



Second Messenger and Signal Transduction Research High Purity Nucleotide & Nucleoside Analogues

- *Unique Collection of Cyclic Nucleotides*
- *Inhibitors and Activators of Protein Kinases A and G*
- *Specific Epac Modulators*
- *Widest Selection of NAD⁺ and cADPR Analogues*
- *c-diGMP and c-diAMP, Derivatives and Metabolites*
- *Nucleoside Mono-, Di-, Tri- and Polyphosphates*
- *Fluorescent and Biotinylated Analogues*
- *Affinity Chromatography Gels*
- *Bulk and Custom Syntheses*





Catalogue Content

Content	Page
Catalogue Number Index	1
Catalogue Content	1
Categorical Index	2
Preparation of Stock Solutions	3
Biolog's Homepage	4
NAD ⁺ Analogues	5
ADPR Analogues	8
cADPR & cIDPR Analogues	10
Alphabetical Index	13
Ordering Information	14
Terms & Conditions	15

Catalogue Number Index

Cat. No.	Page		Cat. No.	Page		Cat. No.	Page		Cat. No.	Page
A 140	10		C 100	10		N 012	5		N 037	6
A 184	8					N 013	5		N 038	7
A 190	9		D 108	11		N 016	6		N 039	8
			D 148	5		N 017	5		N 050	5
B 051	9		D 227	9		N 018	8		N 051	8
B 065	10		D 228	9		N 019	8		N 053	5
B 071	10					N 023	7		N 055	6
B 082	9		E 013	9		N 024	7		N 057	5
B 085	10		E 016	9		N 025	7		N 065	6
B 086	10					N 026	7		N 073	7
B 100	10		M 063	11		N 031	8			
B 103	9		M 064	11		N 032	8		P 034	11
						N 039	7			
C 005	11		N 006	6		N 033	6			
C 098	11		N 010	7		N 036	6			



BIOLOG Product List

NAD⁺ Analogues

	Cat. No.	Page
β- ara- 2'- Deoxy- 2'- fluoro- nicotinamide adenine dinucleotide (ara-2'-F-NAD ⁺)	D 148	5
β- Nicotinamide adenine dinucleotide- 2', 3'- cyclic monophosphate (NADcP ⁺ / 2',3'-cyclic NADP ⁺)	N 050	5
β- Nicotinamide- N ⁶ - (2- aminoethyl)adenine dinucleotide (6-AE-NAD ⁺)	N 013	5
β- Nicotinamide- 8- (2- azidobenzylthio)adenine dinucleotide (8-oN ₃ -BT-NAD ⁺)	N 057	5
β- Nicotinamide- 8- (4- azidophenacylthio)adenine dinucleotide (8-pN ₃ -PACt-NAD ⁺)	N 053	5
β- Nicotinamide- N ⁶ - (2- (6- (6- [biotinyl]aminohexanoyl)aminohexanoyl)aminoethyl)adenine dinucleotide (6-Biotin-17-NAD ⁺)	N 012	5
β- Nicotinamide- 8- bromoadenine dinucleotide (8-Br-NAD ⁺)	N 017	5
β- Nicotinamide- 8- bromo- 7- deazaadenine dinucleotide (8-Br-7-CH-NAD ⁺)	N 016	6
β- Nicotinamide- 8- bromohypoxanthine dinucleotide (8-Br-NHD ⁺)	N 006	6
β- Nicotinamide- 8- butylthioadenine dinucleotide (8-BuT-NAD ⁺)	N 036	6
β- Nicotinamide- 8- (3- butynylthio)adenine dinucleotide (8-Bu(3-yne)T-NAD ⁺)	N 055	6
β- Nicotinamide- 8- (4- chlorophenylthio)adenine dinucleotide (8-pCPT-NAD ⁺)	N 033	6
β- Nicotinamide- 8- cyclopentylthioadenine dinucleotide (8-cPeT-NAD ⁺)	N 037	6
β- Nicotinamide- 2'- deoxyadenine dinucleotide (N-2'-dAD ⁺ / 2'-deoxy-NAD ⁺)	N 065	6
β- Nicotinamide- 2'- deoxy- 2'- fluoroadenine dinucleotide (N-2'-F-dAD ⁺ / 2'-Fluoro-NAD ⁺)	N 073	7
β- Nicotinamide- 8- dimethylaminoadenine dinucleotide (8-DMA-NAD ⁺)	N 026	7
β- Nicotinamide- 1, N ⁶ - ethenoadenine dinucleotide (ε-NAD ⁺)	N 010	7
β- Nicotinamide- 1, N ⁶ - ethenoadenine dinucleotide phosphate(ε-NADP ⁺)	N 024	7
β- Nicotinamide- 8- ethylthioadenine dinucleotide (8-ET-NAD ⁺)	N 038	7
β- Nicotinamide- N ⁶ - (2- (6- [fluoresceinyl]aminohexanoyl)aminoethyl)adenine dinucleotide (6-Fluo-10-NAD ⁺)	N 023	7
β- Nicotinamide- 8- methylaminoadenine dinucleotide (8-MA-NAD ⁺)	N 025	7
β- Nicotinamide- 8- phenylthioadenine dinucleotide (8-PT-NAD ⁺)	N 032	8
β- Nicotinamide- 8- piperidinoadenine dinucleotide (8-PIP-NAD ⁺)	N 031	8
β- Nicotinamide- N ⁶ - propargyladenine dinucleotide (6-Parg-NAD ⁺)	N 051	8
β- Nicotinamide- 8- propylthioadenine dinucleotide (8-PrT-NAD ⁺)	N 039	8
β- Nicotinic acid adenine dinucleotide phosphate (β-NAADP ⁺)	N 018	8
β- Nicotinic acid- 1, N ⁶ - ethenoadenine dinucleotide phosphate (ε-NAADP ⁺)	N 019	8

ADPR Analogues

	Cat. No.	Page
Adenosine- 5'- O- diphospho- (1''- (4- nitrophenoxy)- ribose) (ADPR-pNP)	A 184	8
Adenosine- 5'- O- diphosphoribose phosphate (ADPRP)	A 190	9
8- Bromoadenosine- 5'- O- diphosphoribose (8-Br-ADPR)	B 051	9
8- Bromo- 7- deazaadenosine- 5'- O- diphosphoribose (8-Br-7-CH-ADPR)	B 103	9
8- Bromoinosine- 5'- O- diphosphoribose (8-Br-IDPR)	B 082	9
2'- Deoxyadenosine- 5'- O- diphosphoribose (dADPR / 2'-deoxy-ADPR)	D 227	9
2'- Deoxy- 2'- fluoroadenosine- 5'- O- diphosphoribose (2'-F-dADPR / 2'-F-deoxy-ADPR)	D 228	9
1, N ⁶ - Ethenoadenosine- 5'- O- diphosphoribose (ε-ADPR)	E 013	9
1, N ⁶ - Ethenoadenosine- 5'- O- diphosphoribose phosphate (ε-ADPRP)	E 016	9

cADPR & cIDPR Analogues

	Cat. No.	Page
8- (2- Aminoethylthio)- cyclic inosine diphosphate ribose (8-AET-N ¹ -cIDPR)	A 140	10
8- Benzylthio- cyclic inosine diphosphate ribose (8-BT-N ¹ -cIDPR)	B 085	10
8- Bromo- cyclic adenosine diphosphate ribose (8-Br-cADPR)	B 065	10
8- Bromo- cyclic inosine diphosphate ribose (8-Br-N ¹ -cIDPR)	B 071	10
8- Bromo- 7- deaza- cyclic adenosine diphosphate ribose (8-Br-7-CH-cADPR)	B 100	10
8- (4- tert.- Butylbenzylthio)- cyclic inosine diphosphate ribose (8-ptBBT-N ¹ -cIDPR)	B 086	10
8- (4- Chlorophenylthio)- cyclic inosine diphosphate ribose (8-pCPT-N ¹ -cIDPR)	C 100	10
Cyclic adenosine diphosphate ribose (cADPR)	C 005	11
Cyclic inosine diphosphate ribose (N ¹ -cIDPR)	C 098	11
8- Dimethylamino- cyclic inosine diphosphate ribose (8-DMA-N ¹ -cIDPR)	D 108	11
8- Methylamino- cyclic inosine diphosphate ribose (8-MA-N ¹ -cIDPR)	M 063	11
8- Methylthio- cyclic inosine diphosphate ribose (8-MeS-N ¹ -cIDPR)	M 064	11
8- Phenylethylthio- cyclic inosine diphosphate ribose (8-PhEtT-N ¹ -cIDPR)	P 034	11



Preparation of Stock Solutions

Most BIOLOG products are sold in micromol quantities in order to assist customers with the preparation of stock solutions. In contrast to often troublesome calculations regarding molecular weight, salt form, water content and purity percentages, simply add certain volumes of solvent (mostly water or buffer) and end up already with stock solutions of defined concentrations.

The following table shows how to dissolve the content of a vial with water or buffer in order to obtain defined stock solutions:

Concentration of stock solution	Content of vial				
	0.1 μmol	0.5 μmol	1 μmol	5 μmol	10 μmol
	⇓	⇓	⇓	⇓	⇓
	Water or buffer volumes to be added to achieve stock concentrations				
	⇓	⇓	⇓	⇓	⇓
100 mM (1×10^{-1} M)	1 μl	5 μl	10 μl	50 μl	100 μl
50 mM (5×10^{-2} M)	2 μl	10 μl	20 μl	100 μl	200 μl
20 mM (2×10^{-2} M)	5 μl	25 μl	50 μl	250 μl	500 μl
10 mM (1×10^{-2} M)	10 μl	50 μl	100 μl	500 μl	1 ml
5 mM (5×10^{-3} M)	20 μl	100 μl	200 μl	1 ml	2 ml
1 mM (1×10^{-3} M)	100 μl	500 μl	1 ml	5 ml	10 ml
500 μM (5×10^{-4} M)	200 μl	1 ml	2 ml	10 ml	20 ml

If a typical dilution series (1 mM, 100 μM , 10 μM , 1 μM ...) is prepared, respective final end volumes will be 90% of the starting stock solution. For example: The content of a 10 μmol vial that has been dissolved in 10 ml of water to result in a 1 mM stock solution, yields 9 ml of each concentration level after dilution.

Interested in our experience with nucleotides?

Since we collect scientific data for most of the structures offered, we can assist you with many of your specific questions connected to nucleotide-related compounds. Since our main competence lies in cyclic nucleotide-related issues we can offer here:

- lipophilic ranking of analogues and information about membrane permeability
- phosphodiesterase hydrolysis data
- protein kinase binding, activation and inhibition data
- application references
- potential analogue pitfalls
- selection of suitable structures for respective biological systems

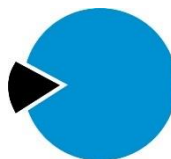
We invite your questions and appreciate hearing about your results and papers related to our products. Confidentiality regarding sensitive matters is, of course, assured. You are encouraged to take advantage of this service regardless whether or not you are already a customer.

Our products are designed, developed and sold for research purposes only!
They are intended for *in vitro* and nonhuman *in vivo* laboratory applications.
Contents of vials are not sterile and have not been tested for endotoxins.



Please visit Biolog's new website

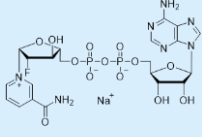
www.biolog.de

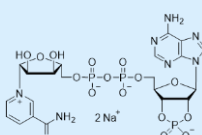


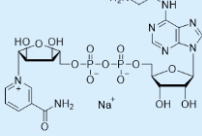
and discover a large variety of rare and sophisticated nucleotide analogues with interesting modifications and useful ligands connected, extended search functions and a convenient shop system

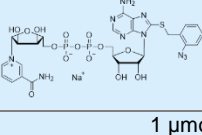
The screenshot shows the homepage of the Biolog Life Science Institute website. The header includes the company logo and name, a search bar, and a shopping cart icon. A left sidebar lists various product categories such as Cyclic Nucleotides, Nucleobases, and Epac Inhibitors. The main content area features a banner for 'Innovative reagents for life science research' with an image of colorful vials, a 'NEW PRODUCTS' section with a chemical structure, and a 'NEWS & OFFERS' section with recent announcements. At the bottom, there are three prominent buttons: 'TECHNICAL INFORMATION', 'CUSTOM SYNTHESIS', and 'LITERATURE DOWNLOAD'. The footer contains a newsletter sign-up form and contact information.

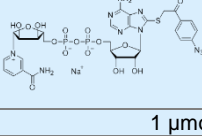
NAD⁺ Analogues

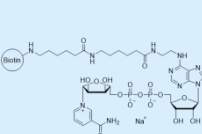
<div>D 148</div> <div></div>	<div>β- ara- 2'- Deoxy- 2'- fluoro- nicotinamide adenine dinucleotide (ara-2'-F-NAD⁺)</div> <div>[133575-27-6]; C₂₁H₂₆FN₇O₁₃P₂; MW 665.4 (free acid); λ_{\max} 260 nm; ϵ 20000; sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Hydrolysis-resistant slow binding inhibitor of ADP-ribosyl cyclase (i.e. CD 38). Detailed technical information available. References: Muller-Steffner et al., <i>J. Biol. Chem.</i>, 267, 9606 - 9611 (1992); Bertheliet et al., <i>Biochem. J.</i>, 330, 1383 - 1390 (1998); Gerth et al., <i>Biochem. J.</i>, 382, 849 - 856 (2004).</div>
0.1 μ mol / ~67 μ g € 259.- (D 148 - 001)	5 x 0.1 μ mol € 1,084.- (D 148 - 005)

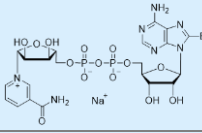
<div>N 050</div> <div></div>	<div>β- Nicotinamide adenine dinucleotide- 2', 3'- cyclic monophosphate (NADcP⁺ / 2',3'-cyclic NADP⁺)</div> <div>[100929-77-9]; C₂₁H₂₆N₇O₁₆P₃; MW 725.4 (free acid); λ_{\max} 259 nm; ϵ 18000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β- nicotinamide adenine dinucleotide phosphate (NADP⁺) in which the 2'-phosphate is cyclized to 2',3'-cyclic phosphate. NADcP⁺ is a substrate for 2',3'-cyclic nucleotide 3'-phosphodiesterase. Detailed technical information available. References: Sogin, D.C., <i>J. Neurochem.</i>, 27, 1333 - 1337 (1976); Müller et al., <i>FEBS Lett.</i>, 131, 37 - 40 (1981).</div> <div>❄ Shipment on dry ice is recommended to maintain original quality!</div>
10 μ mol / ~7.3 mg € 104.- (N 050 - 10)	5 x 10 μ mol € 440.- (N 050 - 50)

<div>N 013</div> <div></div>	<div>β- Nicotinamide- N⁶- (2- aminoethyl)adenine dinucleotide (6-AE-NAD⁺)</div> <div>[59587-50-7]; C₂₃H₃₂N₈O₁₄P₂; MW 706.5 (free acid); λ_{\max} 265 nm; ϵ 21000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD⁺, suitable as a ligand in affinity chromatography or for coupling of various labelling structures including fluorophores. Detailed technical information available. Reference: Schmidt & Grenner, <i>Eur. J. Biochem.</i>, 67, 295 - 302 (1976).</div> <div>❄ Shipment on dry ice is recommended to maintain original quality!</div>
5 μ mol / ~3.5 mg € 207.- (N 013 - 05)	5 x 5 μ mol € 880.- (N 013 - 25)


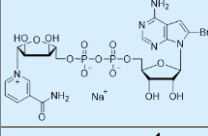
<div>N 057</div> <div></div>	<div>β- Nicotinamide- 8- (2- azidobenzylthio)adenine dinucleotide (8-oN₃-BT-NAD⁺)</div> <div>C₂₈H₃₂N₁₀O₁₄P₂S; MW 826.6 (free acid); λ_{\max} 261 nm; ϵ 22300; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Clickable analogue of β-NAD⁺, for labelling substrate proteins of poly(ADP-ribose) polymerases (PARPs) by click-chemistry. Detailed technical information available.</div> <div>❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μ mol / ~0.8 mg € 207.- (N 057 - 01)	5 x 1 μ mol € 880.- (N 057 - 05)


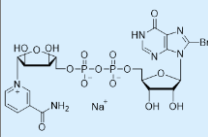
<div>N 053</div> <div></div>	<div>β- Nicotinamide- 8- (4- azidophenacylthio)adenine dinucleotide (8-pN₃-PAcT-NAD⁺)</div> <div>C₂₉H₃₂N₁₀O₁₅P₂S; MW 854.6 (free acid); λ_{\max} 279 nm; ϵ 26000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Clickable analogue of β-NAD⁺, for labelling substrate proteins of poly(ADP-ribose) polymerases (PARPs) by click-chemistry. Detailed technical information available.</div> <div>❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μ mol / ~0.9 mg € 207.- (N 053 - 01)	5 x 1 μ mol € 880.- (N 053 - 05)


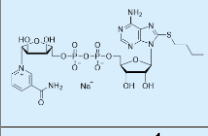
<div>N 012</div> <div></div>	<div>β- Nicotinamide- N⁶- (2- (6- (6- [biotinyl]amino)hexanoyl)aminoethyl)adenine dinucleotide (6-Biotin-17-NAD⁺)</div> <div>[1369508-04-2]; C₄₅H₆₈N₁₂O₁₈P₂S; MW 1159.1 (free acid); λ_{\max} 265 nm; ϵ 22000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Biotinylated analogue of β-NAD⁺, representing a non-radioactive alternative to radio-labelled β-NAD⁺ for corresponding studies. Detailed technical information available. References for a structurally related 6-Biotin-17-NAD⁺: Zhang & Snyder, <i>Biochemistry</i>, 32, 2228 - 2233 (1993); Klebl et al., <i>Arch. Biochem. Biophys.</i>, 347, 155 - 162 (1997); Bakondi et al., <i>J. Histochem. Cytochem.</i>, 50, 91 - 98 (2002).</div> <div>❄ Shipment on dry ice is recommended to maintain original quality!</div>	
0.1 μ mol / ~0.1 mg € 124.- (N 012 - 001)	5 x 0.1 μ mol € 528.- (N 012 - 005)	Inquiries for bulk quantities welcome!


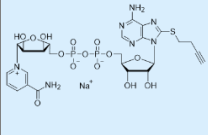
<div>N 017</div> <div></div>	<div>β- Nicotinamide- 8- bromo-adenine dinucleotide (8-Br-NAD⁺)</div> <div>[2022926-16-3]; C₂₁H₂₆BrN₇O₁₄P₂; MW 742.3 (free acid); λ_{\max} 264 nm; ϵ 21200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD⁺ that can be utilized as a substrate by ADP-ribosyl cyclase CD38 to produce the cADPR antagonist 8-Br-cADPR (Cat. No. B 065) and for receptor mapping studies. Detailed technical information available. Reference: Partida-Sanchez et al., <i>Nature Med.</i>, 7, 1209 - 1216 (2001).</div> <div>❄ Shipment on dry ice is recommended to maintain original quality!</div>
10 μ mol / ~7.4 mg € 93.- (N 017 - 10)	5 x 10 μ mol € 396.- (N 017 - 50)


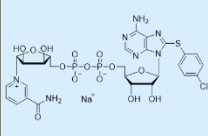



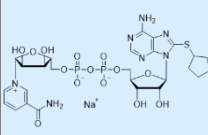
N 016  	β- Nicotinamide- 8- bromo- 7- deazaadenine dinucleotide (8-Br-7-CH-NAD⁺) [189876-09-3]; C ₂₂ H ₂₇ BrN ₆ O ₁₄ P ₂ ; MW 741.3 (free acid); λ _{max} 276 nm; ε 18200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Potential substrate, competitive inhibitor or regulator of enzymes that interact with β-NAD ⁺ . Detailed technical information available. <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.7 mg € 285.- (N 016 - 01)	5 x 1 μmol € 1,165.- (N 016 - 05)


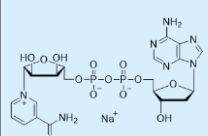
N 006  	β- Nicotinamide- 8- bromohypoxanthine dinucleotide (8-Br-NHD⁺) [477782-33-5]; C ₂₁ H ₂₅ BrN ₆ O ₁₅ P ₂ ; MW 743.3 (free acid); λ _{max} 254 nm; ε 14700 (pH 5.6); sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Potential substrate, competitive inhibitor or regulator of enzymes that interact with β-NAD ⁺ and starting material for nucleophilic substitutions at position 8. Detailed technical information available. Reference: Wagner et al., <i>Nucleic Acids Res. Suppl.</i> , 3 , 1 - 2 (2003). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
5 μmol / ~3.7 mg € 124.- (N 006 - 05)	5 x 5 μmol € 526.- (N 006 - 25) Inquiries for bulk quantities welcome!


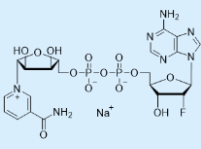
N 036  	β- Nicotinamide- 8- butylthioadenine dinucleotide (8-BuT-NAD⁺) [2022926-17-4]; C ₂₅ H ₃₅ N ₇ O ₁₄ P ₂ S; MW 751.6 (free acid); λ _{max} 277 nm; ε 23200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD ⁺ , useful for screening of NAD ⁺ receptor proteins. Detailed technical information available. Reference: Gibson et al., <i>Science</i> , 353 , 45 - 50 (2016). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.8 mg € 179.- (N 036 - 01)	5 x 1 μmol € 761.- (N 036 - 05)


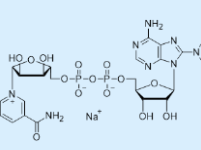
N 055  	β- Nicotinamide- 8- (3- butynylthio)adenine dinucleotide (8-Bu(3-yne)T-NAD⁺) [2022926-15-2]; C ₂₅ H ₃₁ N ₇ O ₁₄ P ₂ S; MW 747.6 (free acid); λ _{max} 276 nm; ε 21400; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Clickable analogue of β-NAD ⁺ , for labelling substrate proteins of poly(ADP-ribose) polymerases (PARPs) by click-chemistry. Detailed technical information available. Reference: Gibson et al., <i>Science</i> , 353 , 45 - 50 (2016). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.7 mg € 207.- (N 055 - 01)	5 x 1 μmol € 880.- (N 055 - 05)


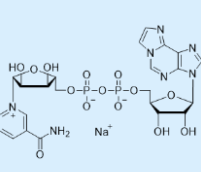
N 033  	β- Nicotinamide- 8- (4- chlorophenylthio)adenine dinucleotide (8-pCPT-NAD⁺) [2022926-12-9]; C ₂₇ H ₃₀ ClN ₇ O ₁₄ P ₂ S; MW 806.0 (free acid); λ _{max} 273 nm; ε 20200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD ⁺ , useful for screening of NAD ⁺ receptor proteins. Detailed technical information available. Reference: Gibson et al., <i>Science</i> , 353 , 45 - 50 (2016). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.8 mg € 179.- (N 033 - 01)	5 x 1 μmol € 761.- (N 033 - 05)


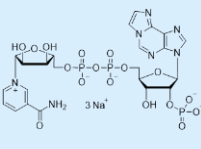
N 037  	β- Nicotinamide- 8- cyclopentylthioadenine dinucleotide (8-cPeT-NAD⁺) [2022926-10-7]; C ₂₆ H ₃₅ N ₇ O ₁₄ P ₂ S; MW 763.6 (free acid); λ _{max} 281 nm; ε 23200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD ⁺ , useful for screening of NAD ⁺ receptor proteins. Detailed technical information available. Reference: Gibson et al., <i>Science</i> , 353 , 45 - 50 (2016). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.8 mg € 179.- (N 037 - 01)	5 x 1 μmol € 761.- (N 037 - 05)


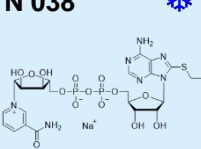
N 065  	β- Nicotinamide- 2'- deoxyadenine dinucleotide (N-2'-dAD⁺ / 2'-deoxy-NAD⁺) [1514900-83-4]; C ₂₁ H ₂₇ N ₇ O ₁₃ P ₂ ; MW 647.4 (free acid); λ _{max} 260 nm; ε 18000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. N-2'-dAD ⁺ is a 2'-deoxyadenosine version of the coenzyme nicotinamide adenine dinucleotide (β-NAD ⁺). It is considered to be a substrate for type III CD38 in the enzymatic production of the Transient Receptor Potential Melastatin 2 (TRPM2) channel superagonist dADPR (2'-deoxy-ADPR, Cat. No. D 227). Both N-2'-dAD ⁺ and dADPR were proved to be present in Jurkat T cells (all data according to Fliegert et al., <i>Nat. Chem. Biol.</i> , 13 , 1036 - 1044 (2017)). Reference: Alvarez-Gonzalez, R., <i>Mol. Cell. Biochem.</i> , 138 , 213 - 219 (1994). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.6 mg € 179.- (N 065 - 01)	5 x 1 μmol € 761.- (N 065 - 05)


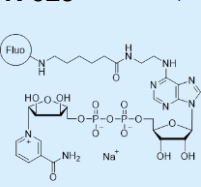
N 073  	β- Nicotinamide- 2'- deoxy- 2'- fluoroadenine dinucleotide (N-2'-F-dAD⁺ / 2'-Fluoro-NAD⁺) [935289-19-3]; C ₂₁ H ₂₆ FN ₇ O ₁₃ P ₂ ; MW 665.4 (free acid); λ _{max} 260 nm; ε 18000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. N-2'-F-dAD ⁺ is a fluorinated version of the coenzyme nicotinamide adenine dinucleotide (β-NAD ⁺). It is a weak inhibitor of human NAD kinase. Reference: Bonnacc et al., <i>Bioorg. Med. Chem. Lett.</i> , 17 , 1512 - 1515 (2007). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.7 mg € 179.- (N 073 - 01)	5 x 1 μmol € 761.- (N 073 - 05)


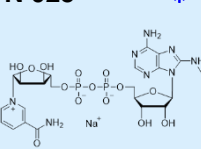
N 026  	β- Nicotinamide- 8- dimethylaminoadenine dinucleotide (8-DMA-NAD⁺) [1262426-05-0]; C ₂₃ H ₃₂ N ₈ O ₁₄ P ₂ ; MW 706.5 (free acid); λ _{max} 273 nm; ε 19200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD ⁺ , useful for screening of NAD receptor proteins. Detailed technical information available. Reference: Gibson et al., <i>Science</i> , 353 , 45 - 50 (2016). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.7 mg € 179.- (N 026 - 01)	5 x 1 μmol € 761.- (N 026 - 05)

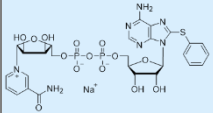
N 010  	β- Nicotinamide- 1, N⁶- ethenoadenine dinucleotide (ε-NAD⁺) [38806-38-1]; C ₂₃ H ₂₇ N ₇ O ₁₄ P ₂ ; MW 687.5 (free acid); λ _{max} 265 nm; ε 10200; sodium salt; purity > 95% HPLC. For other salt forms or analogues please inquire. Fluorescent analogue of β-NAD ⁺ (λ _{exc} 300 nm, λ _{em} 410 nm) that can be used to analyse ADP-ribosylation, for fluorometric assays and for preparation of fluorescent poly-(ADP-ribose). Detailed technical information and references available. References: Favilla & Mazzini, <i>Biochim. Biophys. Acta</i> , 788 , 48 - 57 (1984); Klebl & Pette, <i>Anal. Biochem.</i> , 239 , 145 - 152 (1996); Shirato et al., <i>Biochem. Biophys. Res. Commun.</i> , 355 , 451 - 456 (2007). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
10 μmol / ~6.9 mg € 140.- (N 010 - 10)	5 x 10 μmol € 594.- (N 010 - 50) Inquiries for bulk quantities welcome!

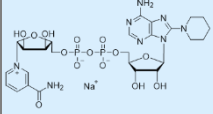
N 024  	β- Nicotinamide- 1, N⁶- ethenoadenine dinucleotide phosphate (ε-NADP⁺) [104809-28-1]; C ₂₃ H ₂₈ N ₇ O ₁₇ P ₃ ; MW 767.4 (free acid); λ _{max} 265 nm; ε 10200; sodium salt; purity > 95% HPLC. For other salt forms or analogues please inquire. Fluorescent analogue of β-NADP ⁺ (λ _{exc} 300 nm, λ _{em} 410 nm), useful to analyse the binding and coenzyme activity of β-NADP ⁺ . Detailed technical information available. References: Morelli et al., <i>Biochem. Biophys. Res. Commun.</i> , 70 , 600 - 606 (1976); Lee & Chang, <i>Biochem. J.</i> , 245 , 407 - 414 (1987). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
5 μmol / ~3.8 mg € 140.- (N 024 - 05)	5 x 5 μmol € 594.- (N 024 - 25)

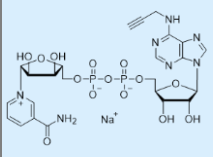
N 038  	β- Nicotinamide- 8- ethylthioadenine dinucleotide (8-ET-NAD⁺) [2022926-07-2]; C ₂₃ H ₃₁ N ₇ O ₁₄ P ₂ S; MW 723.6 (free acid); λ _{max} 276 nm; ε 23200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD ⁺ , useful for screening of NAD ⁺ receptor proteins. Detailed technical information available. Reference: Gibson et al., <i>Science</i> , 353 , 45 - 50 (2016). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality.</div>
1 μmol / ~0.7 mg € 179.- (N 038 - 01)	5 x 1 μmol € 761.- (N 038 - 05)

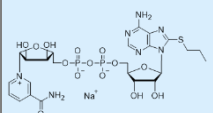
N 023  	β- Nicotinamide- N⁶- (2- (6- [fluoresceinyl]amino)hexanoyl)aminoethyl)adenine dinucleotide (6-Fluo-10-NAD⁺) C ₅₀ H ₅₃ N ₉ O ₂₁ P ₂ ; MW 1178.0 (free acid); λ _{max} 494 nm; ε ~ 79000/pH 9; sodium salt; purity > 95% HPLC. For other salt forms please inquire. Fluorescent analogue of β-NAD ⁺ (λ _{exc} 494 nm, λ _{em} 517 nm) which is a non-radioactive alternative to radio-labelled β-NAD ⁺ for research on enzymes requiring β-NAD ⁺ as a substrate or cofactor. Detailed technical information available. For reference compare: Sugimura et al., <i>J. Cell Biol.</i> , 183 , 1203 - 1212 (2008). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
0.1 μmol / ~0.1 mg € 124.- (N 023 - 001)	5 x 0.1 μmol € 528.- (N 023 - 005) Inquiries for bulk quantities welcome!

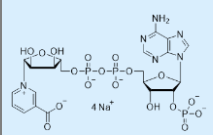
N 025  	β- Nicotinamide- 8- methylaminoadenine dinucleotide (8-MA-NAD⁺) [1262426-04-9]; C ₂₂ H ₃₀ N ₈ O ₁₄ P ₂ ; MW 692.5 (free acid); λ _{max} 273 nm; ε 19200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD ⁺ , useful for screening of NAD ⁺ receptor proteins. Detailed technical information available. References: Moreau et al., <i>Org. Biomol. Chem.</i> , 9 , 278 - 290 (2011); Gibson et al., <i>Science</i> , 353 , 45 - 50 (2016). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.7 mg € 179.- (N 025 - 01)	5 x 1 μmol € 761.- (N 025 - 05)

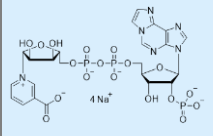
N 032 	β- Nicotinamide- 8- phenylthioadenine dinucleotide (8-PT-NAD⁺) [2022926-11-8]; C ₂₇ H ₃₁ N ₇ O ₁₄ P ₂ S; MW 771.6 (free acid); λ _{max} 273 nm; ε 20200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD ⁺ , useful for screening of NAD ⁺ receptor proteins. Detailed technical information available. Reference: Gibson et al., <i>Science</i> , 353 , 45 - 50 (2016). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.8 mg € 179.- (N 032 - 01)	5 x 1 μmol € 761.- (N 032 - 05)

N 031 	β- Nicotinamide- 8- piperidinoadenine dinucleotide (8-PIP-NAD⁺) [1262426-08-3]; C ₂₆ H ₃₆ N ₈ O ₁₄ P ₂ ; MW 746.6 (free acid); λ _{max} 273 nm; ε 20200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD ⁺ , useful for screening of NAD ⁺ receptor proteins. Detailed technical information available. Reference: Gibson et al., <i>Science</i> , 353 , 45 - 50 (2016). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.7 mg € 179.- (N 031 - 01)	5 x 1 μmol € 761.- (N 031 - 05)

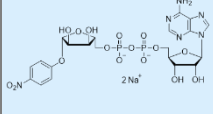
N 051 	β- Nicotinamide- N⁶- propargyladenine dinucleotide (6-Parg-NAD⁺) [1140909-81-4]; C ₂₄ H ₂₉ N ₇ O ₁₄ P ₂ ; MW 701.5 (free acid); λ _{max} 263 nm; ε 19100; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Clickable analogue of β-NAD ⁺ , for labelling substrate proteins of poly(ADP-ribose) polymerases (PARPs) by click-chemistry. Detailed technical information available. References: Du et al., <i>Biochemistry</i> , 48 , 2878 - 2890 (2009); Jiang et al., <i>J. Am. Chem. Soc.</i> , 132 , 9363 - 9372 (2010); Carter-O'Connell et al., <i>J. Am. Chem. Soc.</i> , 136 , 5201 - 5204 (2014). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.7 mg € 207.- (N 051 - 01)	5 x 1 μmol € 880.- (N 051 - 05)

N 039 	β- Nicotinamide- 8- propylthioadenine dinucleotide (8-PrT-NAD⁺) [2022926-18-5]; C ₂₄ H ₃₃ N ₇ O ₁₄ P ₂ S; MW 737.6 (free acid); λ _{max} 276 nm; ε 23200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of β-NAD ⁺ , useful for screening of NAD ⁺ receptor proteins. Detailed technical information available. Reference: Gibson et al., <i>Science</i> , 353 , 45 - 50 (2016). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
1 μmol / ~0.7 mg € 179.- (N 039 - 01)	5 x 1 μmol € 761.- (N 039 - 05)

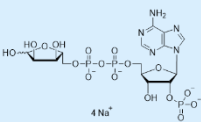
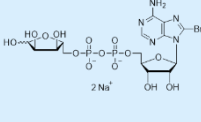
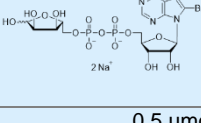
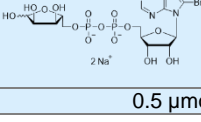
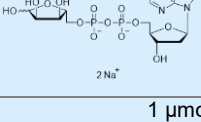
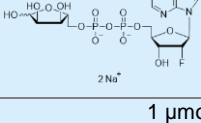
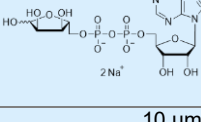
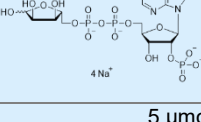
N 018 	β- Nicotinic acid adenine dinucleotide phosphate (β-NAADP⁺) [5502-96-5]; C ₂₁ H ₂₇ N ₆ O ₁₈ P ₃ ; MW 744.4 (free acid); λ _{max} 259 nm; ε 18000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. β-NAADP ⁺ is a potent stimulator of intracellular Ca ²⁺ mobilization in a variety of cell types. Its function was first demonstrated in sea urchin egg homogenates. Detailed technical information available. References: Lee & Aarhus, <i>J. Biol. Chem.</i> , 270 , 2152 - 2157 (1995); Berg et al., <i>J. Cell Biol.</i> , 150 , 581 - 588 (2000); Schmid et al., <i>FEBS Lett.</i> , 585 , 3544 - 3548 (2011). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
10 μmol / ~7.4 mg € 84.- (N 018 - 10)	5 x 10 μmol € 357.- (N 018 - 50)

N 019 	β- Nicotinic acid- 1, N⁶- ethenoadenine dinucleotide phosphate (ε-NAADP⁺) [217313-72-9]; C ₂₃ H ₂₇ N ₆ O ₁₈ P ₃ ; MW 768.4 (free acid); λ _{max} 267 nm; ε 9000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. ε-NAADP ⁺ is a fluorescent analogue of the Ca ²⁺ -releasing messenger β-NAADP (Cat. No. N 018) with λ _{exc} 300 nm and λ _{em} 410 nm. Detailed technical information available. Reference: Lee & Aarhus, <i>Biochim. Biophys. Acta</i> , 1425 , 263 - 271 (1998). <div style="text-align: right;">❄ Shipment on dry ice is recommended to maintain original quality!</div>
5 μmol / ~3.8 mg € 135.- (N 019 - 05)	5 x 5 μmol € 572.- (N 019 - 25)

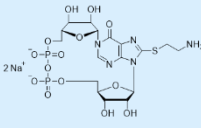
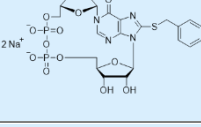

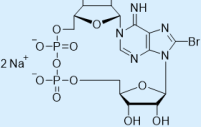
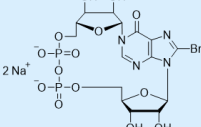

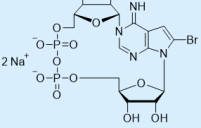
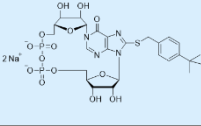
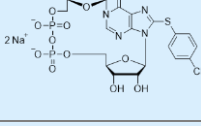
ADPR Analogues

A 184 	Adenosine- 5'- O- diphospho- (1''- (4- nitrophenoxy)- ribose) (ADPR-pNP) [939028-75-8]; C ₂₁ H ₂₆ N ₆ O ₁₆ P ₂ ; MW 680.4 (free acid); λ _{max} 259 nm; ε 15200; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Useful as a colorimetric substrate to monitor PARP activity. By monitoring the production of p-nitrophenolate, the kinetic parameters of PARP-1, tankyrase, and PARP-4 can be evaluated. Detailed technical information available. Reference: Nottbohm et al., <i>Angew. Chem. Int. Ed.</i> , 46 , 2066 - 2069 (2007).
1 μmol / ~0.7 mg € 155.- (A 184 - 01)	5 x 1 μmol € 660.- (A 184 - 05)



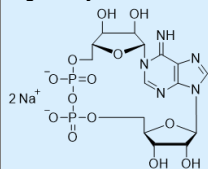
A 190 	Adenosine- 5'- O- diphosphoribose phosphate (ADPRP) [53595-18-9]; C ₁₅ H ₂₄ N ₅ O ₁₇ P ₃ ; MW 639.3 (free acid); λ _{max} 259 nm; ε 15000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. ADPRP is an analogue of adenosine-5'-O-diphosphoribose (ADP-ribose aka ADPR) in which the ribose 2'-hydroxy group is phosphorylated; potential metabolite of β-NADP ⁺ and β-NAADP ⁺ (Cat. No. N 018). Detailed technical information available. References: Roitelman & Shechter, <i>J. Lipid Res.</i> , 27 , 828 - 835 (1986); Aarhus, R. et al., <i>J. Biol. Chem.</i> , 270 , 30327 - 30333 (1995); Schmid et al., <i>FEBS Lett.</i> , 585 , 3544 - 3548 (2011). <div> <div>5 μmol / ~3.2 mg € 80.- (A 190 - 05)</div> <div>5 x 5 μmol € 338.- (A 190 - 25)</div> </div>
B 051 	8- Bromoadenosine- 5'- O- diphosphoribose (8-Br-ADPR) [59259-77-7]; C ₁₅ H ₂₂ BrN ₅ O ₁₄ P ₂ ; MW 638.2 (free acid); λ _{max} 265 nm; ε 17000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Antagonist of the second messenger ADP-ribose (ADPR), inhibiting ADPR-activated cation transport through TRPM2. Detailed technical information available. References: Partida-Sanchez et al., <i>J. Immunol.</i> , 179 , 7827 - 7839 (2007) ; Magnone et al., <i>J. Biol. Chem.</i> , 15 , 21067 - 21081 (2012). <div> <div>5 μmol / ~3.2 mg € 155.- (B 051 - 05)</div> <div>5 x 5 μmol € 660.- (B 051 - 25)</div> </div>
B 103 	8- Bromo- 7- dezaadenosine- 5'- O- diphosphoribose (8-Br-7-CH-ADPR) [1011457-95-6]; C ₁₆ H ₂₃ BrN ₄ O ₁₄ P ₂ ; MW 637.2 (free acid); λ _{max} 277 nm; ε 13250; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Putative antagonist of the second messenger ADP-ribose (ADPR), inhibiting ADPR-activated cation transport through TRPM2. Detailed technical information available. References: Partida-Sanchez et al., <i>J. Immunol.</i> , 179 , 7827 - 7839 (2007) ; Moreau et al., <i>J. Med. Chem.</i> , 56 , 10079 - 10102 (2013). <div> <div>0.5 μmol / ~0.3 mg € 207.- (B 103 - 005)</div> <div>5 x 0.5 μmol € 880.- (B 103 - 025)</div> </div>
B 082 	8- Bromoinosine- 5'- O- diphosphoribose (8-Br-IDPR) C ₁₅ H ₂₁ BrN ₄ O ₁₅ P ₂ ; MW 639.2 (free acid); λ _{max} 254 nm (pH 4); ε 13900; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Analogue of the ADP-ribose antagonist 8-Br-ADPR (Cat. No. B 051). Detailed technical information available. <div> <div>0.5 μmol / ~0.3 mg € 109.- (B 082 - 005)</div> <div>5 x 0.5 μmol € 462.- (B 082 - 025)</div> </div>
D 227 	2'- Deoxyadenosine- 5'- O- diphosphoribose (dADPR / 2'-deoxy-ADPR) [111864-49-4]; C ₁₇ H ₂₃ N ₅ O ₁₃ P ₂ ; MW 543.3 (free acid); λ _{max} 260 nm; ε 15000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. dADPR is a Transient Receptor Potential Melastatin 2 (TRPM2) channel superagonist and potential novel second messenger. Endogenous dADPR was detected in Jurkat T lymphocytes. Reference: Fliegert et al., <i>Nat. Chem. Biol.</i> , 13 , 1036 - 1044 (2017). <div> <div>1 μmol / ~0.5 mg € 207.- (D 227 - 01)</div> <div>5 x 1 μmol € 880.- (D 227 - 05)</div> </div>
D 228 	2'- Deoxy- 2'- fluoroadenosine- 5'- O- diphosphoribose C ₁₅ H ₂₂ FN ₅ O ₁₃ P ₂ ; MW 561.3 (free acid); λ _{max} 260 nm; ε 15000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. For other salt forms please inquire. 2'-F-dADPR is a fluorinated version of the Transient Receptor Potential Melastatin 2 (TRPM2) channel superagonist and potential novel second messenger dADPR (2'-deoxy-ADPR, Cat. No. D 227). Reference for dADPR: Fliegert et al., <i>Nat. Chem. Biol.</i> , 13 , 1036 - 1044 (2017). <div> <div>1 μmol / ~0.6 mg € 207.- (D 228 - 01)</div> <div>5 x 1 μmol € 880.- (D 228 - 05)</div> </div>
E 013 	1, N⁶- Ethenoadenosine- 5'- O- diphosphoribose (ε-ADPR / ε-ADP-ribose) [69699-76-9]; C ₁₇ H ₂₃ N ₅ O ₁₄ P ₂ ; MW 583.3 (free acid); λ _{max} 265 nm; ε 6000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Fluorescent analogue of ADP-ribose (λ _{exc} 300 nm, λ _{em} 410 nm) that can be used in fluorometric assays. References: Bobalova et al., <i>Anal. Biochem.</i> , 305 , 269 - 276 (2002); Song et al., <i>J. Biochem. Biophys. Methods</i> , 63 , 161 - 169 (2005). <div> <div>10 μmol / ~5.8 mg € 155.- (E 013 - 10)</div> <div>5 x 10 μmol € 660.- (E 013 - 50)</div> </div>
E 016 	1, N⁶- Ethenoadenosine- 5'- O- diphosphoribose phosphate (ε-ADPRP) [98088-66-5]; C ₁₇ H ₂₄ N ₅ O ₁₇ P ₃ ; MW 663.3 (free acid); λ _{max} 265 nm; ε 6000; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Metabolite of ε-NADP ⁺ (Cat. No. N 024) and ε-NAADP ⁺ (Cat. No. N 019), fluorescent with λ _{exc} 300 nm, λ _{em} 410 nm. Detailed technical information available. Reference: Schuber & Lund, <i>Curr. Mol. Med.</i> , 4 , 249 - 261 (2004). <div> <div>5 μmol / ~3.3 mg € 223.- (E 016 - 05)</div> <div>5 x 5 μmol € 942.- (E 016 - 25)</div> </div>

cADPR & cIDPR Analogues

A 140 	8- (2- Aminoethylthio)- cyclic inosine diphosphate ribose (8-AET-N¹-cIDPR) $C_{17}H_{25}N_5O_{14}P_2S$; MW 617.4 (free acid); λ_{\max} 269 nm (pH 4); ϵ 10700; sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Metabolically stable analogue of the second messenger cyclic adenosine diphosphate ribose (cADPR, Cat. No. C 005) which is suitable as a ligand in affinity chromatography or for coupling of various labelling structures including fluorophores. The parent compound N¹-cIDPR (Cat. No. C 098) is offered as well. Detailed technical information available. Reference for structurally related agonistic N¹-cIDPR analogues: Moreau et al., <i>J. Med. Chem.</i> , 49 , 5162 - 5176 (2006). <div> <div>0.5 μmol / ~0.3 mg € 129.- (A 140 - 005)</div> <div>5 x 0.5 μmol € 550.- (A 140 - 025)</div> </div>
B 085 	8- Benzylthio- cyclic inosine diphosphate ribose (8-BT-N¹-cIDPR) $C_{22}H_{26}N_4O_{14}P_2S$; MW 664.5 (free acid); λ_{\max} 276 nm (pH 5.5); ϵ 9300 (est.); sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Hydrolysis-resistant putative agonist of the second messenger cyclic ADP ribose (Cat. No. C 005) with significantly increased lipophilicity and membrane permeability. The parent compound N¹-cIDPR (Cat. No. C 098) is offered as well. Detailed technical information available. Reference for structurally related agonistic N¹-cIDPR analogues: Moreau et al., <i>J. Med. Chem.</i> , 49 , 5162 - 5176 (2006). <div> <div>0.5 μmol / ~0.3 mg € 129.- (B 085 - 005)</div> <div>5 x 0.5 μmol € 550.- (B 085 - 025)</div> </div>
B 065  	8- Bromo- cyclic adenosine diphosphate ribose (8-Br-cADPR) [151898-26-9]; $C_{15}H_{20}BrN_5O_{13}P_2$; MW 620.2 (free acid); λ_{\max} 264 nm; ϵ 15730; sodium salt; purity > 95% HPLC. For other salt forms or higher purity please inquire. Antagonist of the second messenger cyclic ADP ribose (Cat. No. C 005) with increased membrane permeability. Detailed technical information available. References: Walseth & Lee, <i>Biochim. Biophys. Acta</i> , 1178 , 235 - 242 (1993); Guse, <i>FEBS J.</i> , 272 , 4590 - 4597 (2005); Guse et al., <i>J. Biol. Chem.</i> , 280 , 15952 - 15959 (2005). <div> <div>0.5 μmol / ~0.3 mg € 124.- (B 065 - 005)</div> <div>5 x 0.5 μmol € 528.- (B 065 - 025)</div> <div>Inquiries for bulk quantities welcome!</div> </div>
B 071 	8- Bromo- cyclic inosine diphosphate ribose (8-Br-N¹-cIDPR) [638195-70-7]; $C_{15}H_{19}BrN_4O_{14}P_2$; MW 621.2 (free acid); λ_{\max} 255 nm (pH 4.9); ϵ 11145; sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Hydrolysis-resistant agonist of the second messenger cyclic ADP ribose (Cat. No. C 005) with increased membrane permeability. The parent compound N¹-cIDPR (Cat. No. C 098) is offered as well. Detailed technical information available. References: Kirchberger et al., <i>Brit. J. Pharmacol.</i> , 149 , 337 - 344 (2006); Kirchberger et al., <i>Biochem. J.</i> , 422 , 139 - 149 (2009). <div> <div>0.5 μmol / ~0.3 mg € 109.- (B 071 - 005)</div> <div>5 x 0.5 μmol € 462.- (B 071 - 025)</div> <div>Inquiries for bulk quantities welcome!</div> </div>
B 100  	8- Bromo- 7- deaza- cyclic adenosine diphosphate ribose (8-Br-7-CH-cADPR) [189876-06-0]; $C_{16}H_{21}BrN_4O_{13}P_2$; MW 619.2 (free acid); λ_{\max} 277 nm; ϵ 10850; sodium salt; purity > 97% HPLC. For other salt forms please inquire. 8-Br-7-CH-cADPR is a membrane-permeant and hydrolysis-resistant antagonist of the second messenger cADPR (Cat. No. C 005). Detailed technical information available. References: Sethi et al., <i>J. Biol. Chem.</i> , 272 , 16358 - 16363 (1997); Guse et al., <i>Nature</i> , 398 , 70 - 73 (1999); A.H. Guse, <i>Curr. Med. Chem.</i> , 11 , 847 (2004). <div> <div>0.5 μmol / ~0.3 mg € 285.- (B 100 - 005)</div> <div>5 x 0.5 μmol € 1,165.- (B 100 - 025)</div> </div>
B 086 	8- (4- tert.- Butylbenzylthio)- cyclic inosine diphosphate ribose (8-ptBBT-N¹-cIDPR) $C_{26}H_{34}N_4O_{14}P_2S$; MW 720.6 (free acid); λ_{\max} 275 nm (pH 5.5); ϵ 9300; sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Hydrolysis-resistant putative agonist of the second messenger cyclic ADP ribose (Cat. No. C 005 , below) with significantly increased lipophilicity and membrane permeability. The parent compound N¹-cIDPR (Cat. No. C 098) is offered as well. Detailed technical information available. Reference for structurally related agonistic N¹-cIDPR analogues: Moreau et al., <i>J. Med. Chem.</i> , 49 , 5162 - 5176 (2006). <div> <div>0.5 μmol / ~0.4 mg € 129.- (B 086 - 005)</div> <div>5 x 0.5 μmol € 550.- (B 086 - 025)</div> </div>
C 100 	8- (4- Chlorophenylthio)- cyclic inosine diphosphate ribose (8-pCPT-N¹-cIDPR) $C_{21}H_{23}ClN_4O_{14}P_2S$; MW 684.9 (free acid); λ_{\max} 274 nm (pH 5.5); ϵ 11000 (est.); sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Hydrolysis-resistant putative agonist of the second messenger cyclic ADP ribose (Cat. No. C 005) with significantly increased lipophilicity and membrane permeability. The parent compound N¹-cIDPR (Cat. No. C 098) is offered as well. Detailed technical information available. Reference for structurally related agonistic N¹-cIDPR analogues: Moreau et al., <i>J. Med. Chem.</i> , 49 , 5162 - 5176 (2006). <div> <div>0.5 μmol / ~0.3 mg € 129.- (C 100 - 005)</div> <div>5 x 0.5 μmol € 550.- (C 100 - 025)</div> </div>

C 005

High Purity!

**Cyclic adenosine diphosphate ribose (cADPR)**

[119340-53-3]; $C_{15}H_{21}N_5O_{13}P_2$; MW 541.3 (free acid); λ_{max} 260 nm; ϵ 12400; ammonium salt; purity > 98% HPLC. For other salt forms or analogues please inquire.

Modulates calcium release in many biological systems including plants. Second messenger, e.g. for glucose-induced insulin release. Detailed technical information available.

References: Lee et al., *J. Biol. Chem.*, **264**, 1608 - 1615 (1989); Dammermann & Guse, *J. Biol. Chem.*, **280**, 21394 - 21399 (2005); Kirchberger et al., *Br. J. Pharmacol.*, **149**, 337 - 344 (2006); Rah et al., *J. Biol. Chem.*, **285**, 21877 - 21887 (2010).

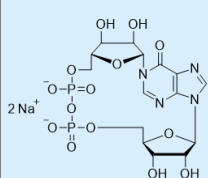
❄ Shipment on dry ice is essential to maintain original quality!

0.5 μ mol / ~0.3 mg

€ 109.- (C 005 - 005)

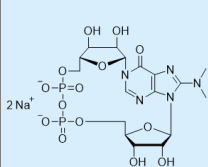
5 x 0.5 μ mol

€ 462.- (C 005 - 025)

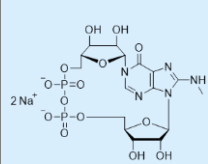
Inquiries for bulk quantities welcome!**Inquire****Cyclic adenosine diphosphate ribose, membrane-permeant prodrug form****C 098****Cyclic inosine diphosphate ribose (N¹-cIDPR)**

[856702-89-1]; $C_{15}H_{20}N_4O_{14}P_2$; MW 542.3 (free acid); λ_{max} 248 nm (pH 5); ϵ 8000; sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Metabolically stable agonist of the second messenger cyclic adenosine diphosphate ribose (Cat. No. [C 005](#)). Detailed technical information available.

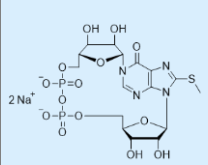
References: Wagner et al., *J. Org. Chem.*, **70**, 4810 - 4819 (2005); Kirchberger et al., *Br. J. Pharmacol.*, **149**, 337 - 344 (2006).

0.5 μ mol / ~0.3 mg € 129.- (C 098 - 005)5 x 0.5 μ mol € 550.- (C 098 - 025)**D 108****8- Dimethylamino- cyclic inosine diphosphate ribose (8-DMA-N¹-cIDPR)**

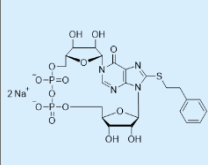
$C_{17}H_{25}N_5O_{14}P_2$; MW 585.4 (free acid); λ_{max} 266 nm (pH 7); ϵ 11500; sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Hydrolysis-resistant putative agonist of the second messenger cyclic ADP ribose (Cat. No. [C 005](#)) with increased lipophilicity and membrane permeability. The parent compound N¹-cIDPR (Cat. No. [C 098](#)) is offered as well. Detailed technical information available. Reference for structurally related agonistic N¹-cIDPR analogues: Moreau et al., *J. Med. Chem.*, **49**, 5162 - 5176 (2006).

0.5 μ mol / ~0.3 mg € 129.- (D 108 - 005)5 x 0.5 μ mol € 550.- (D 108 - 025)**M 063****8- Methylamino- cyclic inosine diphosphate ribose (8-MA-N¹-cIDPR)**

$C_{16}H_{23}N_5O_{14}P_2$; MW 571.3 (free acid); λ_{max} 265 nm (pH 5.5); ϵ 10400 (est.); sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Hydrolysis-resistant putative agonist of the second messenger cyclic ADP ribose (Cat. No. [C 005](#)) with increased lipophilicity and membrane permeability. The parent compound N¹-cIDPR (Cat. No. [C 098](#)) is offered as well. Detailed technical information available. Reference for structurally related agonistic N¹-cIDPR analogues: Moreau et al., *J. Med. Chem.*, **49**, 5162 - 5176 (2006).

0.5 μ mol / ~0.3 mg € 129.- (M 063 - 005)5 x 0.5 μ mol € 550.- (M 063 - 025)**M 064****8- Methylthio- cyclic inosine diphosphate ribose (8-MeS-N¹-cIDPR)**

$C_{16}H_{22}N_4O_{14}P_2S$; MW 588.4 (free acid); λ_{max} 270 nm (pH 5.5); ϵ 8700; sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Hydrolysis-resistant putative agonist of the second messenger cyclic ADP ribose (Cat. No. [C 005](#)) with increased lipophilicity and membrane permeability. The parent compound N¹-cIDPR (Cat. No. [C 098](#)) is offered as well. Detailed technical information available. Reference for structurally related agonistic N¹-cIDPR analogues: Moreau et al., *J. Med. Chem.*, **49**, 5162 - 5176 (2006).

0.5 μ mol / ~0.3 mg € 129.- (M 064 - 005)5 x 0.5 μ mol € 550.- (M 064 - 025)**P 034****8- Phenylethylthio- cyclic inosine diphosphate ribose (8-PhEtT-N¹-cIDPR)**

$C_{23}H_{28}N_4O_{14}P_2S$; MW 678.5 (free acid); λ_{max} 274 nm (pH 5.5); ϵ 9300 (est.); sodium salt; purity > 97% HPLC. For other salt forms or higher purity please inquire. Hydrolysis-resistant putative agonist of the second messenger cyclic ADP ribose (Cat. No. [C 005](#)) with significantly increased lipophilicity and membrane permeability. The parent compound N¹-cIDPR (Cat. No. [C 098](#)) is offered as well. Detailed technical information available. Reference for structurally related agonistic N¹-cIDPR analogues: Moreau et al., *J. Med. Chem.*, **49**, 5162 - 5176 (2006).

0.5 μ mol / ~0.3 mg € 129.- (P 034 - 005)5 x 0.5 μ mol € 550.- (P 034 - 025)**Inquire****Custom Syntheses and Bulk Supply**

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Alphabetical listing of products and abbreviations

Product Name	Page	Product Name	Page
A		E	
Adenosine-5'-O-diphospho-(1''-(4-nitrophenoxy)-ribose) (ADPR-pNP)	8	ε-ADPR	9
Adenosine-5'-O-diphosphoribose phosphate (ADPRP)	9	ε-ADP-Ribose	9
ε-ADPR	9	ε-ADPRP	9
ADPRP	9	ε-NAADP ⁺	8
ADPR Analogues	8	ε-NAD ⁺	7
ADPR-pNP	8	ε-NADP ⁺	7
ε-ADPRP	9	1,N ⁶ -Ethenoadenosine-5'-O-diphosphoribose (ε-ADPR)	9
6-AE-NAD ⁺	5	1,N ⁶ -Ethenoadenosine-5'-O-diphosphoribose phosphate (ε-ADPRP)	9
8-AET-N ¹ -cIDPR	10	8-ET-NAD ⁺	7
8-(2-Aminoethylthio)-cyclic inosine diphosphate ribose (8-AET-N ¹ -cIDPR)	10		
ara-2'-F-NAD ⁺	5	F	
B		N-2'-F-dAD ⁺	7
8-Benzylthio- cyclic inosine diphosphate ribose (8-BT-N ¹ -cIDPR)	10	2'-F-dADPR	9
6-Biotin-17-NAD ⁺	5	2'-F-deoxy-ADPR	9
8-Br-ADPR	9	6-Fluo-10-NAD ⁺	7
8-Br-cADPR	10	2'-Fluoro-NAD ⁺	7
8-Br-7-CH-ADPR	9		
8-Br-7-CH-cADPR	10	M	
8-Br-7-CH-NAD ⁺	6	8-MA-N ¹ -cIDPR	11
8-Br-N ¹ -cIDPR	10	8-MA-NAD ⁺	7
8-Br-IDPR	9	8-MeS-N ¹ -cIDPR	11
8-Br-NAD ⁺	5	8-Methylamino-cyclic inosine diphosphate ribose (8-MA-N ¹ -cIDPR)	11
8-Br-NHD ⁺	6	8-Methylthio-cyclic inosine diphosphate ribose (8-MeS-N ¹ -cIDPR)	11
8-Bromo-			
- adenosine-5'-O-diphosphoribose (8-Br-ADPR)	9	N	
- cyclic adenosine diphosphate ribose (8-Br-cADPR)	10	8-oN ₃ -BT-NAD ⁺	5
- cyclic inosine diphosphate ribose (8-Br-N ¹ -cIDPR)	10	8-pN ₃ -PACT-NAD ⁺	5
- 7-deazaadenosine-5'-O-diphosphoribose (8-Br-7-CH-ADPR)	9	β-NAADP ⁺	8
- 7-deaza-cyclic adenosine diphosphate ribose (8-Br-7-CH-cADPR)	10	ε-NAADP ⁺	8
- inosine-5'-O-diphosphoribose (8-Br-IDPR)	9	NAD Analogues	5
8-BT-N ¹ -cIDPR	10	ε-NAD ⁺	7
8-(4-tert.-Butylbenzylthio)-cyclic inosine diphosphate ribose	10	NADcP ⁺	5
8-BuT-NAD ⁺	6	ε-NADP ⁺	7
8-Bu(3-yne)T-NAD ⁺	6	2',3'-cyclic NADP ⁺	5
C		β-Nicotinamide-	
cADPR	11	- adenine dinucleotide-2',3'-monophosphate (2',3'-cyclic NADP ⁺)	5
cADPR Analogues	9	- N ⁶ -(2-aminoethyl)adenine dinucleotide (6-AE-NAD ⁺)	5
8-(4-Chlorophenylthio)-cyclic inosine diphosphate ribose	10	- 8-(2-azidobenzylthio)adenine dinucleotide (8-oN ₃ -BT-NAD ⁺)	5
N ¹ -cIDPR	11	- 8-(4-azidophenacylthio)adenine dinucleotide (8-pN ₃ -PACT-NAD ⁺)	5
cIDPR Analogues	9	- N ⁶ -(2-(6-(6-[biotinyl]AH)AH)AE)adenine dinucleotide	5
8-CPT-N ¹ -cIDPR	10	- 8-bromoadenine dinucleotide (8-Br-NAD ⁺)	5
cyclic adenosine diphosphate ribose (cADPR)	11	- 8-bromo-7-deazaadenine dinucleotide (8-Br-7-CH-NAD ⁺)	6
cyclic inosine diphosphate ribose (N ¹ -cIDPR)	11	- 8-bromohypoxanthine dinucleotide (8-Br-NHD ⁺)	6
8-cPeT-NAD ⁺	6	- 8-butylthioadenine dinucleotide (8-BuT-NAD ⁺)	6
2',3'-cyclic NADP ⁺	5	- 8-(3-butynylthio)adenine dinucleotide (8-Bu(3-yne)T-NAD ⁺)	6
D		- 8-(4-chlorophenylthio)adenine dinucleotide (8-cPCT-NAD ⁺)	6
N-2'-dAD ⁺	6	- 8-cyclopentylthioadenine dinucleotide (8-cPeT-NAD ⁺)	6
dADPR	9	- 2'-deoxyadenine dinucleotide (N-2'-dAD ⁺ / 2'-deoxy-NAD ⁺)	6
2'-deoxy-ADPR	9	- 2'-deoxy-2'-fluoroadenine dinucleotide (N-2'-F-dAD ⁺ / 2'-Fluoro-NAD ⁺)	7
2'-Deoxyadenosine-5'-O-diphosphoribose (dADPR / 2'-deoxy-ADPR)	9	- 8-dimethylaminoadenine dinucleotide (8-DMA-NAD ⁺)	7
2'-Deoxy-2'-fluoroadenosine-5'-O-diphosphoribose (2'-F-deoxy-ADPR)	9	- 1,N ⁶ -ethenoadenine dinucleotide (ε-NAD ⁺)	7
β-ara-2'-Deoxy-2'-fluoro-nicotinamide adenine dinucleotide	5	- 1,N ⁶ -ethenoadenine dinucleotide phosphate (ε-NADP ⁺)	7
2'-deoxy-NAD ⁺	6	- 8-ethylthioadenine dinucleotide (8-ET-NAD ⁺)	7
8-Dimethylamino-cyclic inosine diphosphate ribose (8-DMA-N ¹ -cIDPR)	11	- N ⁶ -(2-(6-[fluoresceinyl]AHAE)adenine dinucleotide (6-Fluo-10-NAD ⁺)	7
8-DMA-N ¹ -cIDPR	11	- 8-methylaminoadenine dinucleotide (8-MA-NAD ⁺)	7
8-DMA-NAD ⁺	7	- 8-phenylthioadenine dinucleotide (8-PT-NAD ⁺)	8
		- 8-piperidinoadenine dinucleotide (8-PIP-NAD ⁺)	8
		- N ⁶ -propargyladenine dinucleotide (6-Parg-NAD ⁺)	8
		- 8-propylthioadenine dinucleotide (8-PrT-NAD ⁺)	8
		β-Nicotinic acid adenine dinucleotide phosphate (β-NAADP ⁺)	8
		β-Nicotinic acid-1,N ⁶ -ethenoadenine dinucleotide phosphate (ε-NAADP ⁺)	8



Product Name	Page	Product Name	Page
P			
6-Parg-NAD ⁺	8		
8-pCPT-N ¹ -cIDPR	10		
8-pCPT-NAD ⁺	6		
8-Phenylethylthio-cyclic inosine diphosphate ribose (8-PhEtT-N ¹ -cIDPR)	11		
8-PhEtT-N ¹ -cIDPR	11		
8-PIP-NAD ⁺	8		
8-PrT-NAD ⁺	8		
8-PT-NAD ⁺	8		
8-ptBBT-N ¹ - cIDPR	10		



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- **Shipping** of your order will be prepared as soon as possible. Unless otherwise instructed, items requiring refrigeration may not be shipped on Thursday or Friday to avoid weekend storage under unsuitable conditions.
- **Prices** are shown in Euro and do not include taxes or foreign duties (if applicable). We reserve the right to change prices without prior written notice, however, products will not be shipped at an increased price without authorization from the customer.
- **Shipping costs** depend on destination: approx. € 30.- for customers in Germany, approx. € 30.- – € 100.- within Europe, and approx. € 100.- – € 350.- for the rest of the world. Air mail postal service may be available for some destinations without any additional costs. Dry ice shipments (strongly recommended for e.g. all triphosphates & diphosphates) will be extra charged. Please check every arriving parcel for any obvious damage before signing the receipt, otherwise compensation for broken vials is not possible.
- **Invoices** are payable net 30 days by bank transfer; no deductions accepted. European customers are urged to use the SEPA payment system. Corresponding bank details (BIC and IBAN) are shown on all our paper work. Prepayment may apply at our sole discretion.
- **Bulk:** Many of our products can be supplied in larger sizes. Favourable quotations for bulk quantities or discounts on purchase of multiple vials are available upon request.
- **Discounts** can be granted for amounts exceeding catalogue sizes, and for customers identified as permanent buyers. Standing orders with favourable conditions are possible upon request.
- **Support** for our products is provided in form of corresponding technical information that accompanies every product. Additional and updated data can be found on our website (www.biolog.de), especially regarding published references, lipophilicity and specificity. We try hard to support you with all background knowledge available to us, so please contact us by e-mail (service@biolog.de) in case you have special questions, or if you would like to suggest a new product.
- **Feed-back** on performance of our products is very much appreciated, be it positive or negative. It encourages us, helps us to improve, and leads to better and more qualified service for our customers. Also, we would like to hear about your new papers with our products, in order to have the citation included in the corresponding technical information.
- **Custom syntheses** of many structures not listed in this catalogue are offered. Please contact us with your research needs, and be sure to specify purity, salt form and amounts necessary.
- **Quality:** If you are not satisfied with our product, please contact us. Products may not be returned or an invoice annulled without prior written approval from BIOLOG. We cannot be held responsible for damage to material because of improper storage or handling after receipt.
- **Safety:** All products in this catalogue are sold for research purposes only and are **not** intended for human, drug, food additive, clinical, or household use. Only qualified professionals and trained laboratory staff familiar with their potential hazards and trained in good laboratory practices should handle them. Some of the products could be toxic or hazardous compounds. When available, information pertaining to the potential hazards is provided. However, the absence of a warning must **not** be interpreted as an indicator of safety. Material Safety Data Sheets (MSDS) are available upon request.



Terms and Conditions of Sale and Synthesis

Last updated: May 20, 2017

I. Conclusion of Contract

- The following conditions apply and become an integral part of all purchase or other orders for synthesis of products confirmed by us, Biolog Life Science Institute, and apply to all our quotations. They are deemed accepted and acknowledged by our clients in placing an order with us or in taking possession of the delivery. Divergent conditions of our clients whose application is not explicitly confirmed in writing by us are not binding even if there was no expressed contradiction.
- All our quotations are subject to change. The conclusion of the contract can be regarded final only after the client has received our order confirmation. Oral agreements, amendments or additions to the contract are binding only if confirmed by us in writing.
- We retain ownership, copyright and inventor's rights in all quotations, cost estimates, compound lists, structures and other documents. Quotations and connected documentation must not be disclosed to third parties unless our prior authorization has been obtained.
- The client accepts that personal data are recorded by us within the scope of the provisions of the BDSG (German Federal Data Protection Law).

II. Prices and Payment

- Prices shown on the web and in the printed catalogue are in Euro. For price information and our acceptance of other currencies such as US Dollar, please inquire.
- Prices shall be understood without value added tax. Shipping costs are extra charged (approx. Euro 30.00 within Germany; approx. Euro 40.00 - 100.00 within Europe, and for the rest of the world according to destination). Please note, that some products, e.g. all triphosphates, require courier transport with blue or dry ice in order to maintain their original high quality and purity. This will lead to extra costs, please inquire for details. Airmail postal service may be available for some destinations without any additional costs.
- We are entitled to charge our clients additionally to the contract price all increases in expenses accrued in connection with the supply or service provided such increases become effective after conclusion of the contract. This right is independent from the cause of increase as there are legal regulations or other regulations or factual reasons. Expenses which we debit to our clients are especially export and import charges as custom duties, price-adjustment levies and taxes, storage charges, insurance premiums and similar costs which are out of the scope of our direct influence.
- Along with the products ordered you will receive our invoice which is due net 30 days. Payment becomes overdue on the 31st day after invoice date. Invoices should be paid by bank transfer free of expenses for us. Bank details are given on the invoice.
- Without prejudice to any more extensive rights we are entitled in case of default of payment to demand interest on arrears of 8 % above the current discount rate published by the Deutsche Bundesbank.
- A set-off or other retention of payment in view of counter claims of the client is admissible only if the counter-claims have been acknowledged by us or the claims have been finally determined by court order.
- We are entitled to demand, in our choice, the provision of security through letter of credit or other securities such as prepayment. Should the client not comply with this demand within ten days, we have the rights, after expiry of an additional term of 5 days to repudiate the contract.

III. Terms of Delivery

- We are not obliged to comply with the agreed delivery term until the client has fulfilled his contractual obligations or duties imposed on him in particular the stipulated financial commitments. The term of delivery shall be complied with if the products to be delivered have left our premises or readiness for despatch has been announced.
- The term of delivery shall be adequately extended if the completion or delivery of the products is delayed by strikes, lockouts or other obstacles beyond our control (force majeure). We shall notify the client about such circumstances without undue delay.
- Delivery of products which are not produced by us is subject to obtaining punctual and complete supply ourselves.
- Goods may not be returned to us except with our prior permission. Goods can only be accepted for return if they are unopened and in good condition. Transport costs for returned goods are for the purchaser's account. Any returned items may be subject to a processing fee.

IV. Transition of Risk

- We despatch products on account and risk of our clients. The risk shall pass to the client, even with freight prepaid shipments, at the time the products are handed over to the carrier or with commencement of transit by ourselves or by acceptance by the persons instructed by the client. We undertake to assign existing rights and remedies against the carrier on first simple demand and unconditional payment of the contract price by the client.
- By unconditional acceptance of the products by the carrier or by the person instructed by the client all subsequent claims regarding the external condition (packing, leakage etc.) are precluded.
- Even if the delivered products show considerable faults, they have to be accepted by the client, however, without prejudice for subsequent guaranty claims concerning the product. The client must, however, examine the delivery in every respect for any lack of conformity with the contract and shall give notice of any lack of conformity with the contract or will be excluded with all subsequent claims.
- In the event the client defaults in the acceptance of the products or providing security, we are entitled, without prejudice to our rights for repudiation of the contract, to demand a lump sum indemnity of 5 % of the total delivery value. We as well as the client are not precluded from claiming and proving a higher or lower damage.

V. Retention of Title

- We retain the right of property in the products delivered until all our present or accessory claims against the client, irrespective of their cause, are settled. In acceptance of drafts or of bills of exchange or in assuming the liability under a bill of exchange by acceptance or issue of a bill of exchange the title in the products does not pass to the client before the draft or bill of exchange has been finally honoured and it has been ascertained that no claims can be lodged against us based upon the documentary credits. Inserting claims in a current account as well as acknowledgment of a balance does not affect the retention of title.
- The client is authorized to use the products supplied for research purposes only if not otherwise confirmed in writing. He is also entitled to mix or synthesize with the products at his own risk. The title in our products is extended to new products synthesized by our client. In case our title in the products is extinguished by combination, mixture up or incorporation of other products the client herewith transfers title in the new synthesized products to us which is held as security for all claims as per para. 1 above. The products we obtained title in are stored free of charge by the client without giving any cause of action against us in view of the mixing up, the synthesis or the storage of the products.
- In any case, the client agrees that any and all intellectual property or other rights, know-how, and methods relating to the synthesis or purchase contract remain our sole property.

VI. Guaranty and Liability

- We do not assume liability for oral advices of any kind - which are non-binding in any event - to the client. Any advice, oral or written, regarding the area of application of our products does not dispense the client from a self-responsible examination regarding the qualification of the products for the intended purposes or methods as well as of any infringement with issued or pending intellectual property rights belonging to third parties.
- Our products are for laboratory research use only if not otherwise confirmed in writing. They must not be used with human subjects or for clinical diagnosis or therapeutic use in humans or animals, including, but not limited to, commercial purposes, *in vitro* diagnostic purposes, *ex vivo* or *in vivo* therapeutic purposes, investigational use, in foods, drugs, devices or cosmetics of any kind, or for consumption by or use in connection with or administration or application to humans or animals.
- Our products are not sterile and are not regularly checked for endotoxins. Products carrying a charge are essentially desalted by common standard techniques for nucleotides. Please be aware, that efficacy of all known desalting methods is limited and dependent on properties of the particular product. Final preparations of products may therefore contain a minor residual salt content.
- The product descriptions on our web site and in our catalogue are accurate to the best of our knowledge. Since research applications are subjected to variable influences beyond our control, the products are offered without performance warranty, expressed or implied. In any case we reserve the right, from time to time, to modify composition and purity, in response to changes in the market conditions, raw material supply or other factors. Many products are new and experimental and have not been tested for toxicity. PLEASE NOTE THAT THE ABSENCE OF A WARNING STATEMENT DOES NOT IMPLY THAT THE PRODUCT IS NOT HAZARDOUS. Research products should be used only by qualified investigators or by technically trained personnel working under the direct supervision of such investigators. It is the investigator's responsibility to ensure the safe handling of all products.
- If any research product fails to meet the physical criteria ascribed to it on the catalogue, our web site or by any other analysis or description issued by us in writing, we will, after validating the deficiency, at the option of the client, either replace the deficient product in kind or will issue a Euro credit equivalent to the purchase price of the deficient product.
- We will not be liable under any legal theory (including but not limited to contract, negligence, strict liability in tort or warranty of any kind) for any indirect, special, incidental, consequential or exemplary damages (including but not limited to lost profits), even if we had notice of the possibility of such damages. We shall not be liable for any loss, damage or penalty as a result of any delay in or failure to deliver or otherwise perform hereunder. In any event the extent of our liability is restricted to the damage to the product itself.
- If the fault or omission of the ascribed quality is caused by the delivery or performance of a sub-supplier our liability is restricted to an assignment of our rights and remedies we have against the sub-supplier. We undertake to assign these rights and remedies on first simple demand. If the client is not able to recover from the sub-supplier, he is entitled to keep us liable according para. VI. 4. in a subsidiary way.
- Refund, replacement or any other claims is conditioned on client giving written notice to us within thirty (30) days after arrival of the products at its destination. Failure of client to give said notice within said thirty (30) days shall constitute a waiver by the client of all claims hereunder with respect to said material. Our liability under VI. 9. below remains unaffected.
- In any event, any claim of the client against us for, but not limited to refund, replacement, remuneration for consequential damages or otherwise is excluded under the statute of limitations after one year after arrival of the products at its destination. Our liability under VI. 9. below remains unaffected.
- Our liability for intention or gross negligence, for an expressed warranty, for the violation of an obligation which was of absolute material importance for the intended purpose of the contract, under the statute for the liability for defect products, and for personal injury or death remains unaffected. In cases of gross negligence and in cases of our failure to fulfil an obligation which was of absolute material importance for the intended purpose of the contract we are liable only for the immediate and foreseeable damage.
- As our products are delivered to the clients for research purposes only, the client shall indemnify us, without prejudice to our continuing legal rights and waiving any defence of limitation, without limit against any and all claims of third parties which are brought against us on the grounds of product liability, to the extent the claim is based on circumstances which were caused after risk passed to the client.

VII. Legal Clauses

- The sole and exclusive place of performance for all contractual or other obligations under the contract as well as the sole and exclusive place of jurisdiction shall be Bremen for both parties.
- Any dispute between the parties shall be governed by German law.
- In case one of the above stipulations has been proved invalid the validity of the remaining provisions remain unaffected.

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