Biotinylated nucleotides

Biotin is a versatile label, allowing color choice and high sensitivity through the use of various signal amplification system. Biotinylated nucleotides can be incorporated into nucleic materials by Polymerase Chain Reaction (PCR). dUTP serves for DNA amplifications. UTP serves for RNA amplifications. The resulting biotin-containing DNA or RNA can be subsequently labeled with a fluorescent labeled (strept)avidins or detected with anti-biotin antibodies.
Biotin-dUTP can be enzymatically incorporated into DNA via nick translation, random priming, or 3'-end terminal labeling.

Label-nucleotide spacers
The number "11" is the number of atoms in the linker between biotin and dUTP. The linker length affects the incorporation efficiency of the biotin-dUTP probe into DNA using DNA polymerases, and it also affects biotin/avidin or biotin/streptavidin interaction. In general, the shorter the linker, the more efficiently the biotin-dUTP is incorporated into DNA by DNA polymerases. On the other hand, the longer the linker, the better biotin can interact with avidin or streptavidin.

Biotin-11-dUTP
(Biotin-11-2'-deoxyuridine-5'-triphosphate, tetralithium salt)
1 mM in pH 7.5 Tris-HCl buffer
MW : 886.4

Description	Cat.#	Qty
Biotin-11-dUTP	**FP-AM539A**	50 µl
Biotin-11-dUTP Lyophilized powder	**FP-AY489A**	50 µg

Biotin-16-dUTP
(Biotin-16-2'-deoxyuridine-5'-triphosphate, tetralithium salt)
1 mM in pH 7.5 Tris-HCl buffer
MW : 971.5

Description	Cat.#	Qty
Biotin-16-dUTP	**FP-AM541A**	50 µl
Biotin-16-dUTP, Lyophilized powder	**FP-AM542A**	50 µg

Biotin-20-dUTP
(Biotin-20-2'-deoxyuridine-5'-triphosphate, tetralithium salt)
MW : 1020.54

Description	Cat.#	Qty
Biotin-20-dUTP	**FP-AM543A**	50 µg

Biotin-11-UTP
(Biotin-11-uridine-5'-triphosphate, tetralithium salt)
1 mM in pH 7.5 Tris-HCl buffer
MW : 902.5

Description	Cat.#	Qty
Biotin-11-UTP	**FP-AM550A**	50 µl

Biotin-16-UTP
(Biotin-16-uridine-5'-triphosphate, tetralithium salt)
1 mM in pH 7.5 Tris-HCl buffer
MW : 987.52

Description	Cat.#	Qty
Biotin-16-UTP	**FP-AM551A**	50 µl

Biotin-EDA-ATP
2'/3'-O-(2-(Biotinyl-butyl-carbamoyl-)ethyl-carbamoyl)-Adenosine-5'-triphosphate, Na salt
MW : 815.53 (Anion)

Description	Cat.#	Qty
Biotin-EDA-ATP	**FQ5630**	20 u
	FQ5331	10 u

Biotin-EDA-AppNHp (Biotin-EDA-AMPPNP)
2'/3'-O-(2-(Biotinyl-butyl-carbamoyl-)ethyl-carbamoyl)-Adenosine-5'-[(β,γ)-imido]triphosphate, Na salt
MW : 814.55 (Anion)

Description	Cat.#	Qty
Biotin-EDA-AppNHp (Biotin-EDA-AMPPNP)	**FQ2831**	10 u
	FQ2830	50 u

Related Products :
Aminated nucleotides page D.137

Amine labeled nucleotides

Amine labeled nucleotides are used to link nucleotides to amine-reactive probes or to stationary phases for affinity chromatography.

N^6-(4-Amino)butyl-ATP

N^6-(4-Amino)butyl-adenosine-5'-triphosphate, Sodium salt
MW : 575.28 (Anion)

Description	Cat.#	Qty
N^6-(4-Amino)butyl-ATP	**FQ2960**	50 u
	FQ2961	250 u

N^6-(6-Amino)hexyl-ATP

N^6-(6-Amino)hexyl-adenosine-5'-triphosphate, Sodium salt
MW : 603.33 (Anion)

Description	Cat.#	Qty
N^6-(6-Amino)hexyl-ATP	**FQ2970**	50 u
	FQ2971	250 u

Ito, *et al.*, "Modified nucleic acid for systematic evolution of RNA ligands by exponential enrichment.", *J. Bioact. Compat.Pol.*, 13 (2), 114 (1998)
Trayer, " Affinity chromatography of some adenosine phosphate-requiring systems", *Biochem. Soc. T.*, 2 (6), 1302 (1974)

8-[(4-Amino)butyl]-amino-ATP

8-[(4-Amino)butyl]-amino-adenosine-5'-triphosphate, Sodium salt
MW : 590.32 (Anion)

Description	Cat.#	Qty
8-[(4-Amino)butyl]-amino-ATP	**FQ2630**	50 u
	FQ2631	250 u

8-[(6-Amino)hexyl]-amino-ATP

8-[(6-Amino)hexyl]-amino-adenosine-5'-triphosphate, Sodium salt
MW : 618.35 (Anion)

Description	Cat.#	Qty
8-[(6-Amino)hexyl]-amino-ATP	**FQ2640**	50 u
	FQ2641	250 u

EDA-ADP

2'/3'-O-(2-Aminoethyl-carbamoyl)-Adenosine-5'-diphosphate, Sodium salt
MW: 511.28 (Anion)

Description	Cat.#	Qty
EDA-ADP	**FQ4800**	30 u
	FQ4801	150 u

Oiwa, *et al.*, "Comparative Single-Molecule and Ensemble Myosin Enzymology: Sulfoindocyanine ATP and ADP Derivatives.», *Biophys. J.* 78:3048 (2000)
Jameson, *et al.*, "Fluorescent analogs: Synthesis and Applications.", *Methods in Enzymology*, 278, 363 (1997)

EDA-ATP

2'/3'-O-(2-Aminoethyl-carbamoyl)-Adenosine-5'-triphosphate, Sodium salt
MW : 590.25 (Anion)

Description	Cat.#	Qty
EDA-ATP	**FQ4850**	30 u
	FQ4851	150 u

Oiwa, *et al.*, "Comparative Single-Molecule and Ensemble Myosin Enzymology: Sulfoindocyanine ATP and ADP Derivatives.", *Biophys. J.* 78:3048 (2000)
Jameson, *et al.*, "Fluorescent analogs: Synthesis and Applications.", *Methods in Enzymology*, 278, 363 (1997)

γ-Aminophenyl-ATP

Adenosine-5'-[γ-(4-aminophenyl)]triphosphate, Sodium salt
MW : 595.27 (Anion)

Description	Cat.#	Qty
γ-Aminophenyl-ATP	**FQ5120**	3 mg
	FQ5121	15 mg

Haystead, *et al.*, "Gamma-phosphate-linked ATP-Sepharose for the affinity purification of protein-kinases -rapid purification to homogeneity of skeletal-muscle mitogen-activated protein-kinase kinase.", *Eur. J. Biochem.*,214 (2), 459 (1993)
Trayer, *et al.*, "Preparation of adenosine nucleotide derivatives suitable for affinity chromatography.", *Biochem. J.* 139 (3):609 (1974)

5-Propargylamino-Dctp

5-Propargylamino-2'-deoxy-cytidine-5'-triphosphate, Sodium salt
MW : 517.19 (Anion)

Description	Cat.#	Qty
5-Propargylamino-Dctp	**FQ4580**	30 u
	FQ4581	150 u

Hobbs, "Palladium-catalyzed synthesis of alkynylamino nucleosides - a universal linker for nucleic-acids.", *J. Org.Chem.*, 54 (14), 3420 (1989)

Related products :

Description	Cat.#	Qty
EDA-AppNHp (EDA-AMPPNP)	**FQ5690**	20 u

Aminoallyl nucleotides

Aminoallyl-nucleotides can be enzymatically incorporated into nucleic materials, by Polymerase Chain Reaction (PCR). dUTP serves for DNA amplifications. The resulting amine-containing DNA or RNA can be subsequently labeled with a fluorescent dye, biotin or other haptens via conventional peptide coupling methods. This two-step method for labeling nucleic acids is considerably more economical than the one-step method using a prelabeled nucleotide.

5-Aminoallyl-DUTP

Sodium salt
(5-(3-aminoallyl)-2'-deoxyuridine-5'- triphosphate, trisodium salt, AA-dUTP)
MW : 589.17

Description	Cat.#	Qty
5-Aminoallyl-dUTP	**FP-AK218A**	100 µl (10 mM in TE buffer)
	FP-AY490A	1 mg (Powder)

5-Aminoallyl-UTP

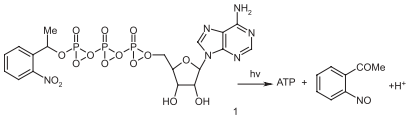
Sodium salt
(5-(3-aminoallyl)uridine-5'-triphosphate, trisodium salt, AA-UTP)
MW : 605.17

Description	Cat.#	Qty
5-Aminoallyl-UTP	**FP-AM555A**	100 µl (10 mM in TE buffer)
	FP-AM558A	1 mg (Powder)

Proc Natl Acad Sci U S A 90, 4206(1993)
J. Clin Microbiol 29, 583(1991)

Mant-labeled oligonucleotides

Mant fluorophore (N-Methyl-anthraniloyl) is compact so, when attached on ribose ring it causes minimal perturbation of nucleotide-protein interactions. It is however sensitive to environment, notably to conformational changes of nucleotide-binding proteins. Mant-labeled nucleotides offer valuable tools to investigate the stucture, protein-ligand interactions, and enzymatic activity of nucleotide-binding proteins (as myosin with ATP, P21 with GTP).



NPE-caged-ATP releases ATP generally on a millisecond time scale upon flash photolysis with near-UV light.

Literature for MAnt-ATP (also available for other Mant nucleotides).
-*Cheng JQ, Jiang W, Hackney DD 1998* ; Interaction of mant-adenosine nucleotides and magnesium with kinesin *; Biochemistry 37, 5288-5295*
-Churchich 1997 ; Conformational changes at the nucleotide binding of GroEL induced by binding of protein substrates – Luminescence studies ; J.Biol. Chem.
272(32) : 19645
-Malnasi-Csizmadia A, Woolley RJ, Bagshaw CR. 2000; Resolution of conformational states of dictyostelium myosin II motor domain using tryptophan (W501)
mutant s: implications for the open-closed transition identified by crystallography. ; Biochemistry 39, 16135-16146
-Shaffer J, Sun G, Adams JA. 2001 ; Nucleotide release and associated conformational changes regulate function in the COOH-terminal Src kinase, Csk;Biochemistry
40, 11149-11155

N^6-[4-(Mant-Amino)]butyl-ATP

N^6-[4-((N-methyl-anthraniloyl)-amino)]butyl-adenosine-5'-triphosphate, Sodium salt
MW : 708.43 (Anion)
λ_{exc} / λ_{em} : 335 / 440 nm
λ max : 280/335 nm ; ε : 18 000/2 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
N^6-[4-(Mant-Amino)]butyl-ATP	**FP-FQ6611**	20 u*
	FP-FQ6610	100 u

N^6-[6-(Mant-Amino)]hexyl-ATP

N^6-[6-((N-methyl-anthraniloyl)-amino)]hexyl-adenosine-5'-triphosphate, Sodium salt
MW : 736.48 (Anion)
λ_{exc} / λ_{em} : 335 / 440 nm
λmax : 280/335 nm ; ε : 18 000/2 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
N^6-[6-(Mant-Amino)]hexyl-ATP	**FP-FQ6621**	20 u
	FP-FQ6620	100 u

8-[4-(Mant-Amino)]butyl-ATP

8-[(4-(N-methyl-anthraniloyl)-amino)butyl]-amino-adenosine-5'-triphosphate, Sodium salt
MW : 723.44 (Anion)
λ_{exc} / λ_{em} : 335 / 440 nm
λmax : 280/335 nm ; ε : 18 000/2 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
8-[4-(Mant-Amino)]butyl-ATP	**FP-FQ6461**	20 u
(MABA-ATP)	**FP-FQ6460**	100 u

Groemping, et al., "Regulation of ATPase and chaperone cycle of DnaK from Thermus thermophilus by the nucleotide exchange factor GrpE.", J. Mol. Biol., 305 (5):1173(2001)
Weikl, et al., "C-terminal regions of Hsp90 are important for trapping the nucleotide during the ATPase cycle.", J. Mol Biol. 303 (4):583(2000)

8-[6-(Mant-Amino)]hexyl-ATP

8-[(6-(N-methyl-anthraniloyl)-amino)hexyl]-amino-adenosine-5'-triphosphate, Sodium salt
MW : 751.50 (Anion)
λ_{exc} / λ_{em} : 335 / 440 nm
λ max : 280/335 nm ; ε : 18 000/2 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
8-[6-(Mant-Amino)]hexyl-ATP	**FP-FQ6471**	20 u
(MAHA-ATP)	**FP-FQ6470**	100 u

1 u = 1 µl at 10 mM

Mant-EDA-ATP

2'/3'-[(2-(N-methyl-anthraniloyl)-amino)ethyl-carbamoyl]-adenosine-5'-triphosphate, Sodium salt

MW : 723.40 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λ max : 255/355 nm ; ε : 23 300/5 800 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-EDA-ATP	**FP-FQ5811**	20 u
	FP-FQ5810	100 u

Mant-ADP

2'/3'-O-(N-Methyl-anthraniloyl)-adenosine-5'-diphosphate, Triethylammonium salt

MW : 558.32 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λ max : 255/355 nm ; ε : 23 300/5 800 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-ADP	**FP-FQ2061**	150 u
	FP-FQ2060	750 u

Bujalowski et al, "Kinetic mechanism of nucleotide cofactor binding to Escherichia coli replicative helicase DnaB protein. stopped-flow kinetic studies using fluorescent, ribose-, and base-modified nucleotide analogues.", Biochemistry 39:2106(2000)

Cheng et al, "Interaction of mant-adenosine nucleotides and magnesium with kinesin.", Biochemistry 37:5288 (1998)

Mant-ATP

2'/3'-(N-Methyl-anthraniloyl)-adenosine-5'-triphosphate, Triethylammonium salt

MW : 637.30 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λ max : 255/355 nm ; ε : 23 300/5 800 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-ATP	**FP-FQ2071**	150 u

Tung-Chung Mou, et al, "Structural Basis for the Inhibition of Mammalian Membrane Adenylyl Cyclase by 2'(3')-O-(NMethylanthraniloyl) guanosine 5'-Triphosphate.", J. Biol. Chem. 280 (8):7253(2005)

Booth, et al, "Analysis of the properties of the N-terminal nucleotide-binding domain of human P-glycoprotein.", Biochemistry 39:5518(2000)

Thoenges, et al., "Tight binding of bulky fluorescent derivatives of adenosine to the low affinity E2ATP site leads to inhibition of Na+/K+-ATPase. Analysis of structural requirements of fluorescent ATP derivatives with a Koshland-Nemethy-Filmer model of two interacting ATP sites.", J. Biol. Chem. 274:1971(1999)

Mant-dATP

3'-(N-Methyl-anthraniloyl)-2'-deoxy-adenosine-5'-triphosphate,Triethylammonium salt

MW : 621.31 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λ max : 255/355 nm ; ε : 23 300/5 800 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-dATP	**FP-FQ2901**	50 u
	FP-FQ2900	250 u

Tung-Chung Mou, et al, "Structural Basis for the Inhibition of Mammalian Membrane Adenylyl Cyclase by 2'(3')-O-(NMethylanthraniloyl)- guanosine 5'-Triphosphate.", J. Biol. Chem. 280 (8):7253(2005)

Churchich, "Binding of a fluorescent nucleotide analog to hsc70 - the effect of peptide protein interactions on the luminescence properties of the probe.", Eur. J. Biochem. 231 (3):736(1995)

Mant-GDP

2'/3'-O-(N-Methyl-anthraniloyl)-guanosine-5'-diphosphate, Triethylammonium salt

MW : 574.32 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λ max : 252/355 nm ; ε : 22 600/5 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-GDP	**FP-FQ2081**	150 u
	FP-FQ2080	750 u

Thanbichler, et al. "Kinetics of the interaction of translation factor SelB from Escherichia coli with guanosine nucleotides and selenocysteine insertion sequence RNA.", J. Biol. Chem. 275:20458(2000)

Murthy, et al, "Nucleotide binding by the erythrocyte transglutaminase/Gh protein, probed with fluorescent analogs of GTP and GDP.", Proc. Natl. Acad. Sci. USA 97:7744 (2000)

1 u = 1 µl at 10 mM

Mant-dGDP

3'-(N-Methyl-anthraniloyl)-2'-deoxy-guanosine-5'-diphosphate, Triethylammonium salt

MW : 558.33 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λmax : 252/355 nm ; ε : 22 600/5 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-dGDP	**FP-FQ4901**	30 u
	FP-FQ4900	150 u

Nomanbhoy, et al., "Investigation of the GTP-binding GTPase cycle of Cdc42Hs using extrinsic reporter group fluorescence.", Biochemistry 35 (14):4602 (1996).
Leonard, et al., "Investigation of the GTP-binding GTPase cycle of cdc42hs using fluorescence spectroscopy.", Biochemistry 33 (40):12323. (1994)

Mant-GTP

2'/3'-O-(N-methyl-anthraniloyl)-guanosine-5'-triphosphate, Triethylammonium salt

MW : 653.30 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λmax : 255/355 nm ; ε : 23 300/5 800 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-GTP	**FP-FQ2091**	150 u
	FP-FQ2090	750 u

Tung-Chung Mou, et al, "Structural Basis for the Inhibition of Mammalian Membrane Adenylyl Cyclase by 2'(3')-O-(NMethylanthraniloyl)-guanosine 5'-Triphosphate.", J. Biol. Chem. 280 (8):7253 (2005) : the mechanism of discrimination between guanosine and adenosine nucleotides.", Biochemistry 34:593(1995)

Mant-dGTP

3'-(N-Methyl-anthraniloyl)-2'-deoxy-guanosine-5'-triphosphate, Triethylammonium salt

MW : 637.30

λ_{exc} / λ_{em} : 355 / 448 nm

λmax : 252/355 nm ; ε : 22 600/5 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-dGTP	**FP-FQ2911**	10 u
	FP-FQ2910	50 u

Mant-GppNHp

2'/3'-O-(N-Methyl-anthraniloyl)-guanosine-5'-[(β ,γ)-imido]triphosphate, Triethylammonium salt

MW : 651.31 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λmax : 252/355 nm ; e : 22 600/5 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-GppNHp (MAnt-GMPPNP)	**FP-FQ2551**	10 u
	FP-FQ2550	50 u

Diebold, et al. "Molecular basis for Rac2 regulation of phagocyte NADPH oxidase", Nature Immunol. 2:211(2001)
Graham, et al., "The conserved arginine in rho-GTPase-activating protein is essential for efficient catalysis but not for complex formation with Rho.GDP and aluminum fluoride.", Biochemistry 38:985(1999)

Mant-dGppNHp

3'-O-(N-Methyl-anthraniloyl)-2'-deoxy-guanosine-5'-[(γ, β)-imido]triphosphate, Triethylammonium salt

MW : 636.32 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λmax 252/355 nm ; ε 22 600/5 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-dGppNHp (MAnt-dGMPPNP)	**FP-FQ2541**	10 u
	FP-FQ2540	50 u

Scheidig, et al., "X-ray crystal-structure analysis of the catalytic domain of the oncogene product p21(H-Ras) complexed with caged GTP and mant dGppNHp.", J. Mol. Biol. 253 (1):132.(1995)

Labeled and modified nucleotides

Mant-GTPgammaS

2'/3'-O-(N-Methyl-anthraniloyl)-guanosine-5'-(γ-thio)-triphosphate,Triethylammonium salt

MW : 669.36 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λmax 252/355 nm ; ε 22 600/5 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-GTPgammaS	**FP-FQ2921**	10 u
	FP-FQ2920	50 u

Remmers, "Detection and quantitation of heterotrimeric G proteins by fluorescence resonance energy transfer.", Anal. Biochem. 257 (1):89(1998)
Remmers, et al. "Interdomain interactions regulate GDP release from heterotrimeric G proteins.", Biochemistry 38(42):13795(1999)

Mant-XDP

2'/3'-O-(N-Methyl-anthraniloyl)-xanthosine-5'-diphosphate, Triethylammonium salt

MW : 575.32 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λ max 254/355 nm ; ε 19 000/5 800 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-XDP	**FP-FQ2941**	10 u
	FP-FQ2940	50 u

Mant-XppNHp

2'/3'-O-(N-Methyl-anthraniloyl)-xanthosine-5'-[(γ, β)-imido]triphosphate, Triethylammonium salt

MW : 653.30 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λ max 254/355 nm ; ε 19 000/5 800 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-XppNHp (mant-XMPPNP)	**FP-FQ5181**	5 u
	FP-FQ5180	25 u

Rodnina, et al., "Codon-dependent conformational change of elongation-factor tu preceding GTP hydrolysis on the Ribosome", EMBO J. 14 (11):2613(1995)
Hazlett, et al., "Solution dynamics of p21(Ras)proteins bound with fluorescent nucleotides - a time-resolved fluorescence study.", Biochemistry-US 32 (49):13575.(1993)

Mant-XTP

2'/3'-O-(N-Methyl-anthraniloyl)-xanthosine-5'-triphosphate, Triethylammonium salt

MW : 654.28 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λ max 254/355 nm ; ε 19 000/5 800 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-XTP	**FP-FQ2951**	10 u
	FP-FQ2950	50 u

Tung-Chung Mou, et al., "Structural Basis for the Inhibition of Mammalian Membrane Adenylyl Cyclase by 2'(3')-O-(NMethylanthraniloyl)- guanosine 5'-Triphosphate.", J. Biol. Chem. 280 (8):7253(2005)

Mant-AppNHp

2'/3'-O-(N-Methyl-anthraniloyl)-Adenosine-5'-[(β,γ)-imido]triphosphate, Triethylammonium salt

MW : 636.32 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λmax 255/355 nm ; ε 23 300/5 800 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-AppNHp (MAnt-AMPPNP)	**FP-FQ2531**	10 u
	FP-FQ2530	50 u

Bujalowski, et al. , "Kinetic mechanism of nucleotide cofactor binding to Escherichia coli replicative helicase DnaB protein. Stopped-flow kinetic studies using fluorescent, ribose-, and base-modified nucleotide analogues.", Biochemistry 39:2106(2000)
Moore, et al. "Kinetic mechanism of adenine nucleotide binding to and hydrolysis by the Escherichia coli Rep monomer. 1. Use of fluorescent nucleotide analogues.", Biochemistry 33:14550(1994)

Mant-ITPγS

2'/3'-O-(N-Methyl-anthraniloyl)-inosine-5'-(γ-thio)-triphosphate, Sodium salt

MW : 654.35 (Anion)

Description	Cat.#	Qty
Mant-ITPγS	**FP-FQ2931**	10 u
	FP-FQ2930	50 u

Mant-N6-Methyl-ATP

2'/3'-O-(N-Methyl-anthraniloyl)-N6-methyl-adenosine-5'-triphosphate, Sodium salt

MW : 650.32 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λmax : 255/355 nm ; ε : 23 300/5 800 mol^{-1} cm^{-1}

Description	Cat.#	Qty
Mant-N6-Methyl-ATP	**FP-FQ4910**	30 u
	FP-FQ4911	150 u

NPE-caged-Mant-dGTP

3'-O-(N-Methyl-anthraniloyl)-2'-deoxy-guanosine-5'-triphosphate, P3-(1-(2 nitrophenyl)-ethyl)-ester, Triethylammonium salt

MW : 786.45 (Anion)

λ_{exc} / λ_{em} : 355 / 448 nm

λmax : 252/355 nm ; ε : 22 600/5 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
NPE-caged-Mant-dGTP	**FP-FQ3021**	10 u
	FP-FQ3020	50 u

Caged nucleotides

Caged nucleotides contain a photolabile group that allows monitoring of fast kinetics especially in time-resolved X-ray crystallography : Flash photolysis of the caging group by ultraviolet light leads to a rapid and highly localized release of the biologically active nucleotide from the inactive caged compound.

Caged nucleotides are increasingly useful for :

- Identification of drug-targets and its binding site
- Determination of the affinity and selectivity of the drug-target interection.
- Determination of the conformation of the binding pocket in structure-based drug design.

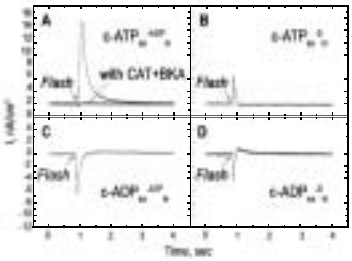
Technical tip

"Caged compounds" serve as photo-induced precursors of biological effector compounds, i.e. nucleotides and Ca^{2+} chelators. Combined with reactive fluorescent probes they have been used to label biological molecules ; by FT-IR coupled with flash photolysis and by fast time-resolved UV-Visible spectroscopy coupled with laser flash photolysis. Applications :

- Kinetic studies of release and export exchanges of nucleotides (mitochondria[1])
- Phosphorylation activation of enzymes (Ca^{2+} ATPase[2])

1) Electrical currents associated with nucleotide transport by the reconstituted mitochondrial ADP/ATP carrier ; Nickolay B. et al ; Proc. Natl. Acad. Sci. USA, Vol. 93, pp. 664–668 (1996) Article.

2) ATP-Induced phosphorylation of the sarcoplasmic reticulum Ca^{2+} ATPase : Molecular interpretation of infrared difference spectra ; A. Barth, et al (1998) ; Biophys. J. 75 538-544 / Abstract.



Capacitive currents generated by the reconstituted AAC under UV flashes with loaded (A and C) and unloaded (B and D) vesicles in the presence of caged ATP (c-ATP) or caged ADP (c-ADP), and inhibitor of CAT and BKA.

NPE-caged-ATP

Adenosine-5'-triphosphate, P3-(1-(2-nitrophenyl)-ethyl)-ester, Triethylammonium salt
MW : 653.30 (Anion)

Description	Cat.#	Qty
NPE-caged-ATP	**FP-FQ2121**	150 u
	FP-FQ2120	750 u

Scheirlinckx, et al., "Monitoring of secondary and tertiary structure changes in the gastric H+/K+-ATPase by infrared spectroscopy", Eur. J. Biochem. 268 (13):3644(2001)
Barth, et al., "Substrate binding and enzyme function investigated by infrared spectroscopy.",FEBS Lett. 477:151(2000)

DMB-caged-ATP

Adenosine-5'-triphosphate, P^3-(1-(3',5'-dimethoxyphenyl)-2-oxo-2-phenyl-ethyl)-ester, Triethylammonium salt
MW : 758.44 (Anion)

Description	Cat.#	Qty
DMB-caged-ATP	**FP-FQ3001**	10 u
	FP-FQ3000	50 u

Sokolov, *et al.*, «Fast transient currents in Na,K-ATPase induced by ATP concentration jumps from the P-3-[1-(3',5'-dimethoxyphenyl)-2-phenyl-2-oxo]ethyl ester of ATP.», *Biophys. J.* 74 (5):2285(1998)
Sokolov, *et al.*, «Fast transient currents in the Na,K-ATPase induced by ATP concentration jump experiments from DMB caged ATP.», *Biophys. J.* 72 (2):242.

NPE-caged-GTP

Guanosine-5'-triphosphate, P3-(1-(2-nitrophenyl)-ethyl)-ester, Triethylammonium salt
MW : 669.30

Description	Cat.#	Qty
NPE-caged-GTP	**FP-FQ2421**	100 u
	FP-FQ2420	500 u

Allin, et al., "Ras catalyzes CTP hydrolysis by shifting negative charges from gamma- to beta-phosphate as revealed by time-resolved FTIR difference spectroscopy.", Biochemistry-US 40 (10):3037(2001)
Scheidig, et al., "The pre-hydrolysis state of p21(ras) in complex with GTP : new insights into the role of water molecules in the GTP hydrolysis reaction of ras-like proteins.", Struct. Fold Des. 7 (11):1311(1999)

NPE-caged-mant-dGTP

3'-O-(N-Methyl-anthraniloyl)-2'-deoxy-guanosine-5'-triphosphate, P^3-(1-(2-nitrophenyl)-ethyl)-ester, Triethylammonium salt
MW : 786.45 (Anion)
λ_{exc} / λ_{em} : 355 / 448 nm
λ max : 252/355 nm ; ε : 22 600/5 700 mol^{-1} cm^{-1}

Description	Cat.#	Qty
NPE-caged-mant-dGTP	**FP-FQ3021**	10 u
	FP-FQ3020	50 u

Tel 33 (0)4 70 03 88 55 ♦ Hot line 33 (0)4 70 03 73 06 ♦ Fax 33 (0)4 70 03 82 60

NPE-caged-AppNHp

Adenosine-5'-[(β,γ)-imido]triphosphate,P^3-(1-(2-nitrophenyl)-ethyl)-ester, riethylammonium salt
MW : 652.32 (Anion)

Description	Cat.#	Qty
NPE-caged-AppNHp (NPE-caged-AMPPNP)	**FP-FQ2411**	100 u
	FP-FQ2410	500 u

NPE-caged-GpCpp

Guanosine-5'-[(β,γ)-methyleno]triphosphate, P^3-(1-(2-nitrophenyl)-ethyl)-ester, Triethylammonium salt
MW : 667.33 (Anion)

Description	Cat.#	Qty
NPE-caged-GpCpp (NPE-caged-GMPCPP)	**FP-FQ3011**	10 u
	FP-FQ3010	50 u

NPE-caged-XDP

Xanthosine-5'-diphosphate, P^3-(1-(2-nitrophenyl)-ethyl)-ester, Triethylammonium salt
MW : 591.32 (Anion)

Description	Cat.#	Qty
NPE-caged-XDP	**FP-FQ3031**	10 u
	FP-FQ3030	50 u

NPE-caged-XppNHp

Xanthosine-5'-[(β,γ)-imido]triphosphate, P^3-(1-(2-nitrophenyl)-ethyl)-ester, Triethylammonium salt
MW : 669.30 (Anion)

Description	Cat.#	Qty
NPE-caged-XppNHp (NPE-caged-XMPPNP)	**FP-FQ5201**	5 u
	FP-FQ5200	25 u

BrDU nucleotides

BrDU is an analog of thymidine, used alternatively to radioactive thimidine to track DNA synthesis by (sub)populations of cells. It is added to the culture at high concentration. Newly synthetized DNA thymidine is (partialy) replaced by BrdU. After fixation and permeabilization of the cells the BrdU can be shown using a fluorochrome labeled antibody against the BrdU. Using DNAse during the staining period the BrdU becomes more available to the antibody without influencing the fluorescence or the structure of the cell.

BrdU

5-Bromo-2'-deoxyuridine
MW : 307.1
BrdU can be incorporated into DNA during cell division and subsequently detected by a anti-BrdU antibody. The probe can be used to study cell-cycle kinetics.

Description	Cat.#	Qty
BrdU (5-Bromo-2'-deoxyuridine)	**FP-18538A**	100 mg

Methods Cell Biol 41, 297(1994).

BrUTP

5-Bromouridine-5'-triphosphate
10 mM in TE buffer
MW : 628.99
BrUTP can be enzymatically incorporated into RNA.

Description	Cat.#	Qty
BrUTP	**FP-T8200A**	25 µl

Literature : Nakayama C, et al. , "Utilizations of various uridine 5'-triphosphate analogues by DNA-dependent RNA polymerases I and II purified from liver nuclei of the cherry salmon (Oncorhynchus masou)" , J Biochem (Tokyo) 96, 1501(1984)

Br-dUTP

5-Bromo-2'-deoxyuridine-5'-triphosphate,
10 mM in TE buffer
5-Bromo-dUTP is widely used in TUNEL assay to detect apoptosis cells(1,2) and it is also a good substrate for reverse transcriptase.

Description	Cat.#	Qty
Br-dUTP	**FP-T8199A**	25 µl

Li X., et al., "Detection of apoptosis and DNA replication by differential labeling of DNA strand breaks with fluorochromes of different color.", Exp Cell Res, 222, 28(1996). Li X., et al., "Labelling DNA strand breaks with BrdUTP. Detection of apoptosis and cell proliferation.", Cell Prolif, 28, 571 (1995). Rytting AS, et al., "Colorimetric capture assay for human-immunodeficiency-virus-I reverse transcriptase activity", Biotechnol Appl Biochem, 29, 241(1999)
Ekstrand DH, et al., "A sensitive assay for the quantification of reverse transcriptase activity based on the use of carrier-bound template and non-radioactive-product detection, with special reference to human-immunodeficiency-virus isolation", Biotechnol Appl Biochem, 23, 95(1996)

5Br-dUDP

5-Bromo-2'-deoxy-uridine-5'-diphosphate, Sodium salt
MW : 465.04 (Anion)
10 mM solution

Description	Cat.#	Qty
5Br-dUDP	**FQ4570**	30 µl
	FQ4571	150 µl

Cyclic nucleotides

Guanosine-3',5'-cyclic monophosphate

Guanosine-3',5'-cyclic monophosphate, Sodium salt
MW : 343.19 (Anion)

Description	Cat.#	Qty
cGMP	**FQ2840**	50 mg
	FQ2841	250 mg

Nisoli, et al. «Mitochondrial biogenesis in mammals: the role of endogenous nitric oxide.», Science, 299 (5608), 896 (200). Rybalkin, et al, «PDE5 is converted to an activated state upon cGMP binding to the GAF A domain.», EMBO J., 22 (3), 469 (2003). Coates, et al., «Antagonistic pathways in neurons exposed to body fluid regulate social feeding in Caenorhabditis elegans.», Nature, 419(6910), 925 (2002)

Related products :

Description	Cat.#
PCR Cleanup Column Kit	**T66380**
Proteinase K	**718960**
TrueBlue PCR cloning kit	**R58140**

Nucleoside bisphosphates

Adenosine-3',5'-bisphosphate

Adenosine-3',5'-bisphosphate, Triethylammonium salt
MW : 425.18 (Anion)

Description	Cat.#	Qty
Adenosine-3',5'-bisphosphate (pAp)	**FQ2281**	100 u

Jacobson, et al., "Ribose modified nucleosides and nucleotides as ligands for purine receptors.", Nucleos. Nucleot. Nucl., 20 (4-7), 333 (2001)
Jung, et al., "Platelet collagen receptor integrin alpha(2)beta(1) activation involves differential participation of ADP-receptor subtypes P2Y1 and P2Y12 but not intracellular calcium change.", Eur. J. Biochem., 268 (12), 3513 (2001)
Sheng, et al., "Bacterial expression, purification, and characterization of rat hydroxysteroid sulfotransferase STa.", Protein Expres. Purif, 21 (1), 235 (2001)

Adenosine-2',5'-bisphosphate

1 unit = 1 µl at 10 mM solution

Adenosine-2',5'-bisphosphate, Triethylammonium salt
MW : 425.18 (Anion)

Description	Cat.#	Qty
Adenosine-2',5'-bisphosphate	**FQ2271**	100 u
	FQ2270	500 u

Toth-Zsamboki , et al., "The P2Y(1) receptor antagonist adenosine-2 ‘,5 ‘-diphosphate non-selectively antagonizes the platelet P2X(1) ion channel.", Thromb. Haemostasis, 86 (5), 1338 (2001)
Leonidas, et al., "Mapping the ribonucleolytic active site of eosinophil-derived neurotoxin (EDN) - High resolution crystal structures of EDN complexes with adenylic nucleotide inhibitors.", J. Biol. Chem,. 276 (18), 15009 (2001)
Gu, et al., "Crystal structures of the complexes of trichosanthin with four substrate analogs and catalytic mechanism of RNA N-glycosidase.", Proteins, 39 (1), 37 (2000)

2’OMe-Adenosine-3',5'-bisphosphate

2'-O-Methyl-adenosine-3',5'-bisphosphate, Sodium salt
MW : 439.21 (Anion)

Description	Cat.#	Qty
2’OMe-Adenosine-3',5'-bisphosphate (2’OMe-pAp)	**FQ6430**	100 u

Guanosine-3',5'-bisphosphate

Guanosine-3',5'-bisphosphate, Triethylammonium salt
MW : 441.18 (Anion)

Description	Cat.#	Qty
Guanosine-3',5'-bisphosphate (pGp)	**FQ2371**	100 u
	FQ2370	500 u

Kvint, et al., "Emergency derepression: stringency allows RNA polymerase to override negative control by an active repressor.", Mol. Microbiol., 35 (2), 435 (2000)
Acharya, et al., "The transmission of the electronic character of guanin-9-yl drives the sugar-phosphate backbone torsions in guanosine 3 ‘,5 ‘-bisphosphate.", Angew. Chem. Int. Edit., 38 (24), 3645 (1999)

Guanosine-2',5'-bisphosphate

Guanosine-2',5'-bisphosphate, Triethylammonium salt
MW: 441.18 (Anion)

Description	Cat.#	Qty
Guanosine-2',5'-bisphosphate	**FQ2361**	100 u
	FQ2360	500 u

Xanthosine and Inosine nucleotides

Xanthosine nucleotides are used as G-nucleotide analogs in signal transduction research, molecular and cell biology.
Inosine is an analog of purine, and inosine nucleotides are widely used for mechanistic studies on ATP (cAMP) or GTP (cGMP) binding proteins.

XDP

Xanthosine-5'-diphosphate, Triethylammonium salt
MW : 442.17 (Anion)

Description	Cat.#	Qty
XDP	**FQ2401**	100 u
	FQ2400	500 u

Legate, et al., "Nucleotide-dependent binding of the GTPase domain of the signal recognition particle receptor betasubunit to the alpha-subunit.", J. Biol. Chem., 275 (35), 27439 (2000). Yu, et al., "Interaction of the xanthine nucleotide binding Go alpha mutant with G protein-coupled receptors.", J. Biol.Chem. 273 (46), 30183 (1998)

XTP

1 u = 1 µl at 10 mM

Xanthosine-5'-triphosphate, Triethylammonium salt
MW : 521.14 (Anion)

Description	Cat.#	Qty
XTP	**FQ2111**	150 u
	FQ2110	750 u

Fulga, *et al.*, "SR beta coordinates signal sequence release from SRP with ribosome binding to the translocon.", *EMBO J.*, 20 (9), 2338(2001). Legate, *et al.*, "Nucleotide-dependent binding of the GTPase domain of the signal recognition particle receptor betasubunit to the alpha-subunit.", *J. Biol. Chem.* 275 (35), 27439 (2000)

IMP

Inosine-5'-monophosphate, Triethylammonium salt
MW : 347.20 (Anion)

Description	Cat.#	Qty
IMP	**FQ2041**	150 u
	FQ2040	750 u

Bhattacharya, *et al.*, "Regiospecificity of nucleotide-amino acid mating vs. water dynamics: a key to protein-nucleic acid assemblies: structure of unidecahydrated inosine-5'-monophosphate and L-glutamic acid.", *J. Chem. Crystallogr.* 30 (10), 655 (2000)
Heroux, *et al.*, "Crystal structures of the Toxoplasma gondii hypoxanthine-guanine hosphoribosyltransferase-GMP and -IMP complexes : Comparison of purine binding interactions with the XMP complex.", *Biochemistry-US* 38 (44), 14485 (1999)

IDP

Inosine-5'-diphosphate, Triethylammonium salt
MW : 426.17 (Anion)

Description	Cat.#	Qty
IDP	**FQ2381**	100 u
	FQ2380	500 u

AlAli, *et al.*, "Effects of metal ions on the activity of cytosolic phosphoenolpyruvate carboxykinase from camel kidney.", *Arab. Gulf J. Sci. Res.* 14 (3), 535 (1996). Vial , *et al.*, "Purification, partial kinetic characterization and reactive sulfhydryl-groups of the phosphoenolpyruvate carboxykinase from perumytilus-purpuratus adductor muscle.", *Comp. Biochem. Phys. B.* 112 (3):451 (1995)

ITP

Inosine-5'-triphosphate, Triethylammonium salt
MW : 505.14

Description	Cat.#	Qty
ITP	**FQ2051**	150 u
	FQ2050	750 u

Noji, *et al.*, "Purine but not pyrimidine nucleotides support rotation of F(1)-ATPase.", *J. Biol. Chem.*, 276 (27), 25480 (2001)
Bianchi, *et al.*, "Intramolecular equilibria in metal ion complexes of guanosine 5 '-triphosphate (GTP(4-)) and inosine 5 '-triphosphate (ITP4-) in aqueous solution.", *J. Inorg. Biochem.*, 86 (1), 148 (2001). Chakrabarti, *et al.*, «Nucleoside triphosphate specificity of tubulin.», *Biochemistry*, 39 (33), 10269 (2000)

cIMP

Inosine-3',5'-cyclic monophosphate, Triethylammonium salt
MW : 329.18 (Anion)

Description	Cat.#	Qty
cIMP	**FQ2850**	50 u
	FQ2851	250 u

Wang, *et al.*, "RNA polymerase-cNMP-ligated cAMP receptor protein (CRP) mutant interactions in the enhancement of transcription by CRP mutants.", *J. Biol. Chem.*, 275 (43), 33457 (2000). Shapiro, *et al*, "Structural basis for ligand selectivity of heteromeric olfactory cyclic nucleotide-gated channels.", *Biophys. J.*, 78 (5), 2307 (2000). Sunderman, *et al.*, "Sequence of events underlying the allosteric transition of rod cyclic nucleotide-gated channels.", *J.Gen. Physiol.*, 113 (5), 621 (1999)

Related products :

Description	Cat.#	Qty
XppNHp (XMPPNP)	**FQ2990**	**50 u**
XTPγS,	**FQ3640**	**5 u**
Mant-XDP	**FP-FQ2941**	**10 u**
Mant-XTP	**FP-FQ2951**	**10 u**
Mant-XppNHp (mant-XMPPNP)	**FP-FQ5181**	**5 u**
NPE-caged-XDP	**FP-FQ3031**	**10 u**
NPE-caged-XTP	**FP-FQ3041**	**10 u**
NPE-caged-XppNHp (NPE-caged-XMPPNP)	**FP-FQ5201**	**5 u**
IppNHp (IMPPNP)	**FQ2890**	**50 u**
Mant-EDA-ATP	**FP-FQ5811**	**20 u**
Mant-ITPgS	**FP-FQ2931**	**10 u**

Halogen-containing nucleotides

Halogen-containing nucleotides are used as rational phasing tools for protein crystallography, as specific substrates for studies on nucleotide binding proteins or as starting material for several nucleotide modifications.

Related products :

Description	Cat.#	Qty
5Br-dUDP	**FQ4570**	**30 u**
5Br-dUTP	**FP-T8199A**	**25 µl**

5I-dUTP

5-Iodo-2'-deoxy-uridine-5'-triphosphate, Sodium salt
MW : 591.01 (Anion)

Description	Cat.#	Qty
5I-dUTP	**FQ2600**	50 u
	FQ2601	250 u

5I-dCTP

5-Iodo-2'-deoxy-cytidine-5'-triphosphate, Sodium salt
MW : 590.03 (Anion)

Description	Cat.#	Qty
5I-dCTP	**FQ2590**	50 u
	FQ2591	250 u

Bisubstrate inhibitors

Bisubstrate inhibitors are used for mechanistic studies on nucleotide kinases.

AP_3A

P^1-(5'-Adenosyl) P^3-(5'-adenosyl) triphosphate, Sodium salt
MW : 753.38 (Anion)

Description	Cat.#	Qty
AP_3A	**FQ2730**	50 u
	FQ2731	250 u

Guranowski, *et al.*, "Selective degradation of 2'-adenylated diadenosine tri- and tetraphosphates, Ap(3)A and Ap(4)A, by two specific human dinucleoside polyphosphate hydrolases.", *Arch. Biochem. Biophys*., 373, 218 (2000)
Luo, *et al.*, "Identification and characterization of diadenosine 5',5»'-P1,P2 -diphosphate and diadenosine 5',5"'-P1,P3-triphosphate in human myocardial tissue.", *FASEB J.*, 13, 695 (1999)
Luthje, *et al.*, "Catabolism of Ap4A and Ap3A in whole blood. The dinucleotides are long-lived signal molecules in the blood ending up as intracellular ATP in the erythrocytes.", *Eur. J. Biochem*., 173, 241 (1988)

AP_4A

P^1-(5'-Adenosyl) P^4-(5'-adenosyl) tetraphosphate, Sodium salt
MW : 832.36 (Anion)

Description	Cat.#	Qty
AP_4A	**FQ2301**	100 u
	FQ2300	500 u

Vartanian, *et al.*, "Ap4A induces apoptosis in human cultured cells.", *FEBS Lett*., 456, 175 (1999)
Campbell, *et al.*, "Characterization of P1,P4-diadenosine 5'-tetraphosphate binding on bovine aortic endothelial cells.", *Arch. Biochem. Biophys*., 364, 280 (1999)
Guedon, *et al.*, "Effect of diadenosine tetraphosphate microinjection on heat shock protein synthesis in Xenopus laevis oocytes.», *EMBO J*., 4, 3743 (1985)

AP_5A

P^1-(5'-Adenosyl) P^5-(5'-adenosyl) pentaphosphate, Sodium salt
MW : 911.83 (Anion)

Description	Cat.#	Qty
AP_5A	**FQ2760**	50 u
	FQ2761	250 u

Wildman, *et al.*, "Selectivity of diadenosine polyphosphates for rat P2X receptor subunits.", *Eur. J. Pharmacol*., 367, 119 (1999)
Pintor, *et al.*, "Presence of dinucleotide and ATP receptors in human cerebrocortical synaptic terminals.", *Eur. J. Pharmacol.* 366, 159 (1999)

1 u = 1 µl at 10 mM

Labeled and modified nucleotides

AP_6A

P^1-(5'-Adenosyl) P^6-(5'-adenosyl) hexaphosphate, Sodium salt
MW : 990.30 (Anion)

Description	Cat.#	Qty
AP_6A	**FQ5600**	20 u
	FQ5601	100 u

Morii, *et al.*, "Adenosine(5')hexaphospho(5')adenosine stimulation of a Ca(2+)-induced Ca(2+)-release channel from skeletal muscle sarcoplasmic reticulum.", *Eur. J. Biochem.*, 205, 979 (1992)
Luo, *et al.*, "Identification of diadenosine hexaphosphate in human erythrocytes.", *Hypertension*, 34, 872 (1999)

AP_5U

P^1-(5'-Adenosyl) P^5-(5'-uridyl) pentaphosphate, Sodium salt
MW : 888.29 (Anion)

Description	Cat.#	Qty
AP_5U	**FQ2790**	50 u
	FQ2791	250 u

Cheng, *et al.*, "Homogeneous uridine kinase from Ehrlich ascites tumor: substrate specificity and inhibition by bisubstrate analogs.", *Mol Pharmacol.*, 30 (2), 159 (1986)

AP_4dT

P^1-(5'-adenosyl) P^4-(5'-(2'-deoxy-thymidyl)) tetraphosphate, Triethylammonium salt
MW : 807.34 (Anion)

Description	Cat.#	Qty
AP_4dT	**FQ2740**	50 u
	FQ2741	250 u

AP_5dT

P^1-(5'-adenosyl) P^5-(5'-(2'-deoxy-thymidyl)) pentaphosphate, Triethylammonium salt
MW : 886.32 (Anion)

Description	Cat.#	Qty
AP_5dT	**FQ2770**	50 u
	FQ2771	250 u

Lavie, *et al.*, "Structural basis for efficient phosphorylation of 3'-azidothymidine monophosphate by Escherichia coli thymidylate kinase.", *Proc. Natl. Acad. Sci., USA* 95 (24), 14045 (1998)
Lavie, *et al*, "Crystal structure of yeast thymidylate kinase complexed with the bisubstrate inhibitor P-1-(5'-adenosyl) P-5-(5'-thymidyl) pentaphosphate (TP(5)A) at 2.0 angstrom resolution: Implications for catalysis and AZT activation.", *Biochemistry*, 37, 3677 (1998)

AP_4G

P^1-(5'-Adenosyl) P^4-(5'-guanosyl) tetraphosphate, Triethylammonium salt
MW : 843.36 (Anion)

Description	Cat.#	Qty
AP_4G	**FQ2750**	50 u
	FQ2751	250 u

Ortiz, *et al.*, "specific synthesis of adenosine (5')tetraphospho(5')nucleoside and adenosine- (5')oligophospho(5')adenosine (n-greaterthan-4) catalyzed by firefly luciverase.", *Eur. J. Biochem.*, 212 (1), 263 (1993)
Palfi, *et al.*, "Alterations in the accumulation of adenylylated nucleotides in heavy-metal-ion-stressed and heat-stressed Synechococcus sp strain pcc-6301, a cyanobacterium, in light and dark.", *Biochem. J.* 276:487 (1991)

AP_5G

P^1-(5'-Adenosyl) P^5-(5'-guanosyl) pentaphosphate, Triethylammonium salt
MW : 927.33 (Anion)

Description	Cat.#	Qty
AP_5G	**FQ2780**	50 u
	FQ2781	250 u

Prinz, *et al.*, "Binding of nucleotides to guanylate kinase, p21(ras), and nucleoside-diphosphate kinase studied by nano-electrospray mass spectrometry.", *J. Biol. Chem.*, 274 (50), 35337 (1999)
Ortiz, *et al.*, "specific synthesis of adenosine (5')tetraphospho(5')nucleoside and adenosine-(5')oligophospho(5')adenosine (n-greater-than-4) catalyzed by firefly luciverase.", *Eur. J. Biochem.*, 212 (1), 263 (1993)

1 u = 1 µl at 10 mM

Antiviral nucleotides

AzTMP
3'-Azido-2',3'-dideoxy-thymidine-5'-monophosphate, Sodium salt
MW : 346.21 (Anion)

Description	Cat.#	Qty
AzTMP	**FQ5620**	20 u
	FQ5621	100 u

Cruchaga, *et al.*, "Inhibition of Phosphorolysis Catalyzed by HIV-1 Reverse Transcriptase Is Responsible for the Synergy Found in Combinations of 3'-Azido-3'-deoxythymidine with Nonnucleoside Inhibitors", *Biochemistry*., 44 (9), 3535 (2005)
Chenal-Francisque, *et al*., "The highly similar TMP kinases of Yersinia pestis and Escherichia coli differ markedly in their AZTMP phosphorylating activity.", *Eur. J. Biochem*. 265, 112 (1999)

AzTTP
3'-Azido-2',3'-dideoxy-thymidine-5'-triphosphate, Sodium salt
MW : 504.16 (Anion)

Description	Cat.#	Qty
AzTTP	**FQ2810**	10 u
	FQ2811	50 u

Cruchaga, *et al.*, « Inhibition of Phosphorolysis Catalyzed by HIV-1 Reverse Transcriptase Is Responsible for the Synergy Found in Combinations of 3'-Azido-3'-deoxythymidine with Nonnucleoside Inhibitors», *Biochemistry*., 44 (9), 3535 (2005)
Akeb, *et al.*, «The production and evaluation of antibodies for enzyme immunoassay of AZTTP.», *Nucleosides Nucleotides Nucleic Acids*. 20, 243 (2001) Faraj, *et al.*, « Effects of beta-L-3'-azido-3'-deoxythymidine 5'-triphosphate on host and viral DNA polymerases.», *Antiviral Res*. 47, 97 (2000)

d4TMP
2',3'-Didehydro-2',3'-dideoxy-thymidine-5'-monophosphate, Sodium salt
MW : 303.18 (Anion)

Description	Cat.#	Qty
d4TMP	**FQ5640**	20 u
	FQ5641	100 u

De Clercq, "Highlights in the development of new antiviral agents.», *Mini Rev. Med. Chem*., 2, 163 (2002)
Mas, *et al.*, "Multidrug-resistant HIV-1 reverse transcriptase: involvement of ribonucleotide-dependent phosphorolysis in cross-resistance to nucleoside analogue inhibitors.», *J. Mol. Biol*., 267, 181 (2002)
Selmi, *et al.*, "The valine-to-threonine 75 substitution in human immunodeficiency virus type 1 reverse transcriptase and its relation with stavudine resistance.», *J. Biol. Chem*., 276, 13965 (2001)

d4TTP
2',3'-Didehydro-2',3'-dideoxy-thymidine-5'-triphosphate, Sodium salt
MW : 461.13 (Anion)

Description	Cat.#	Qty
d4TTP	**FQ2861**	10 u
	FQ2860	50 u

Ray, *et al.*, "Insights into the molecular mechanism of inhibition and drug resistance for HIV-1 RT with carbovir triphosphate.", *Biochemistry*, 41, 5150 (2002)
Vaccaro, *et al.*, "Mechanism of inhibition of the human immunodeficiency virus type 1 reverse transcriptase by d4TTP: an equivalent incorporation efficiency relative to the natural substrate dTTP.", *Antimicrob. Agents. Chemother*., 44, 217 (2000)

3TCMP
2', 3'-Dideoxy-3'-thia-cytidine-5'-monophosphate, Sodium salt (L isomer)
MW : 308.22 (Anion)

Description	Cat.#	Qty
3TCMP	**FQ2561**	10 u
	FQ2560	50 u

Mas, *et al.*, "Multidrug-resistant HIV-1 reverse transcriptase: involvement of ribonucleotide-dependent phosphorolysis in cross-resistance to nucleoside analogue inhibitors.", *J. Mol. Biol*., 323, 181 (2002)

3TCTP
2', 3'-Dideoxy-3'-thia-cytidine-5'-triphosphate, Sodium salt (L isomer)
MW : 466.16 (Anion)

Description	Cat.#	Qty
3TCTP	**FQ3650**	5 u
	FQ3651	25 u

Boyer, *et. al.*, "YADD mutants of human immunodeficiency virus type 1 and Moloney murine leukemia virus reverse transcriptase are resistant to lamivudine triphosphate (3TCTP) in vitro.», *J. Virol*., 75, 6321 (2001).
Kewn, *et. al.*, "Development of enzymatic assays for quantification of intracellular lamivudine and carbovir triphosphate levels in peripheral blood mononuclear cells from human immunodeficiency virus-infected patients.", *Antimicrob. Agents Chemother*., 46, 135 (2002)

1 u = 1 µl at 10 mM

Ribavirin-5'-triphosphate

1-β-D-Ribofuranosyl-1,2,4-triazole-3-carboxamide-5'-triphosphate, Sodium salt
MW: 481.12 (Anion)

Description	Cat.#	Qty
Ribavirin-5'-triphosphate	**FQ5940**	20 u
	FQ5941	100 u

Maag, *et al.*, "Hepatitis C virus RNA-dependent RNA polymerase (NS5B) as a mediator of the antiviral activity of ribavirin.", *J. Biol. Chem.*, 276 (49), 46094 (2001)
Lanford, *et al.*, "Ribavirin induces error-prone replication of GB virus B in primary tamarin hepatocytes.", *J. Virol.*, 75 (17), 8074 (2001)
Crotty, *et al.*, "The broad-spectrum antiviral ribonucleoside ribavirin is an RNA virus mutagen.", *Nat. Med.*, 6 (12), 1375 (2000)

Other nucleotides analogs

N6-Methyl-ATP

N6-Methyl-adenosine-5'-triphosphate, Potassium salt
MW : 518.8 (Anion)

Description	Cat.#	Qty
N6-Methyl-ATP	**FQ2101**	150 u
	FQ2100	750 u

AP4

Adenosine-5'-tetraphosphate, Triethylammonium salt
MW : 583.13 (Anion)

Description	Cat.#	Qty
AP4	**FQ2291**	100 u
	FQ2290	500 u

ara-ATP

Adenine-arabinofuranoside-5'-triphosphate, Sodium salt
MW : 504.16 (Anion)

Description	Cat.#	Qty
ara-ATP	**FQ2800**	50 u
	FQ2801	250 u

Genini, et al., "Nucleotide requirements for the in vitro activation of the apoptosis protein-activating factor-1-mediated caspase pathway.", J. Biol. Chem., 275 (1), 29 (2000)
Ghoshal, et al., "Ara-ATP impairs 3'-end processing of pre-messenger-RNAs by inhibiting both cleavage and polyadenylation.", Nucleic Acids Res. 19 (21):5871 (1991)

ε-ATP

1,N^6-Etheno-adenosine-5'-triphosphate, Sodium salt
MW : 528.18 (Anion)

Description	Cat.#	Qty
ε-ATP	**FQ5780**	200 u
	FQ5781	100 u

Literature : Aguilar, et al., "Ectoenzymatic breakdown of diadenosine polyphosphates by Xenopus laevis oocytes.", Eur. J. Biochem., 268 (5), 1289 (2001)
Churchich, et al., "A catalytic site of protein disulfide isomerase probed with adenosine-5 '-triphosphate analogs.", BBA-Protein Struct.M., 1479 (1-2), 293 (2000)
Gualix, et al., "Studies of chromaffin granule functioning by flow cytometry : Transport of fluorescent epsilon-ATP and granular size increase induced by ATP.", Receptor Channel, 6 (6), 449 (1999)

8-Oxo-GTP

8-Oxo-guanosine-5'-triphosphate, Sodium salt
MW : 536.15 (Anion)

Description	Cat.#	Qty
8-Oxo-GTP	**FQ2710**	50 u
	FQ2711	250 u

Kuryavyi, et al., "Kinetics of inhibition of escherichia-coli RNA polymerase-catalyzed synthesis of the dinucleotide pppApU by 8-oxo-GTP and 8-BrGTP on the A1 promoter of Bacteriophage-t7 delta-d111 DNA using a limited set of substrates.", Mol. Biol.+ 23 (3), 648 (1989)

1 u = 1 µl at 10 mM

8-Oxo-dGTP

8-Oxo-2'-deoxy-guanosine-5'-triphosphate, Sodium salt
MW : 519.15 (Anion)

Description	Cat.#	Qty
8-Oxo-dGTP	**FQ4790**	30 u
	FQ4791	150 u

Kai, et al., "An oxidized nucleotide affects DNA replication through activation of protein kinases in Xenopus egg lysates.", Nucl. Acids Res., 30 (2), 569 (2002). Canitrot, et al., "Nucleotide excision repair DNA synthesis by excess DNA polymerase beta: a potential source of genetic instability in cancer cells.", FASEB J. 14 (12), 1765 (2000)
Nampalli, et al., "Efficient synthesis of 8-oxo-dGTP: A mutagenic nucleotide.", Bioorg. Med. Chem. Lett., 10 (15), 1677 (2000)

6-Thio-GTP

6-Thio-guanosine-5'-triphosphate, Sodium salt
MW : 536.22 (Anion)

Description	Cat.#	Qty
6-Thio-GTP	**FQ1991**	150 u
	FQ1990	750 u

Tiede, et al., "CD28-dependent Rac1 activation is the molecular target of azathioprine in primary human CD4 + T lymphocytes.", J. Clin. Invest., 111, 1133 (2003). Poland, et al., "Entrapment of 6-thiophosphoryl-IMP in the active site of crystalline adenylosuccinate synthetase from Escherichia coli.", J. Biol. Chem., 272 (24), 15200 (1997)

5F-UTP

5-Fluoro-uridine-5'-triphosphate, Sodium salt
MW : 499.11 (Anion)

Description	Cat.#	Qty
5F-UTP	**FQ2221**	100 u
	FQ2220	500 u

Au, et al., "Reversed-phase ion-pair high-performance liquid-chromatographic assay of 5-fluorouracil, 5'-deoxy-5- fluorouridine, their nucleosides, monophosphate, diphosphate, and triphosphate nucleotides with a mixture of quaternary ammonium-ions.", J. Chromatogr., 228, 245 (1982). Glazer, et al., "The effect of 5-fluorouridine 5'-triphosphate on RNA transcribed in isolated-nuclei in vitro.", Mol.Pharmacol. 17 (2), 279 (1980)

5-Aza-dCTP

5-Aza-2'-deoxy-cytidine-5'-triphosphate, Sodium salt
MW : 465.12 (Anion)

Description	Cat.#	Qty
5-Aza-dCTP	**FQ5270**	20 u
	FQ5271	100 u

6-Chlorpurine-riboside-5'-triphosphate

6-Chlorpurine-riboside-5'-triphosphate, Sodium salt
MW : 523.99 (Anion)

1 u = 1 µl at 10 mM

Description	Cat.#	Qty
6-Chlorpurine-riboside-5'-triphosphate	**FQ2231**	100 u
	FQ2230	500 u

Patzelt, et al., "Study of (Na+K)-ATPase with 6-chloropurine triphosphate, 6-mercaptopurine triphosphate and dinitrophenyl-6-thiopurine triphosphate.", H-S Z. Physiol. Chem., 355 (10), 1237 (1974)

6-Mercaptopurine-riboside-5'-triphosphate

6-Mercaptopurine-riboside-5'-triphosphate, Sodium salt
MW : 521.20 (Anion)

Description	Cat.#	Qty
6-Mercaptopurine-riboside-5'-triphosphate	**FQ2241**	100 u
	FQ2240	500 u

Patzelt, et al., "Study of (Na+K)-ATPase with 6-chloropurine triphosphate, 6-mercaptopurine triphosphate and dinitrophenyl-6-thiopurine triphosphate.", H-S Z. Physiol. Chem., 355 (10), 1237 (1974)

dPTP

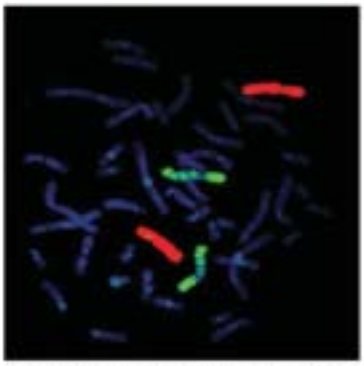
6H,8H-3,4-Dihydro-pyrimido[4,5-c][1,2]oxazin-7-one-8-β-D-2'-deoxy-ribofuranosid-5'-triphosphate, Sodium salt
MW : 506.17 (Anion)

Description	Cat.#	Qty
dPTP	**FQ4520**	30 u
	FQ4521	150 u

Cummins, et al., "Synthesis and study of the fluorescein conjugate of the nucleotide dPTP.", Nucleos. Nucleot. Nucl, 20 (4-7), 1049 (2001) ; Zaccolo, et al., "An approach to randon mutagenesis of DNA using mixtures of Triphosphate derivatives of Nucleoside analogues.", J. Mol. Biol. 255 (4), 589 (1996)

Related products :

Description	Cat.#
ε-AppNHp (ε-AMPPNP)	**FQ3660**
Ribavirin-5'-triphosphate	**FQ5940**



Multicolor chromosome PAINT analysis using Label IT® FISH Biotin labeled human chromosome 7 (Streptavidin-Cy™3 conjugate detection) and Label IT® FISH Fluorescein labeled human chromosome 6 on Jurkat metaphase spread.

Multicolor chromosome centromeric analysis using Label IT® FISH Cy™3 labeled human chromosome 7 and Label IT®FISH Fluorescein labeled human chromosome 6 on jurkat metaphase spread.

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DAPI	**FP-371867**	**10 mg**
Hoechst 33342	**FP-BB1340**	**5 ml**

Label IT® Fluorescence *In Situ* Hybridization Kits (FISH)

- Enables convenient, high efficiency labeling of any probe.
- Obtain consistent and controlled labeling with the Label IT® non-enzymatic covalent attachment method.
- Optimized protocols for use in centromeric and PAINT analysis.
- Provides sensitive hybridization detection.

Fluorescence In Situ hybridization (FISH) uses fluorescent DNA probes to vividly paint genes or chromosomes, revealing the localization of specific nucleic acid sequences. This valuable technique has proven useful for gene mapping and the identification of chromosomal abnormalities. FISH entails the preparation of short sequences of fluorescently labeled DNA (probes) which are complimentary to the target DNA sequences. Metaphase chromosome spreads are prepared, RNase treated, dehydrated and denatured according to the protocol provided. The slides are then hybridized with the fluorescently labeled DNA probe. Post hybridization, the slides are washed, counterstained with a DAPI antifade mixture, and analyzed using fluorescent microscopy.
The optimized Label IT® FISH Kits utilize Label IT® technology to prepare superior labeled probes, by design, and hybridize them to targeted interphase/metaphase chromosome spreads.
The Label IT® FISH Kits are supplied with labeling reagents, hybridization buffer, and an optimized protocol, which can be used to generate fluorescently labeled probes for a variety of FISH applications, including :

- Alpha-satellite centromeric probes - generated from repetitive sequences found at the centromeres of specific chromosomes. Researchers use this technique to enumerate specific chromosomes.
- Whole chromosome PAINT probes (Protocol Aberration Identification and Nomenclature Terminology) - collections of small probe sequences that hybridize to different regions along the length of the same chromosome. These probes are useful for examining chromosomal abnormalities.

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	AO0990	2 µg
Label IT® FISH Biotin Labeling Kit	**AO0921**	10 µg
	AO0920	2 µg

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