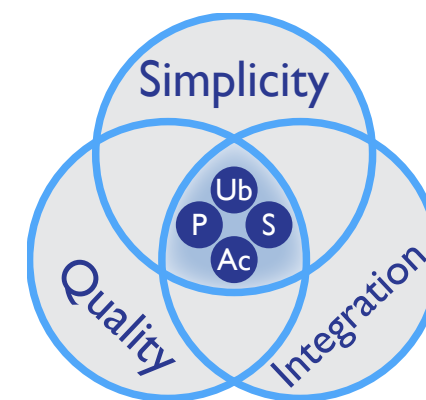
Custom Services - 19

Compound screening, protein purification, and assay development services at an economical price.



Signal-Seeker™ Kits

The First Comprehensive PTM Detection Kits For Non-PTM Experts

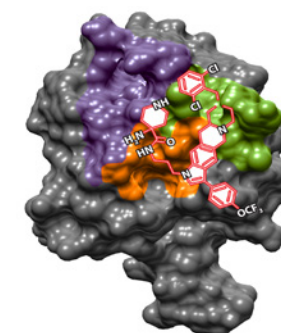


- Comprehensive kits - affinity & control beads, de-PTM inhibitors, validation antibody, lysis & wash buffers, etc.
- Measure endogenous signaling events.
- Includes Cytoskeleton's new Acetyl-Lysine Detection Kit, that was built with the novel technology found in our popular Ub, SUMO 2/3 and pY kits.

See p. 4-5 for more information

New K-Ras Proteins

Measuring inhibition of SOS1 GEF induced GDP dissociation from K-Ras4B wild type and mutants.



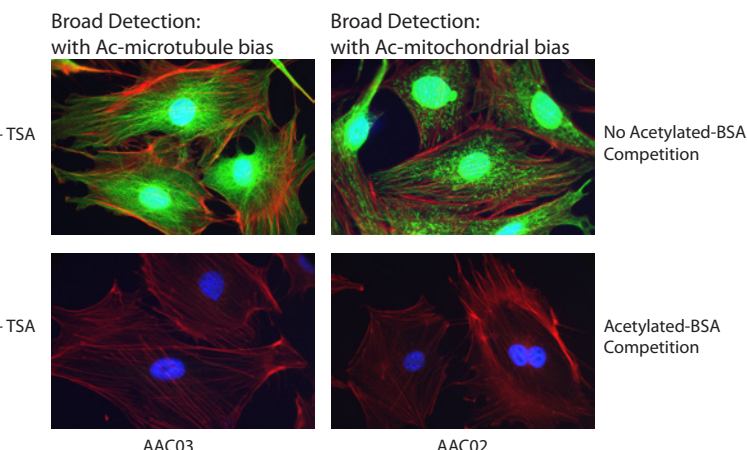
Legend: Welsch et al. 2017 indicate a novel way to improve the binding affinity of small molecule inhibitors of K-Ras. The triple binding site of compound 3144 (red) is shown over the surface of K-Ras. Compound 3144 inhibits GTP exchange with micromolar activity.

- Reliable, pure, biologically active GEF proteins and small G-proteins.
- SOS1, Ras-GRF, Tiam1, Vav1, Vav2, and ARNO available.
- K-Ras4B mutant proteins; G12V, G12D, G13D, G13S, Q61P, K128A, R135A, plus compound binding site mutants G12D+D38A and G12D +I36N, see page 19 for more information.
- Custom compound screening with K-Ras wild type and mutated isoforms with or without exchange factors, see page 19.

See p. 10,11 & 19 for more information

Signal-Seeker™ Antibodies

New Acetyl-Lysine Antibodies



AAC03
Acetylated proteins (green): AAC02 or AAC03 (1:500), anti-mouse 488
Actin (Red): Rhodamine Phalloidin
Nucleus (Blue): DAPI

- Validated for immunofluorescence applications.
- High affinity & specificity for Acetyl-lysine PTMs.

Check out our full line of Signal-Seeker antibodies for Ac, Phosphorylation, Ubiquitin, and SUMO 2/3 PTMs.

See p. 12 for more information

Community Spotlight

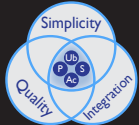
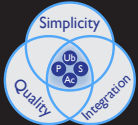


At Cytoskeleton, we recognize the importance of our customers not only as scientists, but as a community of people working together towards a common goal: discovering new aspects of biology and providing a framework for understanding disease at the molecular and cellular levels. Conferences, events, and meetings are vital to creating this collaborative network of knowledge. Cytoskeleton is proud to sponsor and attend events across the globe in support of our community. We hope to see you out there in 2019!

Online Resources at Cytoskeleton.com

- Promotions and Discounts
- Technical Resources
- Informational Newsletters
- Video Guides
- Protocols
- Webinars





Novel Post-translational Modification Tools

- First to develop comprehensive PTM detection kits to simplify investigation for non-PTM experts.
- First to develop a universal lysis system which allows for the investigation of PTM crosstalk.
- First to develop a simple, genomic DNA removal filter that removes rather than shears DNA.
- First to develop a commercially available UBD that effectively enriches mono- and poly-ubiquitinated proteins.
- First to develop an acetylation antibody that visualizes acetylated mitochondria by immunofluorescence.

Uses in Molecular Biology

- Use different kits to build a temporal protein regulation profile.
- Investigate the role of known protein modifications in your system.
- Detect endogenous levels (vs. transfected amounts) of modified proteins.

Protein regulation during signal transduction and other cellular events is, by necessity, a rapid and dynamic process. Most often, these mechanisms involve modification of an extremely small, but important fraction of the target protein. This makes the scientist's job of capturing key PTM regulatory processes difficult and frustrating.

At Cytoskeleton, we have focused on generating accurate methods to measure these small, endogenous changes; because it is critical to determine if these PTM events are occurring physiologically.

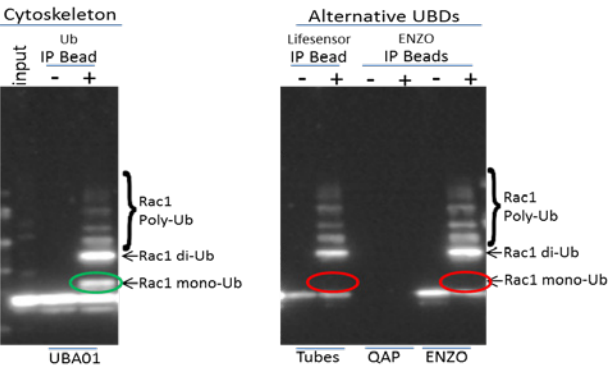
Be The First To Discover Mono- And Poly-Ubiquitination Of Your Protein

Ubiquitination affinity Beads (Cat. # UBA01-beads)

The only commercially available UBD that effectively enriches mono- and poly-ubiquitinated proteins

No heavy and light chain interference, which occurs with antibody enrichment

Learn more at: <https://www.cytoskeleton.com/uba01-beads>



Legend: Ubiquitin affinity beads (Cat. # UBA01-beads) were used to precipitate ubiquitinated proteins from A431 cell extracts. Products were run on 4-20% SDS-PAGE and transferred to a PVDF membrane for western analysis using anti-Rac1 (Rac1 is an example protein), and anti-mouse HRP secondary. Note: Cytoskeleton's ubiquitin affinity beads, on the left, pulled down the mono-ubiquitinated species whereas other suppliers' beads, on the right, did not show this important regulator species.

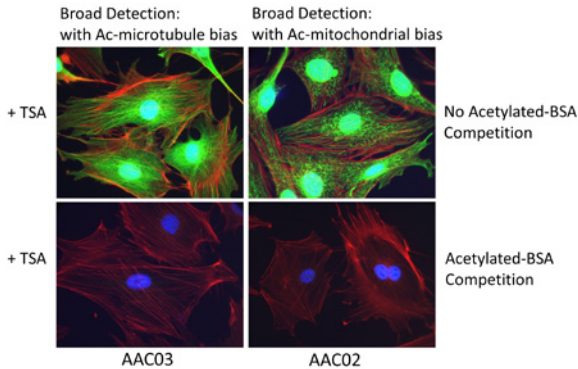
Don't Miss Out: See The Complete Acetylation Picture

Acetyl-Lysine Monoclonal Antibodies (Cat. # AAC02 and AAC03)

AAC02: provides the unique ability to also detect mitochondrial acetylated proteins by IF

AAC03: provides broad detection of acetylated proteins by western or IF

Learn more at: <https://www.cytoskeleton.com/signal-seeker/signal-seeker-acetylation-specific-products>

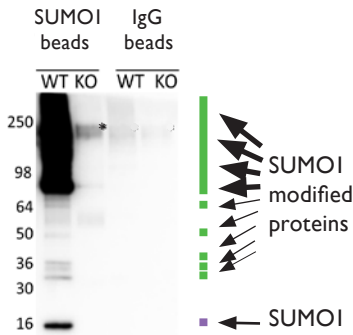


Legend: A431 cells were fixed with 3.7% (w/v) paraformaldehyde in PBS and permeabilized with 1% Triton-X100 in PBS. Samples were probed with an anti-acetylation antibody (Cat. # AAC02 or AAC03 at 1:500 in PBS, green), fluorescent phalloidin (Cat. # PHDR1, red) and Dapi (blue). Interestingly, AAC03 identified many acetylated species with an emphasis on microtubule structures, whereas AAC02 highlighted the mitochondria. We believe this is the first pan-acetyl lysine antibody that has a bias towards acetylated mitochondrial proteins.

Signal-Seeker™ Affinity Beads

Highlights:

- Superior sensitivity, great for detecting endogenous PTM modifications
- Developed to minimize heavy and light chain contamination
- Class-leading affinity beads for Ubiquitin, Acetylation, SUMO1, and others



Legend: SUMO1 affinity beads (Cat. # ASM11-beads) were used to precipitate SUMO1-ylated proteins from A431 cell extracts. Products were run on 4-20% SDS-PAGE and transferred to a PVDF membrane for western analysis using anti-SUMO1 (Cat. # ASM01) and anti-mouse HRP secondary. Note: Control IgG beads (Cat. # CIG01-beads) did not pull down any SUMO1-ylated proteins nor did they leach heavy and light chain antibody proteins which could mask SUMO1-ylated target proteins. Asterix denotes minor IgG band contamination.

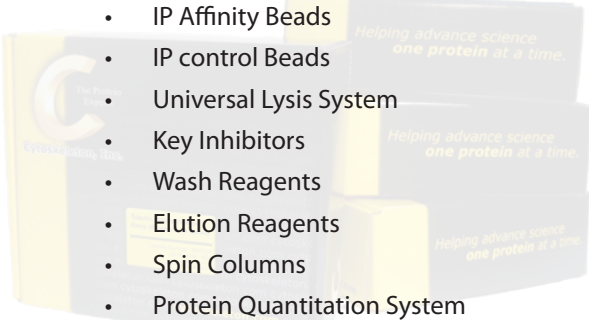
Signal-Seeker™ Comprehensive Detection Kits

Highlights:

- Contains all of the essential components needed for effective PTM-modified-protein detection
- Perfect for scientists that are new to the PTM field

Essential Kit Components:

- IP Affinity Beads
- IP control Beads
- Universal Lysis System
- Key Inhibitors
- Wash Reagents
- Elution Reagents
- Spin Columns
- Protein Quantitation System
- Chemiluminescence



Signal-Seeker™ Toolkit Products

NEW SUMOylation 1 Products

Description	Amount	Item #
Signal-Seeker™ SUMO1 Detection Kit	30 assays	BK165
Signal-Seeker™ SUMO1 Detection Kit	10 assays	BK165-S
SUMO1 Affinity Beads	30 assays	ASM11-beads
SUMO1 Control Beads	10 assays	CIG03-beads
SUMO1 Mouse Antibody (5D8B16)	1 x 100 µl	ASM01

SUMOylation 2/3 Products

Description	Amount	Item #
Signal-Seeker™ SUMO 2/3 Detection Kit	30 assays	BK162
Signal-Seeker™ SUMO 2/3 Detection Kit	10 assays	BK162-S
SUMO 2/3 Affinity Beads	20 assays	ASM24-beads
Mouse IgG Control	10 assays	CIG01-beads
SUMO 2/3 Mouse Antibody (12F3)	2 x 100 µl	ASM23
SUMO 2/3 Mouse Antibody (11G2)	2 x 200 µl	ASM24
SUMO 2/3 Mouse Antibody-HRP labeled	1 x 100 µl	ASM23-HRP

Phosphotyrosine Products

Description	Amount	Item #
Signal-Seeker™ Phosphotyrosine Detection Kit	30 assays	BK160
Signal-Seeker™ Phosphotyrosine Detection Kit	10 assays	BK160-S
Phosphotyrosine Affinity Beads	40 assays	APY03-beads
Mouse IgG Control	10 assays	CIG01-beads
Phosphotyrosine Mouse Antibody (11G2)	2 x 100 µl	APY03
Phosphotyrosine Antibody-HRP labeled	1 x 100 µl	APY03-HRP

Acetyl-Lysine Products

Description	Amount	Item #
Signal-Seeker™ Acetyl-Lysine Detection Kit	30 assays	BK163
Signal-Seeker™ Acetyl-Lysine Detection Kit	10 assays	BK163-S
Acetyl-Lysine Affinity Beads	40 assays	AAC04-beads
Acetyl-Lysine Control Beads	10 assays	CIG02-beads
Acetyl-Lysine Mouse Antibody (3C6.08.20)	1 x 200 µl	AAC01
Acetyl-Lysine Mouse Antibody (7B5A1)	2 x 100 µl	AAC02
Acetyl-Lysine Mouse Antibody (19C4B2.1)	2 x 100 µl	AAC03
Acetyl-Lysine Mouse Antibody-HRP labeled	1 x 100 µl	AAC03-HRP

Ubiquitin Products

Description	Amount	Item #
Signal-Seeker™ Ubiquitination Detection Kit	30 assays	BK161
Signal-Seeker™ Ubiquitination Detection Kit	10 assays	BK161-S
Ubiquitination Affinity Beads	40 assays	UBA01-beads
Ubiquitination Control beads	10 assays	CUB02-beads
Ubiquitin Mouse Antibody	2 x 100 µl	AUB01
Ubiquitin Mouse Antibody-HRP labeled	1 x 100 µl	AUB01-HRP

BlastR™ Lysis System

Description	Amount	Item #
BlastR™ Rapid Lysate Filter System	50 assays	BLR01
BlastR™ Rapid Lysate Filters	50 assays	BLR02



Figure 1: Schematic diagram of dynein pulling cargo along a microtubule.

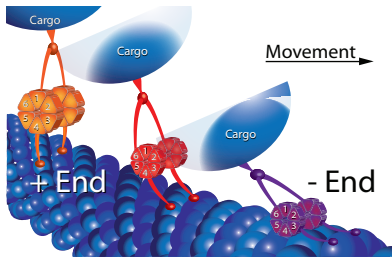


Figure 2: Dose response curve of Ciliobrevin A inhibiting cytoplasmic dynein.

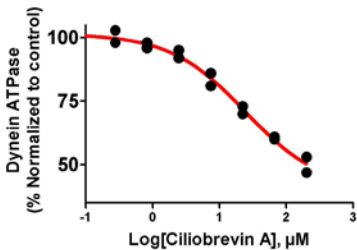


Figure 1: Schematic representation of proposed dynein torsion gear mechanism and microtubule (MT) catch-bonding. The six member ring of the cytoplasmic dynein complex's (CDC) motor domain is shown in a relaxed state in orange and during high load conditions the ring is compressed as shown by the red model. During very high load conditions, CDC's microtubule binding

domain clamps down onto the MT as shown by the purple model. **Figure 2:** Dynein (Cat. # DN01) is available from Cytoskeleton as a purified complex that has microtubule stimulated ATPase activity which is inhibited by Ciliobrevin A with an IC₅₀ of 30 μM, which is similar to Firestone et al. (2012, Fig. 4).

Figure 3: Schematic diagram of muscle acto-myosin filament.

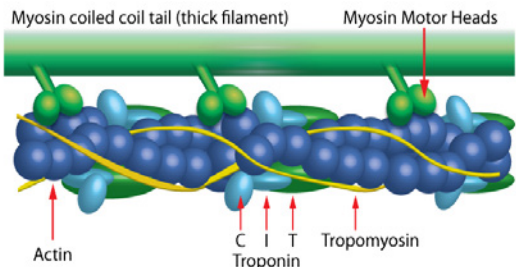


Figure 4: Calcium induced ATPase activity from a reconstituted acto-myosin filament.

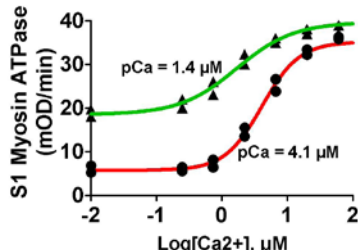
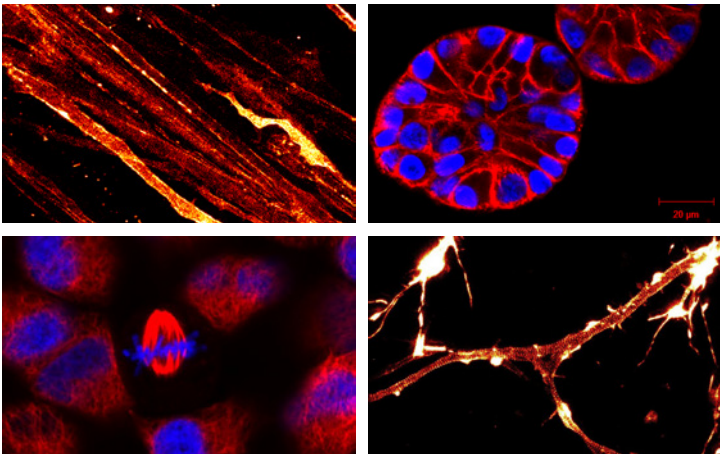


Figure 4: Actin thin filament protein (Cat. # TFC01) was mixed with S1-myosin (Cat. # MYS03) to re-create the acto-myosin filament *in vitro*. Calcium was titrated between 0.2 and 60 μM and ATPase rate was measured kinetically at OD_{360nm} using the components of the ATPase ELIPA Kit (Cat. # BK051, pg. 18). The concentration of calcium was plotted against the rate of ATPase activity to produce the dose

response curves. Red line denotes the control with a pCa = 4.1 μM which is similar to published pCa values for reconstituted cardiac sarcomeres described in Holroyde et al. (1980, Fig. 6). This system is responsive to compounds that bind to the myosin motor domain, e.g. Omecavil mercarbil with a modified pCa = 1.4 μM (green line), and hence it can be used as a screening tool to develop new cardiac therapeutic drugs.



Top Left: STED image of dorsal root ganglion (rat) stained with SiR-actin. Courtesy of Elisa D'Este, MPI Biophysical Chemistry, Göttingen. **Top Right:** fMCF10A cells expressing H2B-GFP (Blue) in Matrigel stained with SiR-actin (red). Image taken on an inverted LSM microscope. Courtesy of Christian Conrad and Katharina Jechow, Heidelberg. **Lower Left:** HeLa cells expressing H2B-mCherry (Blue) stained with SiR-Tubulin (Red), courtesy of Daniel Gerlich and Claudia Blaukopf, Inst. Mol. Biotech., Vienna). **Lower Right:** STED image of cultured rat hippocampal neurons stained with SiR-actin. Actin rings (stripes) with 180 nm periodicity can be seen. Courtesy Of Elisa D'Este, MPI Biophysical Chemistry, Göttingen.



www.cytoskeleton.com/spirochrome

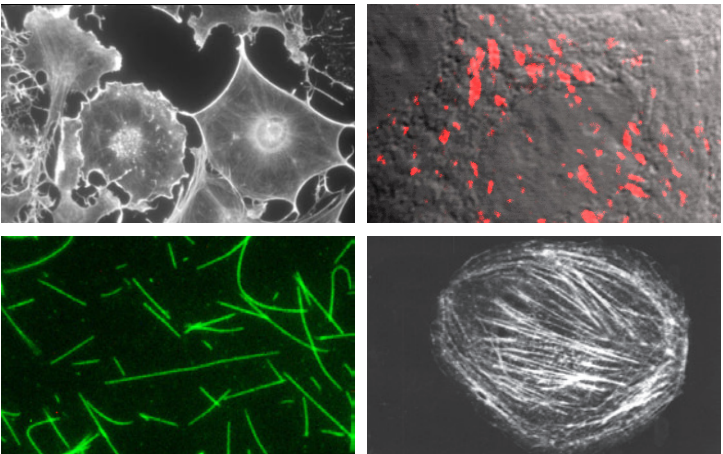
Tubulin Imaging

Description	Ex / Em	Cat. #	Amount
SiR700-Tubulin Kit Includes SiR700-Tubulin and Verapamil	690 / 720 nm	CY-SC014	35 nmol
SiR-Tubulin Kit Includes SiR-Tubulin and Verapamil	630 / 680 nm	CY-SC002	50 nmol
Cytoskeleton Kit Includes SiR-Actin, SiR-Tubulin, and Verapamil	630 / 680 nm	CY-SC006	50 nmol each
AMCA Labeled Tubulin	350 / 440 nm	TL440M-A TL440M-B	5 x 20 μg 20 x 20 μg
HiLyte Fluor™ 488 Labeled Tubulin	460 / 520 nm	TL488M-A TL488M-B	5 x 20 μg 20 x 20 μg
TRITC Rhodamine Labeled Tubulin	535 / 590 nm	TL590M-A TL590M-B	5 x 20 μg 20 x 20 μg
X-Rhodamine Labeled Tubulin	560 / 620 nm	TL620M-A TL620M-B	5 x 20 μg 20 x 20 μg
HiLyte Fluor™ 647 Labeled Tubulin	620 / 670 nm	TL670M-A TL670M-B	5 x 20 μg 20 x 20 μg

ECM Imaging

Description	Ex / Em	Cat. #	Amount
Fibronectin Red fluorescent, rhodamine	535 / 590 nm	FNR01-A FNR01-B	5 x 20 μg 20 x 20 μg
Fibronectin Green fluorescent, HiLyte Fluor™ 488	460 / 520 nm	FNR02-A FNR02-B	5 x 20 μg 20 x 20 μg
Fibronectin Biotinylated	na	FNR03-A FNR03-B	5 x 20 μg 20 x 20 μg
Laminin Red fluorescent, rhodamine	535 / 590 nm	LMN01-A LMN01-B	5 x 20 μg 20 x 20 μg
Laminin Green fluorescent, HiLyte Fluor™ 488	460 / 520 nm	LMN02-A LMN02-B	5 x 20 μg 20 x 20 μg
Laminin Biotinylated	na	LMN03-A LMN03-B	5 x 20 μg 20 x 20 μg

SiR-Actin, SiR-Tubulin, SiR-DNA, SiR-Lysosome are trademarks of Spirochrome SA (Switzerland). HiLyteFluor is a trademark of Anaspec Inc. (CA, USA).



Top Left: Swiss 3T3 cells treated with cell permeable Rho inhibitor (Cat. # CT04) and stained with rhodamine phalloidin (Cat. PHDR1); note the lack of F-actin stress fibers in each cell. **Top right:** Fluorescent fibronectin (Cat. # FNR01) treated MCF10A cells (image kindly provided by A. Varadara and M. Karthykenyan, Univ. S.Carolina, Columbia, SC). **Lower left:** 488 HiLyte Fluor™ labeled tubulin polymerized *in vitro* (Cat. # TL488M). **Lower right:** Fluorescent non-muscle actin (Cat.# APHR) injected in to CHO cells; note the stress fibers across the whole cell width (kindly provided by Dr. Goldman's lab, Northwestern Univ, Chicago, IL).

Small G-protein Modulators and Actin Imaging

Description	Ex / Em	Cat. #	Amount
SiR700-Actin Kit Includes SiR-Actin and Verapamil	690 / 720 nm	CY-SC013	35 nmol
SiR-Actin Kit Includes SiR-Actin and Verapamil	630 / 680 nm	CY-SC001	50 nmol
Cytoskeleton Kit Includes SiR-Actin, SiR-Tubulin, and Verapamil	630 / 680 nm	CY-SC006	50 nmol each
Rhodamine Actin Protein Human platelet, non-muscle	535 / 590 nm	APHR-A APHR-C	4 x 10 μg 20 x 10 μg
Rhodamine Actin protein Rabbit skeletal muscle	535 / 590 nm	AR05-B AR05-C	10 x 20 μg 20 x 20 μg
Rho Activator II Deamidation of Rho Gln-63		CN03-A CN03-B	3 x 20 μg 9 x 20 μg
Rho Inhibitor I ADP ribosylation of Rho Asn-41		CT04-A CT04-B CT04-C	1 x 20 μg 5 x 20 μg 20 x 20 μg
Rho/Rac/Cdc42 Activator I Deamidation of Rho Gln-63 & Rac/Cdc42 Gln-61		CN04-A CN04-B	3 x 20 μg 9 x 20 μg
Rho Activator I SHP-2 phosphatase-mediated Rho activation		CN01-A CN01-B	5 x 10 units 20 x 10 units
Rac/Cdc42 Activator II EGF receptor-mediated Rac/Cdc42 activation		CN02-A CN02-B	5 x 10 units 20 x 10 units

Lysosome Imaging

Lysosome Live Cell Imaging Reagents	Ex / Em	Cat. #	Amount
SiR-Lysosome Kit Includes SiR-Lysosome and Verapamil	630 / 680 nm	CY-SC012	50 nmol
SiR700-Lysosome Kit Includes SiR700-Lysosome and Verapamil	690 / 720 nm	CY-SC016	35 nmol

DNA Imaging

DNA Live Cell Imaging Reagents	Ex / Em	Cat. #	Amount
SiR-DNA Kit Includes SiR-DNA and Verapamil	630 / 680 nm	CY-SC007	50 nmol
SiR700-DNA Kit Includes SiR700-DNA and Verapamil	690 / 720 nm	CY-SC015	35 nmol

Kinesin & Dynein Proteins

Kinesin & Dynein Proteins	Source	Purity	Cat. #	Amount
CENP-E Motor Domain Protein	H. sapiens	>85%	CP01-A CP01-XL	2 x 25 μg 1 x 1 mg
Chromokinesin Motor Domain Protein	H. sapiens	>85%	CR01-A	2 x 25 μg
Dynein (cytoplasmic)	Porcine brain	>80%	CS-DN01	1 x 50 μg
Eg5 Motor Domain Protein	H. sapiens	>85%	EG01-A EG01-B EG01-XL	2 x 25 μg 10 x 25 μg 1 x 1 mg
Eg5 Homolog BimC Motor Domain Protein	A. nidulans	>85%	BM01-A	2 x 25 μg
Eg5 Homolog BimC Motor Domain Protein	A. fumigatus	>85%	EG02-A	2 x 15 μg
KIFC3 Motor Domain Protein	H. sapiens	>85%	KC01-A	2 x 25 μg
KIF3C Motor Domain Protein	H. sapiens	>85%	KF01-A	2 x 25 μg
KIF7 motor domain	H. sapiens	>85%	CS-KF51	1 x 100 μg
Kinesin Heavy Chain Motor Domain Protein	H. sapiens	>85%	KR01-A KR01-XL	2 x 25 μg 1 x 1 mg
MCAK Motor Domain Protein	H. sapiens	>85%	MK01-A	2 x 25 μg
MKLP1 Motor Domain Protein	H. sapiens	>85%	MP01-A MP01-XL	2 x 25 μg 1 x 1 mg
MKLP2 Motor Domain Protein	H. sapiens	>85%	CS-MP05	1 x 50 μg

Myosin & Thin Filament Proteins

Myosin Proteins	Source	Purity	Cat. #	Amount
Myosin S1 fragment (cardiac)	Bovine	>85%	CS-MYS03	1 x 250 μg
Myosin S1 fragment (skeletal)	Rabbit	>85%	CS-MYS04	1 x 250 μg
Myosin S1 fragment (smooth)	Chicken	>85%	CS-MYS05	1 x 250 μg
Myosin II Skeletal Muscle Protein	Rabbit	>95%	MY02-A MY02-B	5 x 1 mg 20 x 1 mg
Myosin Cardiac Muscle Protein	Bovine	>95%	MY03-A MY03-B	5 x 1 mg 20 x 1 mg
Heavy Meromyosin Skeletal Muscle Protein	Rabbit	80%	MH01-A	4 x 50 μg
NEW Heavy Meromyosin Cardiac Muscle Protein	Bovine	80%	CS-MH03	1 x 100 μg
Pre-formed F-actin filaments	Rabbit	>99%	AKF99-A AKF99-B	1 x 1 mg 5 x 1 mg
NEW Actin Thin Filaments (cardiac) Calcium sensitive complex of F-actin, tropomyosin α/β & Troponin C,I,T	Bovine	>90%	CS-TFC01	1 x 1 mg
NEW Actin Thin Filaments (skeletal) Calcium sensitive complex of F-actin, tropomyosin α/β & Troponin C,I,T	Rabbit	>90%	CS-TFC02	1 x 1 mg
Tropomyosin / Troponin Complex Cardiac tropomyosin α/β & Troponin C,I,T	Bovine	>60%	CS-TT05	1 x 1mg

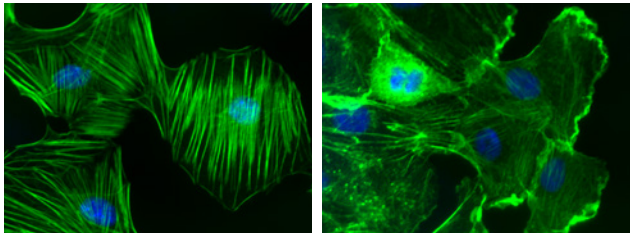
Pre-formed Microtubules & F-Actin Reagents

Microtubules and Other Reagents	Cat. #	Amount
NEW Thin Filament Protein (cardiac tropomyosin/tropomodulin/actin, Ca ²⁺ activated myosin ATPase	CS-TFC01	1 x 1 mg
NEW Thin Filament Protein (skeletal mus. tropomyosin/tropomodulin/actin, Ca ²⁺ activated myosin ATPase	CS-TFC02	1 x 1 mg
Microtubules, Pre-formed, lyophilized, porcine source , substrate for kinesin ATPase assays	MT002-A MT002-XL	4 x 500 μg 1 x 10 mg
Actin Filaments, Pre-formed, lyophilized A ready to use substrate for myosin ATPase assays	AKF99-A AKF99-B	1 x 1 mg 5 x 1 mg
Paclitaxel (2 mM) Stabilizes microtubules	TXD01	10 x 100 μl



About Activation Assays

Since 2001, Cytoskeleton has provided the scientific community with the most robust, accurate, and time-saving kits to measure Small GTP-binding protein (SmG) activation. Along the way, we have developed numerous versions for different SmGs, such as Rho, Rac, Arf1 & 6, Ras, Cdc42, and Ral. Also, the quantifiable G-LISA versions enabled a new wave of more sensitive applications, e.g. measurement in limited primary cell numbers and Matrigel 3D matrices. We continue to develop and maintain these high standards, which allow you to produce the best results in the least amount of time.



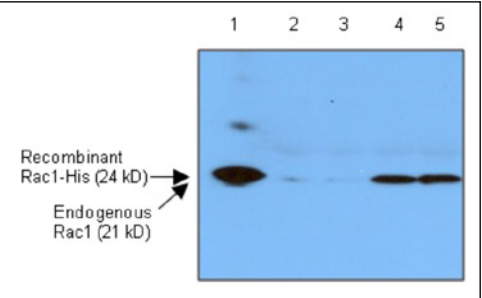
Legend: Rho activation (left) and Rac activation (right) in Swiss 3T3 cells. F-actin is visualized with fluorescent green phalloidin staining (Cat.# PHDG1) and nuclear blue DNA staining with DAPI. Cells were activated with Cat.# CN03 (left) and Cat. # CN04 (right).

Comparison of Pull-down and G-LISA formats

Parameter	Pull-down	G-LISA®
Total protein per assay	500-2000 µg	10-50 µg
Assay time	10-12 h (2 days)	<3 h
Primary cells & 3D matrix compatible	No	Yes
Sample handling	10 Samples	96 Samples
Quantitative data*	Semi	Yes

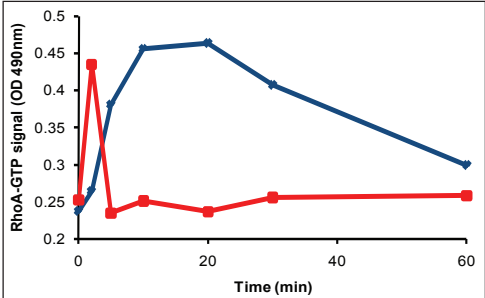
* Numerical readouts and fewer sample handling steps make G-LISA® assays more quantitative.

Pull-down Result Example



Swiss 3T3 cells were serum-starved for 24h; after this, a sample was treated with 10 ng/ml of EGF for 2 min (Lanes 4 & 5). Other cells were not treated and remained serum-starved (Lanes 2 & 3). Rac1 activation was measured using the Rac1 Activation pull-down assay. 500 µg of lysate were assayed with 10 µg of PAK-PBD beads (Lanes 2-5). Lane 1 shows 20 ng of recombinant Rac1-His protein run as a Western blot standard.

G-LISA® Result Example



Time course of activation of RhoA in Swiss 3T3 cells by CN01 and LPA. Serum-starved Swiss 3T3 cells were treated with Rho Activator I, Cat. # CN01 (blue diamonds) or LPA (red squares). RhoA activity was measured by reading signals at OD_{490nm}. Data are background subtracted.

SmGs are involved in regulating cell signaling pathways and impact a wide range of cellular processes, functions, and morphology. The pull-down version of the assay uses affinity beads which are incubated with the extract and then separated by centrifugation. The pelleted products are separated by SDS-PAGE and blotted onto a membrane for Western analysis of the SmG of interest. The G-LISA® format is a modified ELISA which has the affinity reagent permanently attached to the well of a 96-well plate. The extract is incubated in the well which is then washed and probed with primary and secondary antibodies.



Activation Assay Video

Learn which assay format is right for you.
www.cytoskeleton.com/activationassayvideo

Example Product Citations

RhoA G-LISA® (Cat. # BK124)
Chen G.P. et al. 2017. *Mol. Med. Rep.* 15, 3153-3160.
Dai D.P. et al. 2017. *Cell Biol. Int.* doi: 10.1002/cbin.10795.

Rac1 G-LISA® (Cat. # BK126)
Kai M. et al. 2017. *Mol. Carcinog.* 56, 1743-1752.
Jones M.M. et al. 2017. *Mol. Oral Microbiol.* 32, 375-389.

Rac1 G-LISA® (Cat. # BK128)
Kumar V. et al. 2017. *Sci Rep.* 7, 1885.
Peretti A.S. et al. 2017. *Am. J. Pathol.* doi: 10.1016/j.ajpath.2017.10.018.

Cdc42 G-LISA® (Cat. # BK127)
Hernandez A.J.A. et al. 2018. *Toxicology.* 394, 35-44.
Rafiq N.B. et al. 2017. *J. Cell Biol.* 216, 181-197.

Ras G-LISA® (Cat. # BK131)
Huang J.L. et al. 2017. *Nat. Commun.* 8, 15144.
Arora P. et al. 2017. *Hepatology.* doi: 10.1002/hep.29049.

More online!
www.cytoskeleton.com/activation-assays

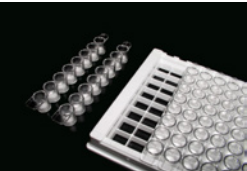


Pull-down Activation Assays

Pull-down assays utilize affinity beads linked to an effector protein that selectively binds active GTPase followed by quantitation with Western blotting.

Pull-down Activation Assays	Cat. #	Amount
Combo RhoA/Rac1/Cdc42 Activation Assay Biochem Kit™	BK030	3 x 10 assays
Arf1 Activation Assay Biochem Kit™	BK032-S	20 assays
Arf6 Activation Assay Biochem Kit™	BK033-S	20 assays
Cdc42 Activation Assay Biochem Kit™	BK034-S BK034	20 assays 50 assays
Rac1 Activation Assay Biochem Kit™	BK035-S BK035	20 assays 50 assays
RalA Activation Assay Biochem Kit™	BK040	50 assays
Ras Activation Assay Biochem Kit™	BK008-S BK008	20 assays 50 assays
RhoA Activation Assay Biochem Kit™	BK036-S BK036	20 assays 80 assays
Protease Inhibitor Cocktail (100x stock)	PIC02	1 ml

For isoforms not listed, see our information resources online.



G-LISA® Activation Assays

G-LISAs use a 96-well plate coated with effector protein that selectively binds the active GTPase followed by quantitation with ELISA techniques.

G-LISA Activation Assays	Cat. #	Amount
RhoA/Rac1/Cdc42 G-LISA Activation Assay Bundle BK135=BK124-S+BK127-S+BK128-S	BK135	3 Kits (24 assays/kit)
Arf1 G-LISA® Activation Assay, colorimetric	BK132	96 assays
Arf6 G-LISA® Activation Assay, colorimetric	BK133	96 assays
Cdc42 G-LISA® Activation Assay, colorimetric	BK127-S BK127	24 assays 96 assays
Rac1,2,3 G-LISA® Activation Assay, colorimetric	BK125	96 assays
Rac1 G-LISA® Activation Assay, colorimetric	BK128-S BK128	24 assays 96 assays
Rac1 G-LISA® Activation Assay, luminescence	BK126	96 assays
RalA G-LISA® Activation Assay, colorimetric	BK129	96 assays
Ras G-LISA® Activation Assay, colorimetric	BK131	96 assays
RhoA G-LISA® Activation Assay, colorimetric	BK124-S BK124	24 assays 96 assays
RhoA G-LISA® Activation Assay, luminescence	BK121	96 assays
Protease Inhibitor Cocktail (100x stock)	PIC02	1 ml

Related Activation Assay Products



Total RhoA ELISA

Rapidly measure Total RhoA from cell or tissue lysates using the extremely sensitive and linear Total RhoA ELISA.

ELISA	Cat. #	Amount
Total RhoA ELISA	BK150	96 assays



Activators & Inhibitors

G-switch™ small G-protein activators and inhibitors are highly potent reagents that target endogenous Rho family proteins and pathways.

See Pg. 10



Acti-stain Phalloidins

Acti-stain™ fluorescent phalloidins provide exceptionally bright and stable probes for F-actin at an economical price.

See Pg. 13



GTPase Affinity Beads & Proteins

Specifically target the active form of small G-proteins with these brightly-colored GTPase affinity beads and proteins.

See Pg. 10



Activators & Inhibitors

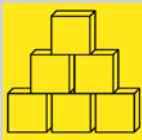


The G-switch™ line of small G-protein tools are highly potent reagents that target endogenous Rho family proteins and pathways. In contrast to methods that rely on over-expression or knockdown of target proteins (e.g., DNA transfection of dominant-negative or constitutively-active Rho mutants, RNAi knockdown), G-switch™ reagents act rapidly on the endogenous target protein (in minutes to hours), thereby optimizing the chance of generating a more physiologically relevant response.

G-protein Modulator	Cell Entry Mechanism	Protein Modulation	Cat. #	Amount
Rho Activator II Deamidation of Rho Gln-63	Cell permeable	Direct	CN03-A CN03-B	3 x 20 µg 9 x 20 µg
Rho Inhibitor I Specific inhibitor of Rho activity, ADP ribosylation of Rho Asn-41 (very cell permeable)	Cell permeable	Direct	CT04-A CT04-B CT04-C	1 x 20 µg 5 x 20 µg 20 x 20 µg
C3 Transferase Protein Specific inhibitor of Rho activity, ADP ribosylation of Rho Asn-41 (limited cell permeability)	Pinocytosis	Direct	CT03-A CT03-C	1 x 25 µg 4 x 25 µg
Rho/Rac/Cdc42 Activator I Deamidation of Rho Gln-63 & Rac/Cdc42 Gln-61	Cell permeable	Direct	CN04-A CN04-B	3 x 20 µg 9 x 20 µg
Rho Activator I SHP-2 phosphatase-mediated Rho activation	Cell permeable	Indirect	CN01-A CN01-B	5 x 10 units 20 x 10 units
Rac/Cdc42 Activator II EGF receptor-mediated Rac/Cdc42 activation	Receptor mediated	Indirect	CN02-A CN02-B	5 x 10 units 20 x 10 units

GEF, GAP, and GDI Effector Proteins

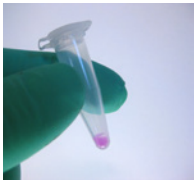
G-protein Modulator & Effector Proteins	Purity	Cat. #	Amount
NEW ARNO Protein Sec7 GEF domain protein. GEF for Arf1 & 6. Human recomb., 6xHis tag	>85%	CS-GE07 CS-GE07-XL	3 x 20 µg 1 x 200 µg
Dbc His Protein, RhoGEF domain (DH/PH) GEF for Cdc42 and RhoA	>80%	GE01-A	2 x 50 µg
p50RhoGAP GST Protein, full length GAP for Cdc42, Rac, and Rho	>90%	GAP01-A GAP01-B	1 x 50 µg 4 x 50 µg
p50RhoGAP GST Protein, GAP domain GAP for Cdc42, Rac, and Rho	>90%	GAS01-A GAS01-B	1 x 50 µg 4 x 50 µg
NEW Ras-GRF GEF protein Cdc25 domain Human recomb., MBP tagged	>85%	CS-GE03	1 x 100 µg
RhoGDI GST Protein Inhibitor of Cdc42, Rac, and Rho	>90%	GDI01-A	1 x 25 µg
SOS1 Ras GEF Domain Protein GEF for H-, K- or N-Ras	>90%	GE02 GE02-XL	1 x 100 µg 1 x 1 mg
NEW Tiam1 GEF protein, GEF for Rac. Human recomb. DHPH domain, MBP tag	>85%	CS-GE04	1 x 100 µg
NEW Vav1 GEF protein, GEF for Rac. Human recomb. DHPHC1 domain Y174D mutant, 6xHis tagged	>85%	CS-GE05	1 x 100 µg
NEW Vav2 GEF protein , GEF for Rac. Human recomb. DH domain, 6xHis tagged	>85%	CS-GE06	1 x 100 µg



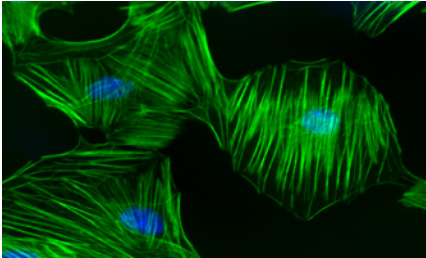
Bulk
Quantities
Available

GTPase Affinity Beads & Proteins

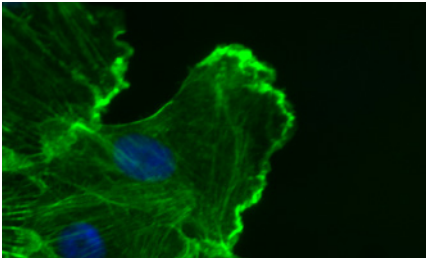
GTPase Affinity Beads and Proteins	Purity	Cat. #	Amount
GGA3-PBD Beads Binds active (GTP-bound) Arf1 and Arf6	>85%	GGA05-A	1 x 500 µg
PAK-PBD Protein Binds active (GTP-bound) Cdc42 and Rac1,2,3	>80%	PAK01-A PAK01-B	1 x 250 µg 4 x 250 µg
PAK-PBD Beads Binds active (GTP-bound) Cdc42 and Rac1,2,3	>80%	PAK02-A PAK02-B	1 x 500 µg 4 x 500 µg
Raf-RBD Beads Binds active (GTP-bound) K-, N-, H-Ras	>80%	RF02-A RF02-B	1 x 2 mg 4 x 2 mg
Rhotekin-RBD Protein Binds active (GTP-bound) RhoA,B,C	>90%	RT01-A	1 x 500 µg
Rhotekin-RBD Beads Binds active (GTP-bound) RhoA,B,C	>85%	RT02-A RT02-B	2 x 2 mg 6 x 2 mg



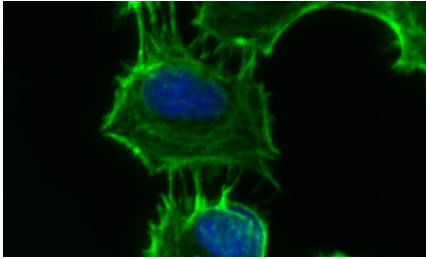
Specifically target the active form of small G-proteins with these brightly-colored GTPase affinity beads and proteins.



Stress fibers caused by Rho activation using Cat. # CN03. Actin stained green with Cat. # PHDG1.



Membrane ruffles induced by Rac activation using Cat. # CN04. Actin stained green with Cat. # PHDG1.

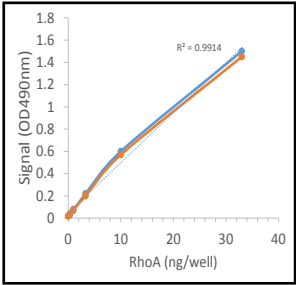


Microspikes induced by Cdc42 activation using Cat. # CN02. Actin stained green with Cat. # PHDG1.

Total RhoA ELISA Kit

Measures the total amount of RhoA in a sample of tissue or cell culture extract. Uses a sandwich ELISA to create the high specificity and sensitivity combination. 10-25 µl sample volume. Key components included are:

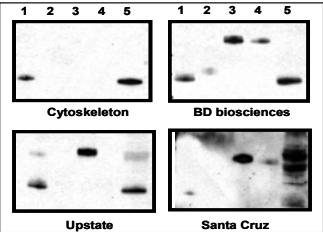
- 96-well anti-Rho binding plate, contains IgY pre-coated surfaces.
- HRP detection reagents.
- Optimized sample dilution buffer.
- Primary and secondary antibodies.
- RhoA control protein included.
- Comprehensive manual.



RhoA ELISA Kit results. The plot indicates the linear dependence of the OD_{490nm} absorbance with the concentration of RhoA.

Product	Cat. #	Amount
Total RhoA ELISA Measures total RhoA levels	BK150	96 assays

Antibodies for Small G-proteins



Anti-Rac1 monoclonal antibody (Cat. # ARC03) does not cross-react with Rac2, 3, or Cdc42 (upper left blot), while all other commercially available Rac1 antibodies cross-react with GTPases other than Rac1.

Small G-protein Antibodies	Host	Type	Species Reactivity	Cat. #	Amount
Cdc42 Specific Antibody Human Cdc42 Peptide	Mouse	mAb	Hu, Ms, Rt, other extracts	ACD03 ACD03-S	2 x 200 µl 1 x 50 µl
Rac1 Specific Antibody Human C-terminal Peptide	Mouse	mAb	Hu, Ms, Rt, other extracts	ARC03 ARC03-S	2 x 100 µl 1 x 50 µl
RhoA Specific Antibody Human RhoA Peptide	Mouse	mAb	Hu, Ms, Rt, other extracts	ARH04 ARH04-S	2 x 100 µl 1 x 50 µl

Additional Signal Transduction Reagents

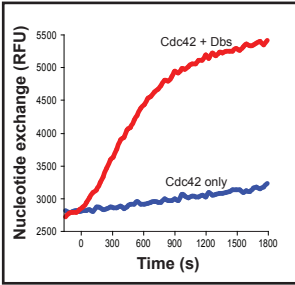
Signal Transduction Reagents	Cat. #	Amount
RhoGAP Assay Biochem Kit™	BK105	80-160 assays
GTPγS Non-hydrolyzable GTP analog, 50 µl of 20 mM	BS01	1 x 500 µg
GTPase CytoPhos™ Assay One step assay for enzyme Kcat 0.01 to 100	BK054	1000 assays

Bulk Discounts Available
Visit www.cytoskeleton.com/bulk

RhoGEF Assay Biochem Kit™

Fluorophore-based assay measures fluorescent-GTP nucleotide exchange on small G-proteins.

- Mant-GTP included, Bodipy-GTP™ can be substituted.
- Reaction buffer included
- Cdc42, Rac1, and RhoA GTPase control proteins
- GEF domain of Dbc (Positive control for GTP or GDP exchange on RhoA and Cdc42)
- Useful with all other small G-proteins



RhoGEF assay using BK100. Cdc42 alone and Cdc42 + Dbc was incubated and fluorescence intensity (nucleotide exchange) was measured.

Product	Cat. #	Amount
RhoGEF Exchange Assay Biochem Kit™	BK100	60-300 assays

Purified G-proteins

Purified G-proteins	Purity	Cat. #	Amount
Cdc42 His Protein, constitutively-active (Q61L)	>70%	C6101-A	1 x 10 µg
Cdc42 GST Protein, dominant-negative (T17N)	>90%	C17G01-A	1 x 25 µg
Cdc42 GST Protein, wild-type	>90%	CDG01-C	8 x 25 µg
Cdc42 His Protein, wild-type	>90%	CD01-A CD01-C CD01-XL	1 x 100 µg 3 x 100 µg 1 x 1 mg
Rac1 His Protein, constitutively-active (Q61L)	>90%	R6101-A	1 x 10 µg
Rac1 GST Protein, dominant-negative (T17N)	>90%	R17G01-A	1 x 25 µg
Rac1 GST Protein, wild-type	>90%	RCG01-C	8 x 25 µg
Rac1 His Protein, wild-type	>90%	RC01-A RC01-C RC01-XL	1 x 100 µg 3 x 100 µg 1 x 1 mg
Rac2 His Protein, wild-type	>90%	RC02-A	1 x 100 µg
Rap1b His Protein, wild-type	>90%	RR02-A	1 x 100 µg
H-Ras His Protein, wild-type	>80%	RS01-A RS01-C	1 x 100 µg 3 x 100 µg
NEW K-Ras4B Protein, human rec., wild-type	>90%	CS-RS03	1 x 100 µg
NEW K-Ras4B Protein, human rec., G12V mutant	>90%	CS-RS04	1 x 100 µg
NEW K-Ras4B Protein, human rec., other mutant	>90%	various	various
NEW N-Ras Protein, human rec., wild type	>90%	CS-RS02	1 x 100 µg
NEW R-Ras Protein, human rec., wild-type	>90%	CS-RS05	1 x 100 µg
RhoA His Protein, constitutively-active (Q63L)	>90%	R6301-A	1 x 10 µg
RhoA GST Protein, wild-type	>90%	RHG01-C	8 x 25 µg
RhoA His Protein, wild-type	>80%	RH01-A RH01-C RH01-XL	1 x 100 µg 3 x 100 µg 1 x 1 mg
RhoC His Protein, wild-type	>90%	RH03-A	1 x 100 µg

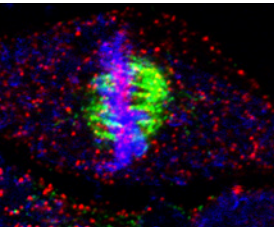


With Cytoskeleton's antibodies and reagents, you will benefit from several distinct advantages for your antibody-based reagents:

- All antibodies developed in house
- All antibodies manufactured in house
- Extensive quality control that is visible to the user
- Specialist technical help

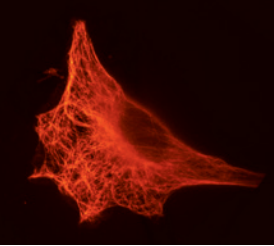
Learn More at
www.cytoskeleton.com/ptm-antibodies
Validation info, analysis, applications, and customer testimonials.

Anti-SUMO-2/3 immuno-fluorescence in mitotic cells



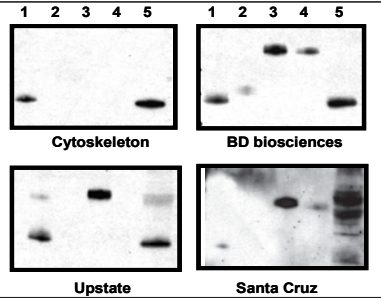
Immunofluorescence of HeLa cells in metaphase with SUMO-2/3 Antibody (Cat. # ASM23, red) and α/β-tubulin antibody (Cat. # ATN02, green). Chromosomal DNA stained with DAPI (blue).

Microtubule Visualizing Antibody (Cat. # ATN02)



Microtubule network in a NIH3T3 cell illuminated with Cytoskeleton's sheep anti-tubulin antibody (ATN02). ATN02 is a pan-tubulin sheep polyclonal antibody, hence it can be co-incubated with mouse, rat or rabbit antibodies for selective dual or triple antibody staining.

Rac1 Antibody Specificity (Cat. # ARC03)



Western blot analysis of small G-protein versus different Rac1 antibodies. Anti-Rac1 monoclonal antibody (Cat. # ARC03) does not cross-react with Rac2, 3, or Cdc42 (upper left blot), while all other commercially available Rac1 antibodies cross-react with GTPases other than Rac1. Ln 1 - Rac1-6xHis, Ln 2 - Rac2-6xHis, Ln 3 - Rac3-GST, Ln 4 - Cdc42-GST, Ln 5 - 50 µg platelet extract.

Small G-protein Antibodies

Sm G-protein Antibodies	Host	Type	Species Reactivity	Cat. #	Amount
Cdc42 Specific Antibody Human Cdc42 Peptide	Mouse	mAb	Hu, Ms, Rt, other extracts	ACD03 ACD03-S	2 x 200 µl 1 x 50 µl
Rac1 Specific Antibody Human C-terminal Peptide	Mouse	mAb	Hu, Ms, Rt, other extracts	ARC03 ARC03-S	2 x 100 µl 1 x 50 µl
RhoA Specific Antibody Human RhoA Peptide	Mouse	mAb	Hu, Ms, Rt, other extracts	ARH04 ARH04-S	2 x 100 µl 1 x 50 µl

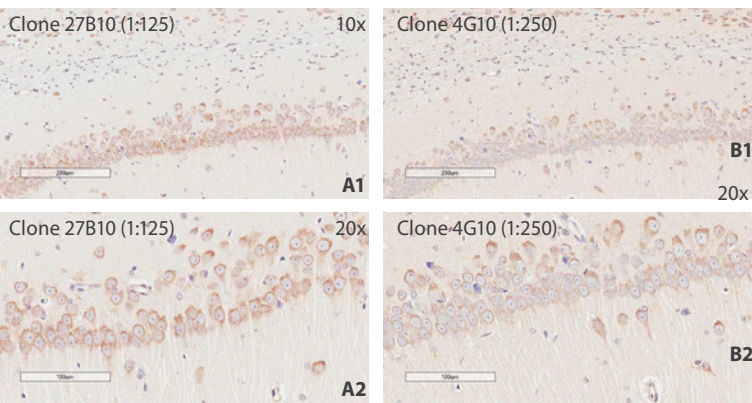
Cytoskeleton Protein Antibodies

Antibodies	Host	Type	Applications	Cat. #	Amount
Actin Antibody	Rabbit	pAb	WB, IP	AAN01-A AAN01-B	1 x 100 µg 3 x 100 µg
Tubulin Polyclonal Antibody	Sheep	pAb	WB, IF, ELISA	ATN02 ATN02-S	2 x 100 µl 1 x 25 µl
Cofilin Antibody	Rabbit	pAb	WB, IP, ICC	ACFL02-A ACFL02-B	1 x 50 µg 3 x 50 µg
Profilin Antibody	Rabbit	pAb	WB, ICC, ELISA, IP	APUF01-A	1 x 50 µg

New Pathway Signaling Antibodies

Cytoskeleton has expanded its offering of antibodies and reagents to study critical protein modifications. Reagents are available to study acetylation, tyrosyl phosphorylation, SUMOylation, and ubiquitination. The products are rigorously QC-tested and are particularly useful for enrichment studies of your protein of interest.

Immunohistochemical analysis of rat neuronal tissue:
Anti-phosphotyrosine mAb 27B10 (Cat. # APY03) vs. 4G10



Anti-phosphotyrosine staining in rat neuronal tissue with Cytoskeleton's monoclonal antibody 27B10 (Cat. # APY03: A1, A2) vs. monoclonal antibody 4G10 (B1, B2). Proteinase K antigen retrieval used. Note the stronger and more specific anti-phosphotyrosine staining with Cytoskeleton's antibody 27B10 versus 4G10 antibody.

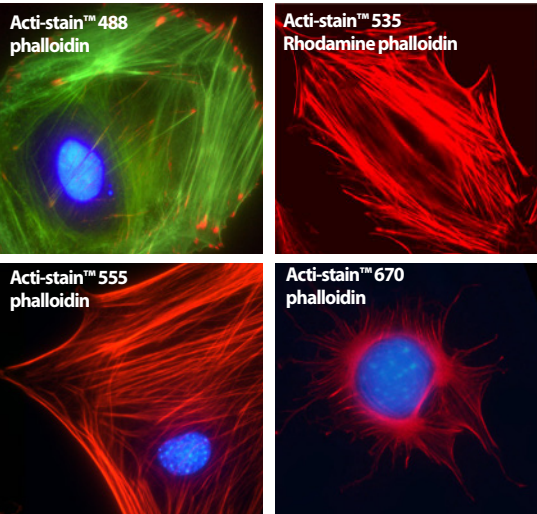
Pathway Signaling Antibodies

PTMtrue Antibody	Host	Type	Applications	Cat. #	Amount
Acetyl Lysine Antibody	Mouse	mAb	WB, IF, IP, ChIP	AAC01 AAC01-S	2 x 100 µl 1 x 25 µl
NEW Acetyl Lysine Affinity Beads	Mouse	mAB	IP	AAC04-beads	5 x 500 µl
Phosphotyrosine Antibody	Mouse	mAb	WB, IP, IF, ELISA	APY03 APY03-S	2 x 100 µl 1 x 25 µl
Anti-Phosphotyrosine Affinity Beads	Mouse	mAb	IP	APY03-Beads	4 x 300 µl
Phosphotyrosine Antibody (HRP conjugate)	Mouse	mAb	WB	APY03-HRP APY03-HRP-S	1 x 100 µl 1 x 25 µl
NEW SUMO-2/3 Antibody (Clone 12F3)	Mouse	mAb	WB, IF, IP	ASM23 ASM23-S	2 x 100 µl 1 x 25 µl
NEW SUMO-2/3 Antibody (Clone 11G2)	Mouse	mAb	IF, IP	ASM24 ASM24-S	2 x 200 µl 1 x 150 µl
NEW SUMO-2/3 Affinity Beads	Mouse	mAb	IP	ASM24-Beads	2 x 400 µl
Ubiquitin Antibody	Mouse	mAb	WB, IF	AUB01 AUB01-S AUB01-XL	2 x 100 µl 1 x 25 µl 4 x 500 µl
Ubiquitin Affinity Beads (binds mono-/poly-ubiquitin tagged proteins)	n/a	n/a	IP	UBA01-beads	2 x 120 µl
NEW Control for Ippt IgG Beads	n/a	n/a	IP	CIG01-beads	10 assays
NEW Control beads for Acetylation Ippt	n/a	n/a	IP	CIG02-beads	10 assays
NEW Control beads for SUMO1 or 2/3 Ippt	n/a	n/a	IP	CIG03-beads	10 assays
NEW Control for Ubiquitin Affinity Beads	n/a	n/a	IP	CUB02-beads	10 assays
NEW SUMO-1 Antibody (Clone 5D8B16)	Mouse	mAb	WB, IP	ASM01 ASM01-S	1 x 100 µl 1 x 25 µl

Acti-stain™ Fluorescent Phalloidins and Spirochrome™ Live Cell Probes

The Acti-stain™ line of fluorescent phalloidins has been developed with an emphasis on creating exceptionally bright and stable probes for F-actin offered at an economical price. Side-by-side comparisons with similar products insure considerable savings without sacrificing quality when switching to an Acti-stain™ probe. The combination of in-house manufacturing, stringent quality control, and convenient packaging provides a great value. Give them a try and see for yourself.

For more information, citations and comparison to other fluorescent phalloidins, visit:
cytoskeleton.com/actin/acti-stain



Swiss 3T3 cells stained with Acti-stain™ Fluorescent Phalloidins

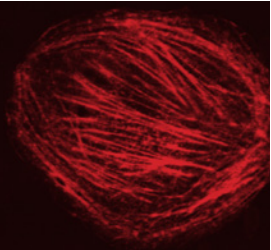
Product	Excitation	Emission	Signal stability without antifade* (T _{1/2} in secs)	Cat. #	Amount**
Acti-stain™ 488 phalloidin	480 nm	535 nm	57	PHDG1-A	300 Slides
Acti-stain™ 535 phalloidin (Rhodamine phalloidin)	535 nm	585 nm	27	PHDR1	300 Slides
Acti-stain™ 555 phalloidin	535 nm	585 nm	46	PHDH1-A	300 Slides
Acti-stain™ 670 phalloidin	640 nm	670 nm	18	PHDN1-A	300 Slides
SIR700-Actin Kit Includes SiR-Actin and Verapamil	690 nm	720 nm	na***	CY-SC013	35 nmol
SiR-Actin Kit Includes SiR700-Actin and Verapamil	630 nm	680 nm	na***	CY-SC001	50 nmol

* Stability measured with stained slides without antifade. For comparison, fluorescein phalloidin has a T_{1/2} of 6 secs.
** One slide equals enough phalloidin to stain a 25 mm² coverslip.

*** SiR was approximately ten fold more stable than Alexa647 and as stable as atto647N (Lukinavičius, et. al.; Nature Chemistry, 5, 132–139, 2013.). SiR-Actin is a trademarks of Spirochrome SA (Switzerland).

Live Cell Actin Staining Products

In living cells, actin structures can be observed by incorporating fluorescently labeled actin, by expressing GFP-actin, or by expressing a fluorescently labeled actin binding protein sub-domain. Fluorescent actin is the most accurate reporter of actin structures.



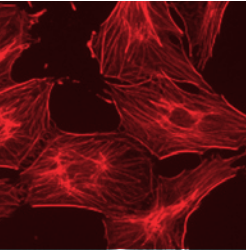
Rhodamine-labeled actin microinjected into CHO cells. The labeled actin (Cat. # APHR) rapidly incorporates into the cellular actin cytoskeleton and allows real time observation of actin dynamics.

Labeled Actins	Source	Purity	Cat. #	Amount
Rhodamine Actin Protein	Human platelet, non-muscle	>99%	APHR-A APHR-C	4 x 10 µg 20 x 10 µg
Rhodamine Actin Protein	Rabbit skeletal muscle	>99%	AR05-B AR05-C	10 x 20 µg 20 x 20 µg
Spirochrome™ SiR-Actin Kit	Chemical	>99%	CY-SC001	50 nmol
Spirochrome™ SiR700-Actin Kit	Chemical	>99%	CY-SC013	35 nmol

SiR-Actin is a trademarks of Spirochrome SA (Switzerland).

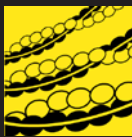
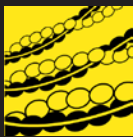
F-actin Visualization Biochem Kit™

Fix and permeabilize tissue culture cells while preserving structure of the F-actin cytoskeleton. Subsequently, the F-actin cytoskeleton is stained with fluorescent (rhodamine) phalloidin (Cat. # PHDR1) that is provided in the kit.



The F-actin cytoskeleton of Swiss 3T3 cells visualized with rhodamine phalloidin and using fixatives and cell permeabilizing reagents from the F-actin Visualization Biochem Kit™.

Product	Cat. #	Amount
F-actin Visualization Biochem Kit™	BK005	300 assays

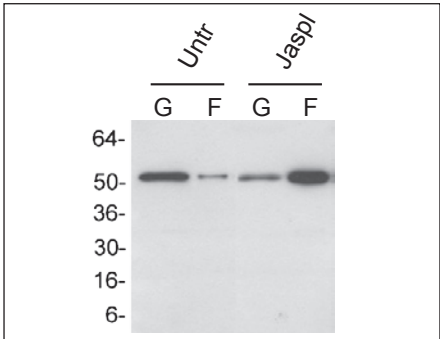


G-actin/F-actin *In Vivo* Assay Biochem Kit™

- Quantitates monomeric vs polymeric actin in cell/tissue lysates
- Reproducible and accurate method
- Contains all needed reagents

Lyse cells or tissue in the F-actin stabilizing buffer, preserving the G-actin:F-actin ratio. Centrifuge samples, separating supernatants (G-actin) and pellets (F-actin) which are then run on a gel for Western blot analysis.

Reorganization of actin after treatment with jasplakinolide



Swiss 3T3 cells were treated with jasplakinolide (JaspI) or left untreated (Untr) and the G-actin (G) and F-actin (F) content was assayed using the G-actin/F-actin kit. Treatment with jasplakinolide resulted in a potent accumulation of F-actin.

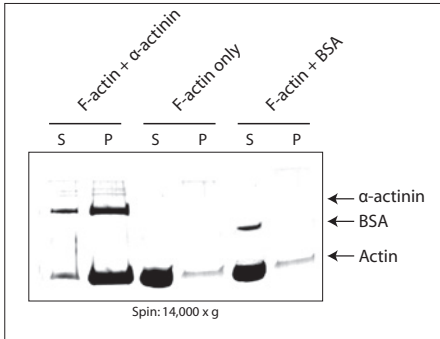
Product	Cat. #	Amount
G-actin/F-actin <i>In Vivo</i> Assay Biochem Kit™	BK037	30-100 assays
Protease Inhibitor Cocktail (100x solution)	PIC02	1 ml

Actin Binding Protein Spin-Down Assay Biochem Kit

- Identifies and characterizes Actin Binding Proteins (ABPs)
- Generation of saturation binding curves
- Muscle (BK001) or non-muscle (BK013) actin

This co-sedimentation assay will help you identify whether your ABP is a F-actin binding protein, a F-actin severing protein, has F-actin bundling activity, or is a G-actin binding protein.

Actin bundling assay using kit BK001



F-actin was incubated alone or together with α-actinin or BSA. Bundled F-actin was pelleted by a 14,000 x g centrifugation and pellets (P) and supernatants (S) were run on a SDS-PAGE gel. Only in the presence of the F-actin bundling protein α-actinin is actin pelleted at this centrifugation speed.

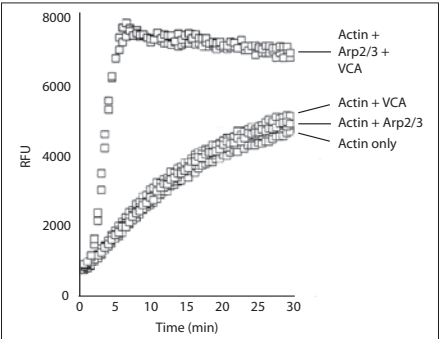
Product	Cat. #	Amount
Actin Binding Protein Spin-Down Assay Biochem Kit™ (skeletal muscle actin)	BK001	30-100 assays
Actin Binding Protein Spin-Down Assay Biochem Kit™ (non-muscle actin)	BK013	30-100 assays

Actin Polymerization Assay Biochem Kit™

- Utilizes fluorescent pyrene-actin
- F-actin polymerization and depolymerization
- Works with multiple sources of actin
- Valuable for characterizing ABPs

This kit is based upon the enhanced fluorescence of pyrene-conjugated actin that occurs during polymerization. Its versatility allows the study of the effects on polymerization (or depolymerization) of a compound, tissue extract, or protein of interest.

Characterization of ABPs using Actin Polymerization Biochem Kit™

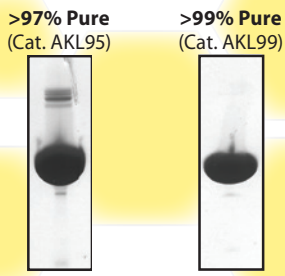


Effects of Arp2/3 (Cat. # RP01P) and the WASP VCA (Cat. # VCG03) domain on actin polymerization *in vitro*. Arp2/3 or the WASP VCA domain alone has little effect on the rate of actin polymerization, while the combination of the two leads to an activation of the actin nucleating Arp2/3 complex and a subsequent increased rate of actin polymerization.

Product	Cat. #	Amount
Actin Polymerization Assay Biochem Kit™	BK003	30-100 assays

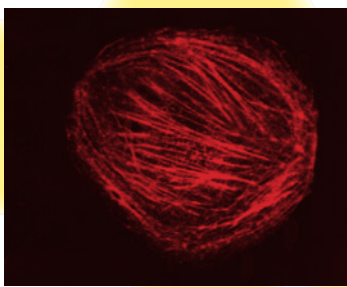
High Purity

The highest purity actin available. Purities greater than 99% from most sources. Cited hundreds of times in the literature.



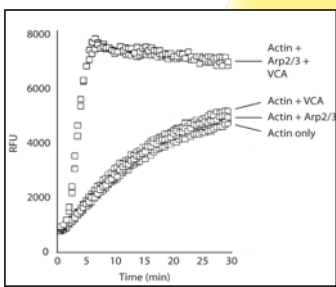
Labeled Actins

Highly pure, biologically active actins labeled with Rhodamine, Pyrene, or Biotin.



Biologically Active

Actin polymerization stimulated by Arp2/3 complex and the VCA domain of WASP measured by Pyrene Actin fluorescence (Cat. # AP05).



Unlabeled Actin Proteins

Unlabeled Actins	Source	Purity	Cat. #	Amount
Actin Protein	Rabbit skeletal muscle	>99%	AKL99-A AKL99-B AKL99-C AKL99-D AKL99-E	4 x 250 µg 2 x 1 mg 5 x 1 mg 10 x 1 mg 20 x 1 mg
Actin Protein	Rabbit skeletal muscle	>97%	AKL95-B AKL95-C	1 x 1 mg 5 x 1 mg
Actin Protein	Bovine cardiac muscle	>99%	AD99-A AD99-B	1 x 1 mg 5 x 1 mg
Actin Protein	Smooth muscle, chicken gizzard	>99%	AS99-A AS99-B	1 x 1 mg 5 x 1 mg
Actin Protein	Human platelet, non-muscle	>99%	APHL99-A APHL99-C APHL99-E	2 x 250 µg 1 x 1 mg 5 x 1 mg
Pre-formed Actin Filaments	Rabbit skeletal muscle	>99%	AKF99-A AKF99-B	1 x 1 mg 5 x 1 mg
NEW Actin Thin Filament (Ca2+ sensitive complex)	Bovine cardiac muscle	90%	TFC01	1 x 1 mg
NEW Actin Thin Filament (Ca2+ sensitive complex)	Rabbit skeletal muscle	90%	CS-TFC02	1 x 1 mg
Ebashi Complex (complex of troyosin/tropomodulin)	Bovine cardiac muscle	70%	CS-TT05	1 x 1 mg

Labeled Actin Proteins

Labeled Actins	Source	Purity	Cat. #	Amount
Biotinylated Actin Protein	Rabbit skeletal muscle	>99%	AB07-A AB07-C	5 x 20 µg 20 x 20 µg
Pyrene Actin Protein	Rabbit skeletal muscle	>99%	AP05-A AP05-B	1 x 1 mg 5 x 1 mg
Rhodamine Actin Protein	Human platelet, non-muscle	>99%	APHR-A APHR-C	4 x 10 µg 20 x 10 µg
Rhodamine Actin Protein	Rabbit skeletal muscle	>99%	AR05-B AR05-C	10 x 20 µg 20 x 20 µg

Actin Antibodies

Antibodies	Antigen	Host	Grade	Cat. #	Amount
Actin Antibody	C-terminal of actin	Rabbit	Affinity Purified	AAN01-A AAN01-B	1 x 100 µg 3 x 100 µg
Cofilin Antibody	N-terminal of human cofilin1	Rabbit	Affinity Purified	ACFL02-A ACFL02-B	1 x 50 µg 3 x 50 µg
Profilin Antibody	Purified human profilin	Rabbit	Affinity Purified	APUF01-A	1 x 50 µg

Actin Binding Proteins

Actin Binding Proteins	Source	Purity	Cat. #	Amount
α-Actinin Protein	Rabbit skeletal muscle	>90%	AT01-A AT01-C	2 x 50 µg 10 x 50 µg
Arp2/3 Protein Complex	Porcine brain	>90%	RP01P-A RP01P-B	2 x 50 µg 6 x 50 µg
Cofilin Protein	Recombinant human cofilin 1	95%	CF01-A CF01-C	1 x 100 µg 4 x 100 µg
Gelsolin Protein	Recombinant human, plasma isoform	>95%	HPG6-A HPG6-B	4 x 20 µg 20 x 20 µg
Myosin II Cardiac Protein	Bovine cardiac muscle	95%	MY03-A MY03-B	5 x 1 mg 20 x 1 mg
S1 Myosin Protein	Rabbit skeletal muscle Chymotrypsin digest of Cat. # MY02 plus chromat	>90%	CS-MYS04	1 x 250 µg
S1 Myosin Protein	Bovine cardiac muscle Chymotrypsin digest of Cat. # MY03 plus chromat	>90%	CS-MYS03	1 x 250 µg
Heavy Meromyosin Protein	Bovine cardiac muscle Chymotrypsin digest of Cat. # MY03 plus FPLC	90%	CS-MH03	1 x 100 µg
Myosin II Protein	Rabbit skeletal muscle	95%	MY02-A MY02-B	5 x 1 mg 20 x 1 mg
Heavy Meromyosin Protein	Rabbit skeletal muscle Chymotrypsin digest of Cat. # MY02	90%	MH01-A	4 x 50 µg
Profilin Protein	Recombinant human profilin 1	>95%	PR02-A PR02-B PR02-XL2	1 x 100 µg 1 x 500 µg 1 x 1 mg
WASP protein VCA Domain: Activates Arp2/3, GST tag.	Recombinant human	>95%	VCG03-A	1 x 500 µg

Labeled ECM Proteins

Labeled ECMs	Source	Purity	Cat. #	Amount
Fibronectin	Red fluorescent, rhodamine	>80%	FNR01-A FNR01-B	5 x 20 µg 20 x 20 µg
Fibronectin	Green fluorescent, HiLyte Fluor™ 488	>80%	FNR02-A FNR02-B	5 x 20 µg 20 x 20 µg
Fibronectin	Biotinylated	>80%	FNR03-A FNR03-B	5 x 20 µg 20 x 20 µg
Laminin	Red fluorescent, rhodamine	>90%	LMN01-A LMN01-B	5 x 20 µg 20 x 20 µg
Laminin	Green fluorescent, HiLyte Fluor™ 488	>90%	LMN02-A LMN02-B	5 x 20 µg 20 x 20 µg
Laminin	Biotinylated	>90%	LMN03-A LMN03-B	5 x 20 µg 20 x 20 µg

HiLyte Fluor is a trademark of Anaspec, Inc. (CA).

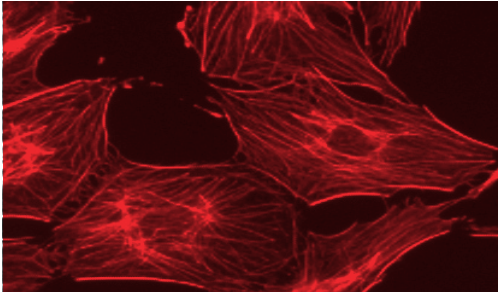
Actin Buffers

Actin Buffers	Cat. #	Amount
General Actin Buffer (10 ml or 100 ml when resuspended) For resuspending & diluting G-actin protein	BSA01-001 BSA01-010	1 x 10 ml 1 x 100 ml
Actin Polymerization Buffer (10X stock when resuspended) For the polymerization of actin	BSA02-001	1 x 2 ml
ATP (100 mM stock solution when resuspended) ATP is required for actin stability and polymerization	BSA04-001	1 x 1 ml

F-actin Visualization Biochem Kit™

Fix and permeabilize tissue culture cells while preserving structure of the F-actin cytoskeleton. Subsequently, the F-actin cytoskeleton is stained with fluorescent (rhodamine) phalloidin (Cat. # PHDR1) that is also provided in the kit.

Product	Cat. #	Amount
F-actin Visualization Biochem Kit™	BK005	300 assays

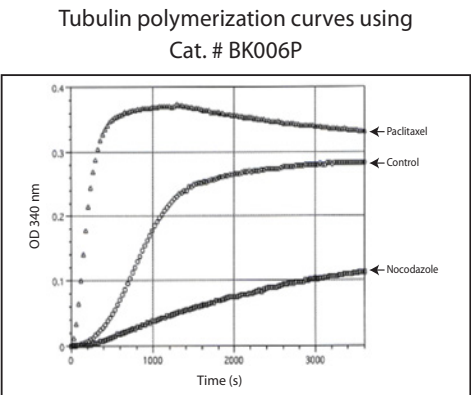


The F-actin cytoskeleton of Swiss 3T3 cells visualized with rhodamine phalloidin and using fixatives and cell permeabilizing reagents from the F-actin Visualization Biochem Kit™.



Tubulin Polymerization Assays

Tubulin polymerization assays are available in two formats: 1) the light scatter (also called absorbance or turbidometric) and 2) the fluorescence format based on the DAPI fluorophore. Both methods are sensitive to inhibitors and enhancers of polymerization. BK004P is an absorbance-based format used for hit or no hit screening results, whereas BK006P is for IC50 determinations which need more accuracy. BK011P, the fluorescent-based format, is used for screening and IC50s and is the most economical per assay.



Product	Cat. #	Amount
Tubulin Polymerization Assay Biochem Kit™ Turbidometric-based, >99% pure tubulin	BK006P	24-30 assays
Tubulin Polymerization Assay Biochem Kit™ Turbidometric-based, >97% pure tubulin	BK004P	24-30 assays
Tubulin Polymerization Assay Biochem Kit™ Fluorescence-based, >99% pure tubulin	BK011P	96 assays

More Tubulin Biochem Kits™ & Antibodies

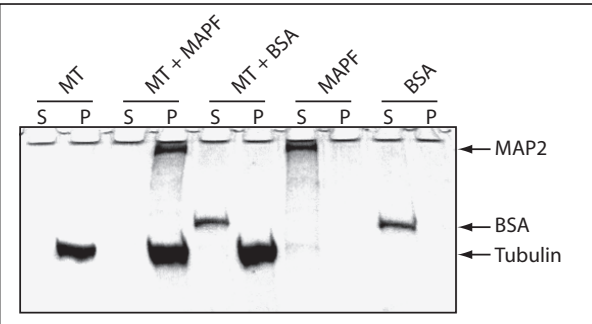
The Microtubule/Tubulin *In Vivo* Assay Kit measures the ratio of microtubules to tubulin in cell and tissue extracts. Samples are homogenized in lysis buffer, centrifuged, and then supernatant (tubulin) and pellet (microtubules) samples are run on a SDS-PAGE gel, blotted onto a membrane, and probed with anti-tubulin antibody. The tubulin antibody is ideal for dual and triple staining because the host animal is sheep, thus creating additional bandwidth for immunostaining.

Tubulin Biochem Kits™	Cat. #	Amount
Microtubule / Tubulin <i>In Vivo</i> Assay Biochem Kit™ Quantitates <i>in vivo</i> ratio of tubulin polymers & monomers	BK038	30-100 assays
Tubulin polyclonal antibody (host: sheep) Detects all species and isoforms of tubulin	ATN02 ATN02-S	2 x 100 µl 1 x 25 µl

Tubulin Binding Assays

The Microtubule Binding Assay provides a robust method to identify and quantify how your test substance interacts with microtubules (see below). Biotinylated tubulin (Cat. # T333P) for use in subunit (heterodimer) binding assays is also available. See the SPA-based ligand competition assay described by Tahir et al. 2000 (Biotechniques, v29, pp156-160.).

Microtubule Binding Assay (Cat. # BK029) used to detect MAP binding to microtubules



Product	Cat. #	Amount
Tubulin (biotin labeled)	T333P-A T333P-B T333P-XL	5 x 20 µg 20 x 20 µg 1 x 500 µg
Microtubule Binding Protein Spin-Down Assay Biochem Kit™	BK029	30-100 assays

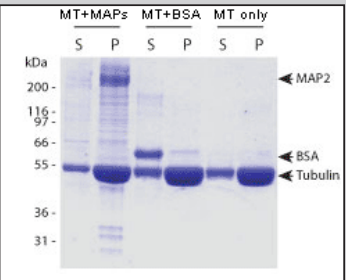
Specialized Tubulins For Pathogen Targeting

These specialized tubulins help exploit the diversity between host and pathogen tubulin isotypes. In combination with these proteins, micro-assays provide the most economical method of measuring drug interaction.

Products	Cat. #	Amount
Caki-1 Tumor Tubulin Protein	CS-TM001	1 x 250 µg
HeLa Cancer Cell Tubulin Protein (90% βI, 10% βIV isotypes)	CS-H001-B	1 x 250 µg
HeLa Cancer Cell Tubulin Protein (biotinylated) (90% βI, 10% βIV isotypes)	H003	1 x 40 µg
MCF-7 Cell Tubulin Protein (55% βI, 6% βIII, 39% βIV isotypes)	CS-H005	1 x 250 µg

Pre-formed Microtubules

- Substrate for discovery and characterization of microtubule binding proteins
- Determine IC50s for kinesin inhibitors
- Substrate for kinesin ATPases
- Ideal for HTS applications



MT binding spin-down assay using MT002. >80% of MT002 (arrow: Tubulin) is in pellet (P) after spin-down. MAPs bind to MTs and end up in pellet while BSA does not and stays in supernatant (S).

Unlabeled Tubulin Proteins

Unlabeled Proteins	Source	Purity	Cat. #	Amount
Tubulin Protein Lyophilized (no glycerol)	Porcine Brain	>99%	T240-A T240-B T240-C T240-DX	1 x 1 mg 5 x 1 mg 20 x 1 mg 1 x 10 mg
Tubulin Protein, MAP rich Lyophilized (no glycerol)	Porcine Brain	70% tubulin 30% MAPs	ML116-A ML116-B ML116-DX	1 x 1 mg 5 x 1 mg 1 x 10 mg
Tubulin for HTS Applications	Porcine Brain	97%	HTS03-A HTS03-B	1 x 4 mg 1 x 40 mg
Tubulin Protein Frozen (no glycerol)	Porcine Brain	>99%	T238P-A T238P-B T238P-C	1 x 1 mg 5 x 1 mg 20 x 1 mg
Microtubules pre-formed, lyophilized	Porcine brain	>99%	MT002-A MT002-XL	4 x 500 µg 1 x 10 mg
Caki-1 Tumor Tubulin Protein	Caki-1 Tumor Tissue	>90%	CS-TM001	1 x 250 µg
Cancer Cell Tubulin Protein	HeLa cells	>90%	CS-H001-B	1 x 250 µg
Cancer Cell Tubulin Protein	MCF-7 cells	>90%	CS-H005	1 x 250 µg

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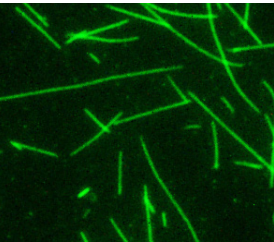
FtsZ Proteins

FtsZ Proteins	Source	Purity	Cat. #	Amount
FtsZ Protein	<i>S. aureus</i> , recombinant, 6xHis-tagged	>90%	FTZ02-A FTZ02-B	1 x 1 mg 5 x 1 mg
FtsZ Protein	<i>S. pneumoniae</i> , recombinant, 6xHis-tagged	>90%	FTZ03-A FTZ03-B	1 x 1 mg 5 x 1 mg
FtsZ Protein	<i>E. faecalis</i> , recombinant, 6xHis-tagged	>90%	FTZ04-A FTZ04-B	1 x 1 mg 5 x 1 mg
FtsZ Protein	<i>E. coli</i> , recombinant, 6xHis-tagged	>90%	FTZ05-A FTZ05-B	1 x 1 mg 5 x 1 mg

Tubulin Buffers, Reagents, & MAPs

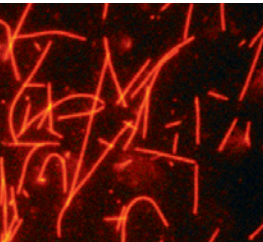
Tubulin Buffers, Reagents, & MAPs	Cat. #	Amount
General Tubulin Buffer 10 ml or 100 ml when resuspended	BST01-001 BST01-010	1 x 10 ml 1 x 100 ml
GTP (100 mM stock when resuspended)	BST06-001 BST06-010	1 x 100 µl 10 x 100 µl
Tubulin Glycerol Buffer Enhances tubulin polymerization	BST05-001	1 x 10 ml
Microtubule-Associated Protein (MAP) Fraction Bovine brain MAP fraction, 70% MAP2	MAPF-A MAPF-C	1 x 100 µg 5 x 100 µg
Paclitaxel (2 mM stock when resuspended) Stabilizes microtubules	TXD01	10 x 100 µl
Tau Protein Bovine brain	TA01-A TA01-B	1 x 50 µg 3 x 50 µg

Labeled Tubulin Proteins



HiLyte Fluor™ 488 Labeled Tubulin - Cat. # TL488M

HiLyte Fluor is a trademark of Anaspec, Inc. (CA).



TRITC Rhodamine Labeled Tubulin - Cat. # TL590M

Labeled Tubulin Proteins	Ex / Em wavelength	T _{1/2} of fluorescenc (s)	Source	Purity	Cat. #	Amount
AMCA Labeled Tubulin	350 +/-20 nm 440 +/-20 nm	10	Porcine Brain	>99%	TL440M-A TL440M-B	5 x 20 µg 20 x 20 µg
HiLyte Fluor™ 488 Labeled Tubulin	460 +/-20 nm 520 +/-20 nm	300	Porcine Brain	>99%	TL488M-A TL488M-B	5 x 20 µg 20 x 20 µg
TRITC Rhodamine Labeled Tubulin	535 +/-20 nm 590 +/-20 nm	50	Porcine Brain	>99%	TL590M-A TL590M-B	5 x 20 µg 20 x 20 µg
X-Rhodamine Labeled Tubulin	560 +/- 20 nm 620 +/- 20 nm	70	Bovine Brain	>99%	TL620M-A TL620M-B	5 x 20 µg 20 x 20 µg
HiLyte Fluor™ 647 Labeled Tubulin	620 +/-20 nm 670 +/-20 nm	80	Porcine Brain	>99%	TL670M-A TL670M-B	5 x 20 µg 20 x 20 µg
Biotin Tubulin	na	na	Porcine Brain	>99%	T333P-A T333P-B T333P-XL	5 x 20 µg 20 x 20 µg 1 x 500 µg
Biotin Cancer Tubulin	na	na	HeLa cells	>90%	H003	1 x 40 µg



GOBlot: Western Blot Processor

Save Time and Money with the GOBlot™

- Save up to 3 hours per day
- Choice of six colors
- Fully automated
- Recycle primary antibody
- Choice of four routines
- No obligation trial period



Recycle the Primary Antibody



Legend: A single anti-RhoA monoclonal antibody solution was used to probe four replicate membranes. Note how the 3rd re-cycle test has a reduced band intensity indicating the antibody is being depleted by the repeated process.

Product	Cat. #
GOBlot Western Blot Processor (1 Machine)	WBM01
GOBlot Western Blot Processor (4 Machine Bundle)	WBM01

www.cytoskeleton.com/goblot

Protein Assay Reagents

Since 1997, Cytoskeleton has been providing two standard protein assays that enable rapid, accurate, and detergent-compatible measurement of proteins in solution. Every batch is rigorously monitored and quality controlled for excellent batch to batch

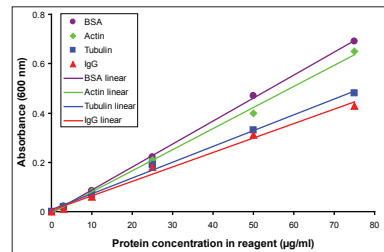
matching. The Advanced Protein Assay measures many different proteins with the same signal generation, and has very low detection capability (i.e., 1 µg/ml), whereas Precision Red is useful for measuring protein in cell extracts presented in detergent buffers.

Used for measuring protein in:

- Cell Extracts in Detergent Buffers
- Purified Proteins and Antibodies
- High Protein Concentration Solutions
- Low Protein Concentration (ADV01 only)
- Serum Samples

Detergent Compatibility

- Triton X-100
- NP40 or Igepal
- Tween 20
- SDS (ADV02 only)
- Color signal develops in 1 min
- OD is read at 600 nm with both reagents



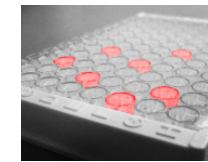
Legend: ADV02 was used to measure four solutions of purified proteins, optical density was read at 600 nm. For both assays the color signal is developed in 1 min.

Description	Cat. #	Amount
Advanced Protein Assay™ (5X stock reagent) Quantitates protein in the 0.025 - 1.0 mg/ml range	ADV01-A ADV01-B	1 x 500 ml 3 x 500 ml
Precision Red™ Advanced Protein Assay (1X stock reagent) Quantitates protein in the 0.25-50 mg/ml range	ADV02-A ADV02-B	1 x 500 ml 3 x 500 ml

www.cytoskeleton.com/kits/protein-assays

About Custom Services

Like our product offerings, the Custom Services department emphasizes quality products and services. We also understand **accuracy** and **timeliness** are critical elements for a successful project. The process starts with an experienced scientist asking for **specifications and success factors** for your project. Within 24 hours, the quotation will arrive and work can

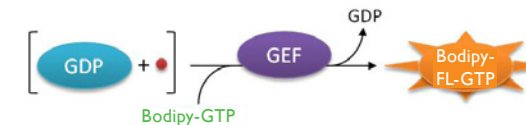


Compound or Gene Screening

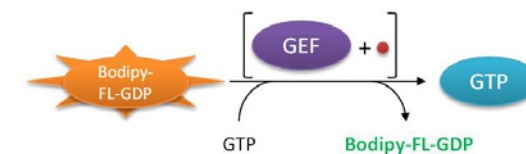
- Identify target and assay
e.g. tissue culture or in vitro protein assay, fluorescence or optical density, domain or full length protein.
- Schedule and initiate project
- Report weekly progress
- Deliver certified report
e.g. analysis and dose response data.

Examples of GTPase Exchange Factor assays

1. In vitro GTP association



2. In vitro GDP dissociation



3. Tissue culture

- Choose GEF or GAP DNA
- Transfect
- Culture +/- compound
- Extract protein
- Measure GTPase activity of specific small G-protein.

Other examples: Kinesin, Dynein and Myosin assays

1. In vitro ATPase; myosin plus thin filament complex.

Use myosins from heart tissue to identify compounds that alter calcium induced ATPase of myosin on thin filaments.

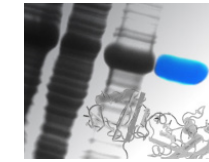
2. In vitro ATPase; kinesin plus microtubules.

Use purified kinesins that are important in tumor cells to identify compounds that inhibit cancer cell movement or division.

3. In vitro ATPase; dynein plus microtubules.

Use dynein isolated from neuronal tissue to identify compounds that increase dynein activity as a way to improve the outcome of dementia diseases.

start at the next available schedule date. Regular updates are provided until project completion. Once complete, we continue support through timely citation-based advice and practical experience. Choose from over forty defined modules (full list is available online).



Protein Purification with Validated Purity and Activity Testing



Many satisfied customers, including:

Novartis, Merck, Biokines, Amgen, Inova Diagnostics, Bayer Cropsciences, Alcon, Frost Biologic, Cullinan Pharmaceuticals, DE Shaw Institute, Sigma-Clermont Institute, Imperial Cancer Research Institute, and many more!

Example purified proteins:

Ras Small-G Proteins	Motor Proteins
K-Ras4B Protein, hu. rec., wild-type (Cat. # RS03)	MKLP2 kinesin like protein (Cat. # CS-KF51)
K-Ras4B Protein, hu. rec., G12V mutant (Cat. # RS04)	Dynein neuronal tissue (Cat. CS-DN01)
K-Ras4B Protein, hu. rec., G13D mutant (Cat. # RS06)	S1 myosin, cardiac tissue (Cat. # CS-MYS03)
K-Ras4B Protein, hu. rec., G13S mutant (Cat. # RS07)	S1 myosin, smooth muscle (Cat. # CS-MYS05)
K-Ras4B Protein, hu. rec., G12D mutant (Cat. # RS13)	S1 myosin, skeletal muscle (Cat. # CS-MYS04)
K-Ras4B Protein, hu. rec., Q61P mutant (Cat. # RS09)	Thin filament complex cardiac (Cat. # TFC01)
K-Ras4B Protein, hu. rec., K128A mutant (Cat. # RS08)	Thin filament complex skeletal (Cat. # TFC02)
K-Ras4B Protein, hu. rec., R135A mutant (Cat. # RS10)	Heavy meromyosin cardiac tissue (Cat. # MH03)
K-Ras4B Protein, hu. rec., G12D+H36N mutant (Cat. # RS11)	GEF Proteins
K-Ras4B Protein, hu. rec., G12D+D38A mutant (Cat. # RS12)	RasGRF Guanine Exchange Factor (Cat. # CS-GE03)
R-Ras Protein, hu. rec., wild type (Cat. # RS05)	SOS1 Exchange Factor (Cat. # CS-GE02)
K-Ras4B Protein, hu. rec., other mutants (inquire)	Tiam1 (Rac GTP) Exchange Factor (Cat. # CS-GE04)
N-Ras Protein, hu. rec., wild-type (Cat. # RS02)	Vav1 (Rac GTP) Exchange Factor (Cat. CS-GE05)
H-Ras Protein, hu. rec., wild-type (Cat. # RS01)	Vav2 (Rac GTP) Exchange Factor (Cat. # CS-GE06)

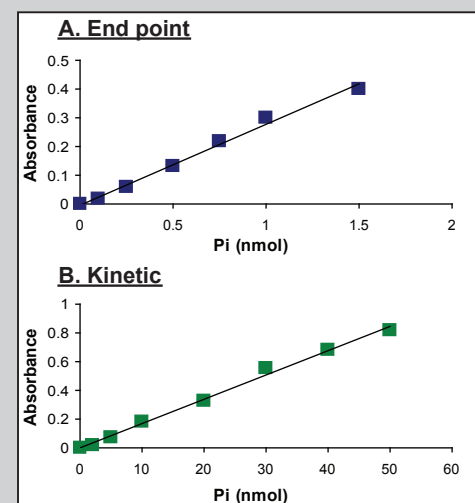
For more information about Protein Purification Services please visit www.cytoskeleton.com/custom-services or email service@cytoskeleton.com

ATPase, GTPase, & Phosphatase Biochem Kits™

ATPases, GTPases, and other phosphatases liberate inorganic phosphate (Pi) from their respective triphosphate nucleotide or substrate. BK051-BK054 are suitable for HTS applications. BK051-BK054 and BK060 measure free phosphate via binding to a reporter dye or by enzymatic conversion into a reporter molecule. BK053 and BK054

are end-point assays suitable for measuring microtubule-induced kinesin ATPase or F-actin-induced myosin ATPase activity. BK051, BK052 and BK060 are kinetic assays, thus suitable for Vmax or Kcat determinations. These kits require a higher level activity ATPase or GTPase for sufficient sensitivity. BK060 is specialized for kinesins.

Phosphate Quantitation Biochem Kits™	Cat. #	Amount
ATPase ELIPA™ (enzyme-linked, colorimetric) Kinetic quantitation of ATP hydrolysis (Kcat 0.05 to >1.0)	BK051/052	96 assays
CytoPhos™ Phosphate Assay (endpoint assay) Colorimetric assay for ATPases & GTPases (Kcat 0.01 to >1.0)	BK054	1000 assays
GTPase ELIPA™ (enzyme-linked, colorimetric) Kinetic quantitation of GTP hydrolysis (Kcat 0.05 to >1.0)	BK051/052	96 assays
Kinesin ELIPA™ Biochem Kit For real time kinetic and Vmax kinesin ATPase measurements	BK060	96 assays
Kinesin ATPase Endpoint Assay For endpoint measurement of kinesin ATPase activity	BK053	1000 assays
Purine Nucleoside Phosphorylase protein Catalyzes the transfer of phosphate to MSEG reporter	ELP03	96 assays

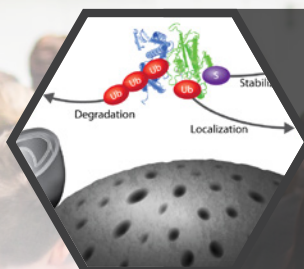


Comparison of standard curves of Cytoskeleton's endpoint (BK053 and BK054) and kinetic (BK051/52 and BK060) phosphate assays. Endpoint assays have a linear response between 0.1 and 1.5 nmol Pi. Kinetic assays give a linear response between 2 and 50 nmol Pi.

Ordering information for USA:

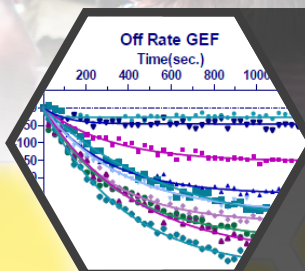
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Phone - 303.322.2254
Fax - 303.322.2257
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1830 S. Acoma St.,
Denver, CO 80223, USA.

International Customers
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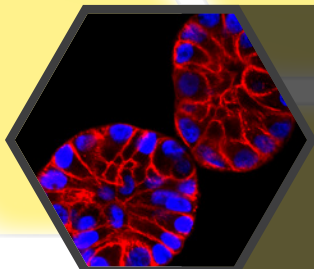
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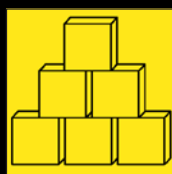
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