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BIOLOG

Nucleosides

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*

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Nucleosides *(continued)*

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					
	1 µmol	**5 µmol**	**10 µmol**	**25 µmol**	**50 µmol**	**100 µmol**
	⇓	⇓	⇓	⇓	⇓	⇓
	Water or buffer volumes to be added to achieve stock concentrations on the left					
	⇓	⇓	⇓	⇓	⇓	⇓
100 mM (1×10^{-1} M)	10 µl	50 µl	100 µl	250 µl	500 µl	1 ml
50 mM (5×10^{-2} M)	20 µl	100 µl	200 µl	500 µl	1 ml	2 ml
20 mM (2×10^{-2} M)	50 µl	250 µl	500 µl	1.25 ml	2.5 ml	5 ml
10 mM (1×10^{-2} M)	100 µl	500 µl	1 ml	2.5 ml	5 ml	10 ml
5 mM (5×10^{-3} M)	200 µl	1 ml	2 ml	5 ml	10 ml	20 ml
1 mM (1×10^{-3} M)	1 ml	5 ml	10 ml	25 ml	50 ml	100 ml
500 µM (5×10^{-4} M)	2 ml	10 ml	20 ml	50 ml	100 ml	200 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

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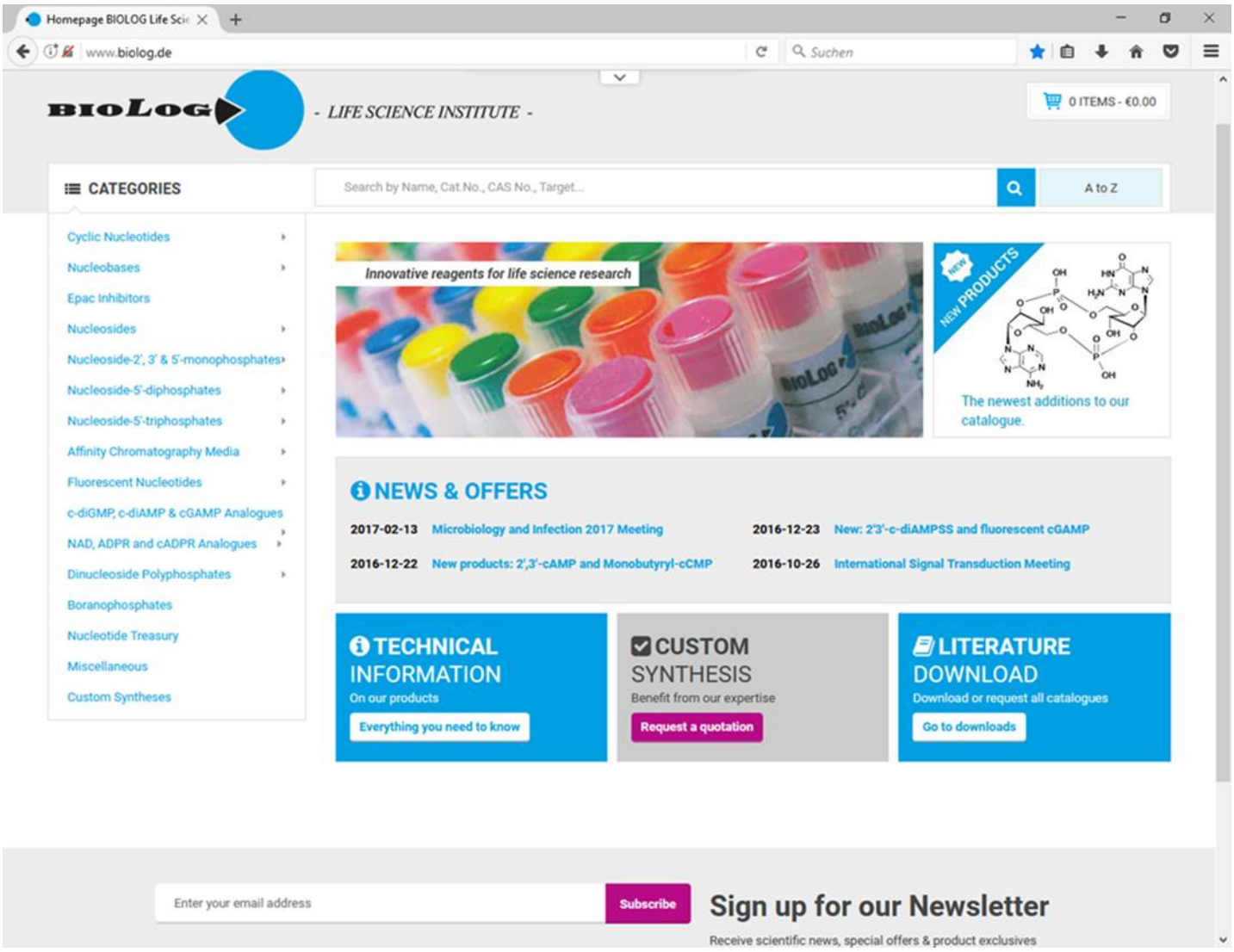
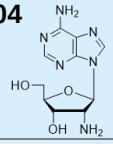


Nucleosides

A 104

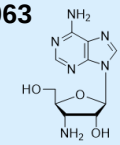


2'- Amino- 2'- deoxyadenosine (2'-AdA)

[10414-81-0]; $C_{10}H_{14}N_6O_3$; MW 266.3 (for free base); λ_{max} 259 nm; ε 15000; purity > 98% HPLC.
Detailed technical information available. Reference: Bressi et al., *J. Med. Chem.*, **44**, 2080 - 2093 (2001).

10 µmol / ~2.7 mg € 40.- (A 104 - 10)	5 x 10 µmol € 170.- (A 104 - 50)

A 063

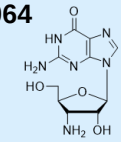


3'- Amino- 3'- deoxyadenosine (3'-AdA)

[2504-55-4]; $C_{10}H_{14}N_6O_3$; MW 266.3 (for free base); λ_{max} 259 nm; ε 15000; purity > 98% HPLC.
3'-AdA strongly inhibits nucleic acid labelling in Ehrlich ascites tumor cells. Detailed technical information available. Reference: Truman & Klenow, *Mol. Pharmacol.*, **4**, 77 - 86 (1968).

10 µmol / ~2.7 mg € 141.- (A 063 - 10)	5 x 10 µmol € 600.- (A 063 - 50)

A 064

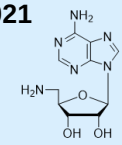


3'- Amino- 3'- deoxyguanosine (3'-AdG)

[80015-76-5]; $C_{10}H_{14}N_6O_4$; MW 282.3 (for free base); λ_{max} 252 nm; ε 13500; purity > 98% HPLC.
Detailed technical information available. References: Kissman et al., *J. Med. Chem.*, **6**, 407 - 409 (1963); Zielinski & Orgel, *Nucl. Acids Res.*, **13**, 2469 - 2484 (1985).

10 µmol / ~2.8 mg € 141.- (A 064 - 10)	5 x 10 µmol € 600.- (A 064 - 50)

A 021

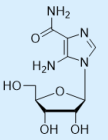


5'- Amino- 5'- deoxyadenosine (5'-NH_2-Ado)

[14365-44-7]; $C_{10}H_{14}N_6O_3$; MW 266.3 (for free base); chloride form; λ_{max} 259 nm; ε 15000; purity > 95% HPLC.
Inhibitor of adenosine kinase. Detailed technical information available. Reference: Langer et al., *Chem. Bio. Chem.*, **5**, 1508 - 1516 (2004).

10 µmol / ~2.7 mg € 90.- (A 021 - 10)	5 x 10 µmol € 383.- (A 021 - 50)

A 103

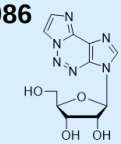


5- Aminoimidazole- 4- carboxamide- 1- ß- D- ribofuranoside (AICAR / Acadesine / Z- riboside)

[2627-69-2]; $C_9H_{14}N_4O_5$; MW 258.2; λ_{max} 265 nm; ε 12500; purity > 98% HPLC.
The membrane-permeable AICAR activates AMP-activated protein kinase (AMPK) via its phosphorylated metabolite AICAR-5'-MP (Cat. No. A 105). Detailed technical information available. References: Fediuc et al., *Endocrinology*, **147**, 5170 - 5177 (2006); Prasad et al., *J. Neurosci. Res.*, **84**, 614 - 625 (2006).

10 µmol / ~2.6 mg € 40.- (A 103 - 10)	5 x 10 µmol € 130.- (A 103 - 50)

A 086

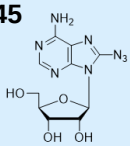


2- Aza- 1, N^6- ethenoadenosine (2-Aza-ε-Ado)

[50663-82-6]; $C_{11}H_{12}N_6O_4$; MW 292.3; λ_{max} 290 nm; ε 5000; purity > 95% HPLC.
Fluorescent analogue of adenosine. λ_{exc} 358 nm; λ_{em} 494 nm at pH 5. Detailed technical information available. References: Yip & Tsou, *Tetrahedron Lett.*, **33**, 3087 - 3090 (1973); Tsou et al., *Nucl. Acids Res.*, **1**, 531 - 547 (1974).

10 µmol / ~2.9 mg € 77.- (A 086 - 10)	5 x 10 µmol € 323.- (A 086 - 50)	**Inquiries for bulk quantities welcome!**

A 045

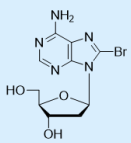


8- Azidoadenosine (8-N_3-Ado)

[4372-67-2]; $C_{10}H_{12}N_8O_4$; MW 308.3; λ_{max} 281 nm; ε 13000 (pH 6); purity > 95% HPLC.
Analogue for affinity labelling of adenosine receptors. Detailed technical information available. References: Jarvis et al., *J. Biol. Chem.*, **261**, 11077 - 11085 (1986); Viswanadhan et al., *Biochim. Biophys. Acta*, **1039**, 356 - 366 (1990).

100 µmol / ~31 mg € 79.- (A 045 - 100)	5 x 100 µmol € 332.- (A 045 - 500)	**Inquiries for bulk quantities welcome!**

B 027



8- Bromo- 2'- deoxyadenosine (8-Br-dAdo)

[14985-44-5]; $C_{10}H_{12}BrN_5O_3$; MW 330.1; λ_{max} 264 nm; ε 17000; purity > 98% HPLC.
Useful as starting structure for 2'-deoxyadenosine nucleotides modified in position 8, as cytotoxic nucleoside and of potential interest in research on bromine-stressed DNA. Detailed technical information available. References: Liu & Verdine, *Tetrahedr. Lett.*, **33**, 4265 - 4268 (1992); Coomber et al., *Int. J. Parasitol.*, **24**, 357 -365 (1994); Jimenez et al., *Photochem. Photobiol. Sci.*, **3**, 1042 - 1046 (2004).

10 µmol / ~3.3 mg € 86.- (B 027 - 10)	5 x 10 µmol € 366.- (B 027 - 50)

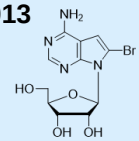
B 021

8- Bromo- 2'- deoxyguanosine (8-Br-dGuo)

[13389-03-2]; $C_{10}H_{12}BrN_5O_4$; MW 346.2; λ_{max} 258 nm; ε 15000; purity > 98% HPLC.
Useful as starting structure for 2'-deoxyguanosine nucleotides modified in position 8, and of potential interest in research on bromine-stressed DNA. Detailed technical information available. References: Lin, *J. Med. Chem.*, **28**, 1194 - 1198 (1985); Shen et al., *Biochemistry*, **40**, 2041 - 2051 (2001); Esposito et al., *Org. Biomol. Chem.*, **2**, 313 - 318 (2004).

10 µmol / ~3.5 mg € 86.- (B 021 - 10)	5 x 10 µmol € 366.- (B 021 - 50)

B 013

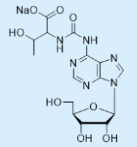


6- Bromotubercidin (8- Bromo- 7- deazaadenosine, 6-Br-Tu)

[78000-56-3]; $C_{11}H_{13}BrN_4O_4$; MW 345.2; λ_{max} 275 nm; ε 14000; purity > 97% HPLC.
Analogue of potential interest in antiviral research. Detailed technical information available. Reference: Bergstrom et al., *J. Med. Chem.*, **27**, 285 - 292 (1984).

5 µmol / ~1.7 mg € 114.- (B 013 - 05)	5 x 5 µmol € 484.- (B 013 - 25)

C 022

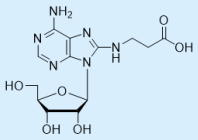


N^6- Carbamoylthreonyladenosine (t^6-Ado)

[24719-82-2]; $C_{15}H_{19}N_6O_8{\cdot}Na$; MW 434.4; λ_{max} 270 nm; ε 24900; purity > 98% HPLC.
Nucleoside with anticodon-adjacent base present in transfer ribonucleic acid. Detailed technical information available. References: Schweizer et al., *Biochem. Biophys. Res. Commun.*, **40**, 1046 - 1052 (1970); Hagemeier et al., *J. Clin. Chem. Clin. Biochem.*, **22**, 175 - 184 (1984); Morin et al., *RNA*, **4**, 24 – 37 (1998).

10 µmol / ~4.3 mg € 117.- (C 022 - 10)	5 x 10 µmol € 499.- (C 022 - 50)

C 092

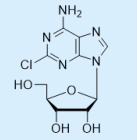


8- Carboxyethylaminoadenosine (8-CEA-Ado)

[1151916-53-8]; $C_{13}H_{18}N_6O_6$; MW 354.3; λ_{max} 278 nm; ε 17000; purity > 97% HPLC.
Reactive precursor for immobilisation and coupling of various ligands or dyes.
Detailed technical information available.

10 µmol / ~3.5 mg € 57.- (C 092 - 10)	5 x 10 µmol € 242.- (C 092 - 50)

C 017

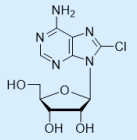


2- Chloroadenosine (2-Cl-Ado / 2-CADO)

[146-77-0]; $C_{10}H_{12}ClN_5O_4$; MW 301.7; λ_{max} 263 nm; ε 14000; purity > 98% HPLC.
Non-metabolizable, selective A (1) adenosine receptor agonist and useful as starting structure for nucleosides and nucleotides modified in position 2 of the purine nucleobase. Detailed technical information available. References: Evans et al., *Neurosci. Lett.*, **83**, 287 - 292 (1987); Bellezza et al., *Curr. Pharmaceut. Anal.*, **1**, 265 - 272 (2005).

100 µmol / ~30 mg € 54.- (C 017 - 100)	5 x 100 µmol € 229.- (C 017 - 500)	**Inquiries for bulk quantities welcome!**

C 006

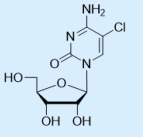


8- Chloroadenosine (8-Cl-Ado)

[34408-14-5]; $C_{10}H_{12}ClN_5O_4$; MW 301.7; λ_{max} 262 nm; ε 17000; purity > 98% HPLC.
Cytotoxic metabolite of 8-chloro cyclic AMP (Cat. No. C 007). Detailed technical information and updated reference list available. References: Cho-Chung et al., *Cancer Invest.*, **7**, 161 - 177 (1989); Gu et al., *Biochem. Pharmacol.*, **72**, 541 - 550 (2006).

10 µmol / ~3 mg € 49.- (C 006 - 10)	5 x 10 µmol € 208.- (C 006 - 50)	**Inquiries for bulk quantities welcome!**

C 034



5- Chlorocytidine (5-Cl-C)

[25130-29-4]; $C_9H_{12}ClN_3O_5$; MW 277.7; λ_{max} 287 nm; ε 7250; purity > 98% HPLC.
Biomarker for analysis of chlorine stressed RNA and useful starting structure for nucleosides and nucleotides modified in position 5 of the pyrimidine nucleobase. For 5-chlorocytosine please inquire. Detailed technical information available. Reference: Badouard et al., *J. Chromatogr.*, **827**, 26 - 31 (2005).

5 µmol / ~1.4 mg € 59.- (C 034 - 05)	5 x 5 µmol € 249.- (C 034 - 25)	**Inquiries for bulk quantities welcome!**

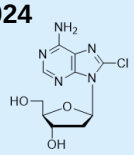
C 028

2- Chloro- 2'- deoxyadenosine (Cladribine, 2-Cl-dAdo, CdA)

[4291-63-8]; $C_{10}H_{12}ClN_5O_3$; MW 285.7; λ_{max} 263 nm; ε 14000; purity > 97% HPLC.
Adenosine deaminase-resistant analogue with antileukemic properties, probably effective via its corresponding triphosphate. Detailed technical information available. References: Wang et al., *J. Biol. Chem.*, **268**, 22847 - 22852 (1993); Beutler, *Semin. Hematol.*, **31**, 40 - 45 (1994).

100 µmol / ~29 mg € 67.- (C 028 - 100)	5 x 100 µmol € 285.- (C 028 - 500)

C 024



8- Chloro- 2'- deoxyadenosine (8-Cl-dAdo)

[85562-55-6]; $C_{10}H_{12}ClN_5O_3$; MW 285.7; λ_{max} 262 nm; ε 17000; purity > 95% HPLC.
Lipophilic analogue of 2'-deoxyadenosine (Coomber et al., *Int. J. Parasitol.*, **24**, 357 - 365 (1994)), and of potential interest in research on chlorine-stressed DNA. Detailed technical information available.

5 µmol / ~1.4 mg € 59.- (C 024 - 05)	5 x 5 µmol € 249.- (C 024 - 25)

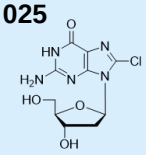
C 081

5- Chloro- 2'- deoxycytidine (5-Cl-dC / CldC)

[32387-56-7]; $C_9H_{12}ClN_3O_4$; MW 261.7; λ_{max} 287 nm; ε 7250; purity > 95% HPLC.
Tumor-selective radiosensitizer and of potential interest in research on chlorine-stressed DNA. Detailed technical information available. Reference: Hale et al., *Biochem. Pharmacol.*, **64**, 1493 - 1502 (2002).

5 µmol / ~1.3 mg € 70.- (C 081 - 05)	5 x 5 µmol € 300.- (C 081 - 25)

C 025

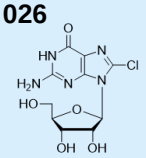


8- Chloro- 2'- deoxyguanosine (8-Cl-dGuo)

[437715-62-3]; $C_{10}H_{12}ClN_5O_4$; MW 301.7; λ_{max} 258 nm; ε 15000; purity > 95% HPLC.
Analogue of potential interest in research on chlorine-stressed DNA. Detailed technical information available. Reference: Masuda et al., *J. Biol. Chem.*, **276**, 40486 - 40496 (2001).

5 µmol / ~1.5 mg € 59.- (C 025 - 05)	5 x 5 µmol € 249.- (C 025 - 25)

C 026

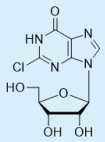


8- Chloroguanosine (8-Cl-Guo)

[2104-68-9]; $C_{10}H_{12}ClN_5O_5$; MW 317.7; λ_{max} 258 nm; ε 15000; purity > 98% HPLC.
Analogue of potential interest in research on chlorine-stressed RNA. Detailed technical information available. Reference: Masuda et al., *J. Biol. Chem.*, **276**, 40486 - 40496 (2001).

5 µmol / ~1.6 mg € 59.- (C 026 - 05)	5 x 5 µmol € 249.- (C 026 - 25)

C 021

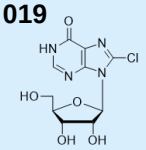


2- Chloroinosine (2-Cl-Ino)

[13276-43-2]; $C_{10}H_{11}ClN_4O_5$; MW 302.7; λ_{max} 255 nm; ε 13100; purity > 98% HPLC.
Potential metabolite of 2-chloroadenosine (Cat. No. C 017, p. 9) and useful as starting structure for nucleosides and nucleotides modified in position 2 of the purine nucleobase. Hypotensive effects in normo- and hypertensive rats. Detailed technical information available. Reference: Maling et al., *J. Appl. Biochem.*, **2**, 130 - 137 (1980).

10 µmol / ~3 mg € 80.- (C 021 - 10)	5 x 10 µmol € 339.- (C 021 - 50)	**Inquiries for bulk quantities welcome!**

C 019

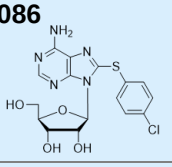


8- Chloroinosine (8-Cl-Ino)

[116285-77-9]; $C_{10}H_{11}ClN_4O_5$; MW 302.7; λ_{max} 252 nm; ε 10500; purity > 98% HPLC.
Potential metabolite of 8-chloro cyclic AMP (Cat. No. C 007) and 8-chloroadenosine (Cat. No. C 006, p. 9), respectively. Detailed technical information available. Reference: Lange-Carter et al., *Cancer Res.*, **53**, 393 - 400 (1993).

5 µmol / ~1.5 mg € 72.- (C 019 - 05)	5 x 5 µmol € 309.- (C 019 - 25)

C 086

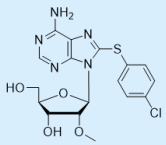


8- (4- Chlorophenylthio)adenosine (8-pCPT-Ado)

[85352-87-0]; $C_{16}H_{16}ClN_5O_4S$; MW 409.9; λ_{max} 282 nm; ε 16000; purity > 97% HPLC.
Potential metabolite of 8-CPT-cAMP (Cat. No. C 010). The corresponding 5'-monophosphate 8-pCPT-5'-AMP (Cat. No. C 101) as well as the nucleobase 8-pCPT-Ade (Cat. No. C 069) are also offered. Detailed technical information available.

10 µmol / ~4.1 mg € 57.- (C 086 - 10)	5 x 10 µmol € 242.- (C 086 - 50)	**Inquiries for bulk quantities welcome!**

C 070

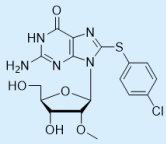


8- (4- Chlorophenylthio)- 2'- O- methyladenosine (8-pCPT-2'-O-Me-Ado)

[1187179-96-9]; $C_{17}H_{18}ClN_5O_4S$; MW 423.9; λ_{max} 282 nm; ε 16000; purity > 98% HPLC.
Potential metabolite of the specific Epac activator 8-pCPT-2'-O-Me-cAMP (Cat. No C 041). The corresponding 5'-monophosphate 8-pCPT-2'-O-Me-5'-AMP (Cat. No. C 078) as well as the nucleobase (Cat. No. C 069) are available as well. Detailed technical information available. Reference: Laxman et al., *Proc. Natl. Acad. Sci. USA*, **103**, 19194 - 19199 (2006).

10 µmol / ~4.2 mg € 171.- (C 070 - 10)	5 x 10 µmol € 726.- (C 070 - 50)

C 102

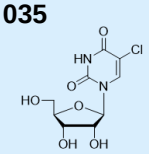


8- (4- Chlorophenylthio)- 2'- O- methylguanosine (8-pCPT-2'-O-Me-Guo)

[956935-50-5]; $C_{17}H_{18}ClN_5O_5S$; MW 439.9; λ_{max} 275 nm; ε 21500; purity > 97% HPLC.
Potential metabolite of the PKG- and Epac-inactive cGMP analogue 8-pCPT-2'-O-Me-cGMP (Cat. No. C 048). The corresponding nucleobase (Cat. No. C 076) is offered as well.
Detailed technical information available.

5 µmol / ~2.2 mg € 171.- (C 102 - 05)	5 x 5 µmol € 726.- (C 102 - 25)

C 035

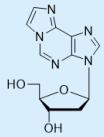


5- Chlorouridine (5-Cl-U)

[2880-89-9]; $C_9H_{11}ClN_2O_6$; MW 278.6; λ_{max} 277 nm; ε ~10000; purity > 98% HPLC.
Potential biomarker for analysis of chlorine stressed RNA. For related structures, such as 5-chlorouracil, please inquire.
Detailed technical information available. Reference: Sierakowska et al., *J. Biol. Chem*., **264**, 19185 - 19191 (1989).

5 µmol / ~1.4 mg € 59.- (C 035 - 05)	5 x 5 µmol € 249.- (C 035 - 25)	**Inquiries for bulk quantities welcome!**

D 080

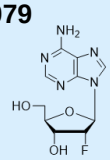


2'- Deoxy- 1, N^6- ethenoadenosine (ε-dAdo)

[68498-25-9]; $C_{12}H_{13}N_5O_3$; MW 275.3; λ_{max} 275 nm; ε 6000; purity > 97% HPLC.
Fluorescent analogue of 2'- deoxyadenosine, λ_{exc} 300 nm, λ_{em} 410 nm at pH 7. Detailed technical information available.
References: Eberle et al., *Carcinogenesis*, **10**, 209 - 212 (1989); Srivastava et al., *Nucl. Acids Res*., **22**, 1296 - 1304 (1994).

5 µmol / ~1.4 mg € 80.- (D 080 - 05)	5 x 5 µmol € 340.- (D 080 - 25)	**Inquiries for bulk quantities welcome!**

D 079

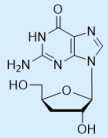


2'- Deoxy- 2'- fluoroadenosine (2'-F-dAdo)

[64183-27-3]; $C_{10}H_{12}FN_5O_3$; MW 269.2; λ_{max} 259 nm; ε 15000; purity > 97% HPLC.
Adenosine analogue with antiviral properties and starting material for corresponding nucleotide syntheses. Detailed technical information available. References: Morishita et al., *Acta Crystallogr*., **C40**, 434 - 436 (1984); Rollins et al., *Antiviral. Res*., **21**, 357 - 368 (1993).

5 µmol / ~1.3 mg € 90.- (D 079 - 05)	5 x 5 µmol € 383.- (D 079 - 25)

D 041

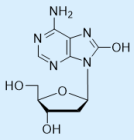


3'- Deoxyguanosine (3'-dG)

[3608-58-0]; $C_{10}H_{13}N_5O_4$; MW 267.3; λ_{max} 252 nm; ε 13500; purity > 98% HPLC.
Analogue of potential interest in antiviral and anti-amoebic research and starting structure for synthesis of corresponding di- and triphosphates. Detailed technical information available. References: Jenkins et al., *J. Org. Chem*., **30**, 2851 - 2852 (1965); Ghosal et al., *Int. J. Pharm.*, **194**, 15 - 20 (2000).

50 µmol / ~13 mg € 129.- (D 041 - 50)	5 x 50 µmol € 550.- (D 041 - 250)

D 050

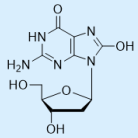


2'- Deoxy- 8- hydroxyadenosine (8-OH-dAdo)

[62471-63-0]; $C_{10}H_{13}N_5O_4$; MW 267.3; λ_{max} 268 nm; ε 11000; purity > 97% HPLC.
Reference for analysis of oxidative stress DNA hydrolysates. The corresponding ribo nucleoside (Cat. No. H 011, p. 12) and nucleobase (Cat. No. H 007) are available as well. Detailed technical information available. References: Sodum & Fiala, *Chem. Res. Toxicol*., **14**, 438 - 450 (2001); Frelon et al., *Free Radical Res*., **36**, 499 - 508 (2002).

5 µmol / ~1.3 mg € 70.- (D 050 - 05)	5 x 5 µmol € 300.- (D 050 - 25)

D 022

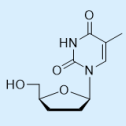


2'- Deoxy- 8- hydroxyguanosine (8-OH-dGuo)

[88847-89-6]; $C_{10}H_{13}N_5O_5$; MW 283.3; λ_{max} 245 / 293 nm; ε 12300 / 10300; purity > 97% HPLC. Reference for analysis of oxidative stress DNA hydrolysates. The corresponding ribo nucleoside (Cat. No. H 001, p. 12) and nucleobase (Cat. No. H 002) are available as well. Detailed technical information available. References: Pilger & Ruediger, *Int. Arch. Occup. Environ. Health*, **80**, 1 - 15 (2006); Orimo et al., *Cancer Science,* **97**, 99 - 105 (2006).

5 µmol / ~1.4 mg € 70.- (D 022 - 05)	5 x 5 µmol € 245.- (D 022 - 25)

D 040

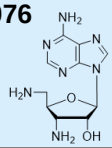


3'- Deoxythymidine / 2', 3'- Dideoxythymidine (ddT)

[3416-05-5]; $C_{10}H_{14}N_2O_4$; MW 226.2; λ_{max} 267 nm; ε 9600; purity > 98% HPLC.
Thymidine analogue of interest in antiviral research. Inhibits DNA polymerase ß and thymidine kinase. Detailed technical information available. References: Yamanaka et al., *Biol. Pharmaceut. Bull*., **20**, 163 - 167 (1997); Seiser et al., *J. Mol. Biol*., **265**, 153 - 160 (1997).

100 µmol / ~23 mg € 128.- (D 040 - 100)	5 x 100 µmol € 450.- (D 040 - 500)	**Inquiries for bulk quantities welcome!**

D 076

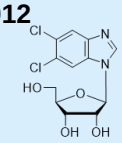


3', 5'- Diamino- 3', 5'- dideoxyadenosine (3',5'-DA-ddA)

[67313-23-9]; $C_{10}H_{15}N_7O_2$; MW 265.3; λ_{max} 259 nm; ε 15000; purity > 98% HPLC.
Starting structure for the synthesis of corresponding nucleotides and precursor for various tags. Detailed technical information available. Reference: Morr & Ernst, *Chem. Ber.*, **112**, 2815 - 2828 (1979).

5 µmol / ~1.3 mg € 164.- (D 076 - 05)	5 x 5 µmol € 692.- (D 076 - 25)

D 012

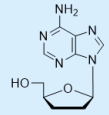


5, 6- Dichloro- 1- ß- D- ribofuranosyl benzimidazole (DRB)

[53-85-0]; $C_{12}H_{12}Cl_2N_2O_4$; MW 319.1; λ_{max} 254 nm; ε 6400; purity > 98% HPLC.
Inhibitor of casein kinase II and of RNA synthesis in eukaryotic cells. Detailed technical information and reference list available. Reference: Tamm & Sehgal, *Adv. Virus Res.,* **22**, 187 - 258 (1978).

100 µmol / ~32 mg € 55.- (D 012 - 100)	5 x 100 µmol € 232.- (D 012 - 500)	**Inquiries for bulk quantities welcome!**

D 002

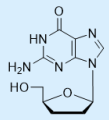


2', 3'- Dideoxyadenosine (ddA)

[4097-22-7]; $C_{10}H_{13}N_5O_2$; MW 235.3; λ_{max} 259 nm; ε 15000; purity > 98% HPLC.
Inhibitor of adenylate cyclase and adenosine deaminase. Antiviral nucleoside which blocks viral reverse transcription from RNA to DNA. Detailed technical information available. Reference: Mitsuya et al., *Proc. Natl. Acad. Sci. USA*, **84**, 2033 - 2037 (1987).

25 µmol / ~5.9 mg € 36.- (D 002 - 25)	5 x 25 µmol € 127.- (D 002 - 125)	**Inquiries for bulk quantities welcome!**

D 039



2', 3'- Dideoxyguanosine (ddG)

[85326-06-3]; $C_{10}H_{13}N_5O_3$; MW 251.3; λ_{max} 252 nm; ε 13500; purity > 98% HPLC.
Guanosine analogue of interest as inhibitor of guanylate cyclase and in antiviral research. Detailed technical information available. References: Suzuki et al., *Biochem. Biophys. Res. Commun.*, **156**, 1144 - 1151 (1988); Johnson, *Mol. Pharmacol.*, **35**, 681 - 688 (1989); Walters et al., *J. Pharm. Biomed. Anal.*, **19**, 955 - 965 (1999).

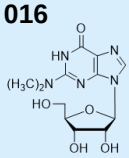
50 µmol / ~13 mg € 83.- (D 039 - 50)	5 x 50 µmol € 352.- (D 039 - 250)	**Inquiries for bulk quantities welcome!**

D 040

2', 3'- Dideoxythymidine / 3'- Deoxythymidine (ddT)

Please refer to the correct name 3'- deoxythymidine listed on p. 11.

D 016

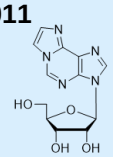


N^2, N^2- Dimethylguanosine (m_2^2 Guo)

[2140-67-2]; $C_{12}H_{17}N_5O_5$; MW 311.3; λ_{max} 262 nm; ε 12250 (pH 11); purity > 98% HPLC.
Reference for analysis of degenerated RNA. For other structures carrying the N^2, N^2-dimethylguanine nucleobase please inquire. N^2, N^2, 7- Trimethylguanosine is offered as well (Cat. No. T 009, p. 13). Detailed technical information available. Reference: Topp et al., *Nucleosides Nucleotides*, **12**, 585 - 596 (1993).

100 µmol / ~31 mg € 106.- (D 016 - 100)	5 x 100 µmol € 450.- (D 016 - 500)	**Inquiries for bulk quantities welcome!**

E 011

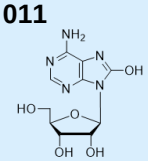


1, N^6- Ethenoadenosine (ε-Ado)

[39007-51-7]; $C_{12}H_{13}N_5O_4$; MW 291.3; λ_{max} 275 nm; ε 6000; purity > 95% HPLC.
Fluorescent analogue of adenosine, λ_{exc} 300 nm, λ_{em} 410 nm at pH 7. Detailed technical information available. References: Scheller & Sigel, *J. Am. Chem. Soc.*, **105**, 3005 - 3014 (1983); Miura et al., *Anal. Biochem.*, **196**, 84 - 88 (1991); Srivastava et al., *Nucl. Acids Res.*, **22**, 1296 - 1304 (1994).

10 µmol / ~2.9 mg € 41.- (E 011 - 10)	5 x 10 µmol € 176.- (E 011 - 50)	**Inquiries for bulk quantities welcome!**

H 011

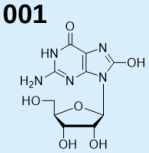


8- Hydroxyadenosine (8-OH-Ado)

[29851-57-8]; $C_{10}H_{13}N_5O_5$; MW 283.3; λ_{max} 268 nm; ε 11000; purity > 97% HPLC.
Reference for analysis of oxidative/radioactive stress RNA hydrolysates. The corresponding 2'-deoxynucleoside (Cat. No. D 050, p. 11) and nucleobase (Cat. No. H 007) are available as well. Detailed technical information available. Reference: Douki et al., *J. Chim. Phys. Physico-Chim. Biol.*, **96**, 138 - 142 (1999).

5 µmol / ~1.4 mg € 109.- (H 011 - 05)	5 x 5 µmol € 464.- (H 011 - 25)

H 001

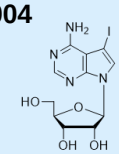


8- Hydroxyguanosine (8-OH-Guo)

[3868-31-3]; $C_{10}H_{13}N_5O_6$; MW 299.3; λ_{max} 245 / 293 nm; ε 12300 / 10300; purity > 98% HPLC.
Reference for analysis of oxidative stress RNA hydrolysates. The corresponding nucleobase (Cat. No. H 002) is available as well. For other 8-OH-nucleosides and nucleotides please inquire. Detailed technical information available. Reference: Takeuchi et al., *Carcinogenesis,* **14**, 1115 - 1120 (1993).

5 µmol / ~1.5 mg € 83.- (H 001 - 05)	5 x 5 µmol € 291.- (H 001 - 25)	**Inquiries for bulk quantities welcome!**

I 004



5- Iodotubercidin (5-I-Tu) / 7- Deaza- 7- iodoadenosine

[24386-93-4]; $C_{11}H_{13}IN_4O_4$; MW 392.2; λ_{max} 283 nm; ε 8500; purity > 98% HPLC.
Potent inhibitor of adenosine kinase and other protein kinases. Detailed technical information available. References: Flückiger-Isler et al., *Biochem. J.*, **292**, 85 - 91 (1993); Parkinson & Geiger, *J. Pharmacol. Exp. Ther.*, **277**, 1397 - 1401 (1996).

5 µmol / ~2 mg € 124.- (I 004 - 05)	5 x 5 µmol € 528.- (I 004 - 25)	**Inquiries for bulk quantities welcome!**

K 001

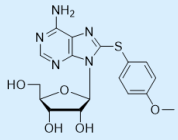
Ko-*Libri* Library of nucleosides and nucleobases

The Ko-*Libri* library of nucleobases and nucleosides is constantly growing. At present the collection contains a broad variety of mostly purine ß-D-ribofuranosides modified at various positions of the nucleobase and the ribose moiety, as well as some purine analogues. Additional details on p. 14.

❄ Shipment on dry ice is recommended to maintain original quality.

2.5 µmol each € 1,565.- (K 001 - 48)	*This library is constantly enlarged, please inquire for adjusted price*

M 062

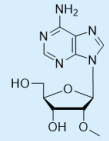


8- (4- Methoxyphenylthio)adenosine (8-pMeOPT-Ado)

[696574-56-8]; $C_{17}H_{19}N_5O_5S$; MW 405.4; λ_{max} 284 nm; ε 16000; purity > 97% HPLC.
The corresponding nucleobase is available as well (M 061). Detailed technical information available. Reference: Llauger et al., *J. Med. Chem.*, **48**, 2892 - 2905 (2005).

10 µmol / ~4 mg € 57.- (M 062 - 10)	5 x 10 µmol € 242.- (M 062 - 50)

M 054

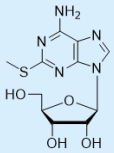


2'- O- Methyladenosine (2'-O-Me-Ado)

[2140-79-6]; $C_{11}H_{15}N_5O_4$; MW 281.3; λ_{max} 259 nm; ε 15000; purity > 98% HPLC.
Analogue with antiviral properties, starting material for 2'-O-methyl nucleotides. Potential metabolite of 2'-O-Me-cAMP (Cat. No. M 050). Detailed technical information available. References: Wei et al., *Proc. Nat. Acad. Sci. USA*, **72**, 318 - 322 (1975); Yamada et al., *Cell. Mol. Life Sci.*, **54**, 125 - 128 (1998).

10 µmol / ~2.8 mg € 44.- (M 054 - 10)	5 x 10 µmol € 187.- (M 054 - 50)	**Inquiries for bulk quantities welcome!**

M 033

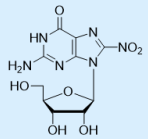


2- Methylthioadenosine (2-MeS-Ado)

[4105-39-9]; $C_{11}H_{15}N_5O_4S$; MW 313.4; λ_{max} 277 nm; ε 14700 (pH 11); purity > 98% HPLC.
Inhibitor of human betaine-homocysteine methyltransferase expression and starting material for 2-methylthio nucleotide analogues. Detailed technical information available. References: Zimmerman et al., *Biochemistry*, **19**, 2252 - 2259 (1980); Chattopadhyay et al., *Biochem. Biophys. Res. Commun.*, **343**, 203 - 207 (2006); Ou et al., *Biochem. J.*, **401**, 87 - 96 (2007).

10 µmol / ~3.1 mg € 68.- (M 033 - 10)	5 x 10 µmol € 291.- (M 033 - 50)

N 004

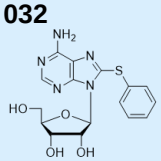


8- Nitroguanosine (8-NO_2-Guo)

[337536-53-5]; $C_{10}H_{12}N_6O_7$; MW 328.3; λ_{max} 390 nm; ε 4100; purity > 98% HPLC.
Reference for analysis of hydrolysates of RNA stressed by nitric oxide/superoxide and peroxynitrite, respectively. The corresponding nucleobase is available as well (Cat. No.: N 003). Instable, can contain some 8-nitroguanine. For 8-nitro-2'-deoxyguanosine or other 8- nitro nucleosides and nucleotides please inquire. Detailed technical information available. References: Masuda et al., *Chem. Biol. Interact.*, **139**, 187 - 197 (2002); Akuta et al., *Nitric Oxide*, **14**, 101 - 108 (2006).

5 µmol / ~1.6 mg € 217.- (N 004 - 05)	5 x 5 µmol € 924.- (N 004 - 25)

P 032

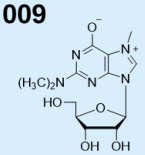


8- Phenylthioadenosine (8-PT-Ado)

[908117-27-1]; $C_{16}H_{17}N_5O_4S$; MW 375.4; λ_{max} 283 nm; ε 16000; purity > 97% HPLC.
Adenosine analogue modified in position 8 of the adenine nucleobase moiety, useful for receptor mapping studies. Detailed technical information available.

10 µmol / ~3.8 mg € 57.- (P 032 - 10)	5 x 10 µmol € 242.- (P 032 - 50)

T 009



N^2, N^2, 7- Trimethylguanosine ($m^{2,2,7}G$ / TMG)

[40027-70-1]; $C_{13}H_{19}N_5O_5$; MW 325.3 (internal salt); λ_{max} 267 nm; ε 13800 (pH 5); purity > 95% HPLC.
5' cap nucleoside of small nuclear RNAs. N^2, N^2- Dimethylguanosine is offered as well (Cat. No. D 016, p. 12). Detailed technical information available. References: Reddy et al., *J. Biol. Chem.*, **247**, 7245 - 7250 (1972); Bahia et al., *Nucleosides Nucleotides Nucleic Acids*, **25**, 909 - 923 (2006); Liou & Blumenthal, *Mol. Cell. Biol.*, **10**, 1764 - 1768 (1990).

5 µmol / ~1.6 mg € 169.- (T 009 - 05)	5 x 5 µmol € 716.- (T 009 - 25)

Inquire	**Special nucleosides not listed as regular products**
Updated speciality list on the web !	• Nucleosides of nearly all nucleobases listed in this catalogue • Additional 1, N^6-etheno modifications of many adenine nucleoside analogues listed • Fluorescent methylanthraniloyl (MANT) modification of 2'/3'-ribose hydroxyl groups • Nucleosides with attached spacers and reactive terminal group for immobilization as affinity ligands and for labelling • Affinity chromatography gels with immobilized nucleoside ligands • Nucleosides with attached fluorescent dyes For structures not listed please inquire or visit our website (www.biolog.de).

Ko-*Libri* Libraries

K 001 ❄

This library is permanently expanded, please inquire for current status and price.

Ko-*Libri* Library of Nucleosides and Nucleobases

10 mM solution of nucleobases and nucleosides dissolved in 250 µl DMSO in 1.4 ml polypropylene vials in 96 (8 x 12) well polypropylene racks. Purity of compounds: typically > 95% HPLC. Supporting datasheet and electronic datafiles (ISIS™/BASE and MSExcel) on CD. Current contents:

Nucleobases	Cat. No.	Nucleosides *continued*	Cat. No.
8-Chloroadenine	C 023	8-(4-Chlorophenylthio)guanosine	C 060
8-Chloroguanine	C 027	6-Chloropurine riboside	C 058
8-Hydroxyadenine	H 007	7-Deaza-7-iodoadenosine	I 004
8-Hydroxyguanine*	H 002	2'-Deoxyguanosine	D 065
* 1 mM		3'-Deoxyguanosine	D 041
Nucleosides		2'-Deoxy-8-hydroxyadenosine	D 050
2-Amino-6-chloropurine riboside	A 080	2'-Deoxyinosine	D 062
2',3'-O-*para*-Anisylideneguanosine	A 081	2,6-Dichloropurine riboside	D 064
5'-Amino-5'-deoxyguanosine	A 078	2,6-Dichloro-2',3',5'-triacetylpurine riboside	D 063
5'-Azido-5'-deoxyguanosine	A 079	5,6-Dichlorobenzimidazole riboside	D 012
8-Azidoadenosine	A 045	2',3'-Dideoxyadenosine	D 002
8-Bromoadenosine	B 033	2',3'-Dideoxyguanosine	D 039
8-Bromo-2'-deoxyadenosine	B 027	2',3'-Dideoxythymidine	D 040
8-Bromo-2'-deoxyguanosine	B 021	8-Hydroxyadenosine	H 011
8-Bromoguanosine	B 036	8-Hydroxyguanosine	H 001
8-Bromo-2'-O-methylguanosine	B 034	Inosine	I 006
8-Bromo-2',3',5'-tri-O-acetylguanosine	B 038	2',3'-Isopropylideneguanosine	I 007
8-Bromoxanthosine	B 039	2',3'-Isopropylideneinosine	I 005
2-Chloroadenosine	C 017	8-Mercaptoguanosine	M 046
8-Chloroadenosine	C 006	6-Mercaptopurine riboside	M 044
5-Chlorocytidine	C 034	2'-O-Methylguanosine	M 045
2-Chloro-2'-deoxyadenosine	C 028	6-Methylmercaptopurine riboside	M 043
8-Chloroguanosine	C 026	Purine riboside	P 016
2-Chloroinosine	C 021	2',3',5'-Triacetylinosine	T 006
8-Chloroinosine	C 019	2',3',5'-Tri-O-benzoylguanosine	T 007

2.5 µmol each € 1,565.- (K 001 - 48) ❄ Shipment on dry ice is recommended to maintain original quality

Inquire	**Special nucleobases, nucleosides or nucleotides not listed as library products**
	The *Ko-Libri* libraries of nucleobases, nucleosides and cyclic nucleotides are constantly growing. If you miss a group of compounds to be added or if you are interested in a custom-made library collection or a special format, please inquire. **All library compounds are available as single compounds as well.**

Alphabetical listing of products and abbreviations

We appreciate your interest in our product line. Please take a moment to review the following notes:

- **Orders** can be placed at our online shop, but are welcome by phone, e-mail, fax or regular mail as well, of course. Customers from EC countries are requested to submit the European tax registration number of their institution along with their order.

- **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). There are no packing or transport costs for air mail delivery, however, courier service and dry ice shipments (recommended for e.g. all triphosphates & diphosphates) will be extra charged. 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.

- **Courier** costs depend on destination: approx. € 35.- for customers in Germany, € 50.- – € 150.- within Europe, and € 100.- – € 350.- for the rest of the world. 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.

- **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

1. 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.
2. 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.
3. 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.
4. 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

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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

1. 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.
2. 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.
3. Delivery of products which are not produced by us is subject to obtaining punctual and complete supply ourselves.
4. 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

1. 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.
2. 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.
3. 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.
4. 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

1. 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.
2. 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.
3. 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

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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

1. 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.
2. Any dispute between the parties shall be governed by German law.
3. In case one of the above stipulations has been proved invalid the validity of the remaining provisions remain unaffected.

BIOLOG - *LIFE SCIENCE INSTITUTE* -

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