

Table S1. Abbreviations of cAMP analogues

	cAMP	Adenosine-3',5'-cyclic monophosphate
2'-modification	Z-001 2'-dcAMP	2'-Deoxyadenosine-3',5'-cyclic monophosphate
	Z-002 2'-F-cAMP	2'-Deoxy-2'-fluoroadenosine-3',5'-cyclic monophosphate
	Z-003 2'-NH₂-cAMP	2'-Deoxy-2'-aminoadenosine-3',5'-cyclic monophosphate
	Z-004 2'-O-Me-cAMP	2'-O-Methyladenosine-3',5'-cyclic monophosphate
	Z-005 2'-O-Pr-cAMP	2'-O-Propyladenosine-3',5'-cyclic monophosphate
	Z-006 2'-O-Bu-cAMP	2'-O-Butyladenosine-3',5'-cyclic monophosphate
	Z-007 2'-O-AlI-cAMP	2'-O-Allyladenosine-3',5'-cyclic monophosphate
	Z-008 2'-O-Bn-cAMP	2'-O-Benzyladenosine-3',5'-cyclic monophosphate
8-modification	L-001 8-Cl-cAMP	8-Chloroadenosine-3',5'-cyclic monophosphate
	L-002 8-Br-cAMP	8-Bromoadenosine-3',5'-cyclic monophosphate
	L-003 8-NH ₂ -cAMP	8-Aminoadenosine-3',5'-cyclic monophosphate
	L-004 8-N ₃ -cAMP	8-Azidoadenosine-3',5'-cyclic monophosphate
	L-005 8-MeA-cAMP	8-Methylaminoadenosine-3',5'-cyclic monophosphate
	L-006 8-AEA-cAMP	8-(2-Aminoethylamino)adenosine-3',5'-cyclic monophosphate
	L-007 8-OHEA-cAMP	8-(2-Hydroxyethylamino)adenosine-3',5'-cyclic monophosphate
	L-008 8-OHBuA-cAMP	8-(4-Hydroxybutylamino)adenosine-3',5'-cyclic monophosphate
	L-009 8-HA-cAMP	8-Hexylaminoadenosine-3',5'-cyclic monophosphate
	L-010 8-AHA-cAMP	8-(6-Aminohexylamino)adenosine-3',5'-cyclic monophosphate
	L-011 8-AIIA-cAMP	8-Allylaminoadenosine-3',5'-cyclic monophosphate
	L-012 8-(S-2-OHPrA)-cAMP	8-(2-(+)-S-Hydroxypropylamino)adenosine-3',5'-cyclic monophosphate
	L-013 8-cHA-cAMP	8-cycloHexylaminoadenosine-3',5'-cyclic monophosphate
	L-014 8-BnA-cAMP	8-Benzylaminoadenosine-3',5'-cyclic monophosphate
	L-015 8-DMeA-cAMP	8-Dimethylaminoadenosine-3',5'-cyclic monophosphate
	L-016 8-DEA-cAMP	8-Diethylaminoadenosine-3',5'-cyclic monophosphate
	L-017 8-Pyr-cAMP	8-Pyrrolidinoadenosine-3',5'-cyclic monophosphate
	L-018 8-PIP-cAMP	8-Piperidinoadenosine-3',5'-cyclic monophosphate
	L-019 8-PIA-cAMP	8-Piperazinoadenosine-3',5'-cyclic monophosphate
	L-020 8-Morph-cAMP	8-Morpholinoadenosine-3',5'-cyclic monophosphate
	L-021 8-OH-cAMP	8-Hydroxyadenosine-3',5'-cyclic monophosphate
	L-022 8-MeO-cAMP	8-Methoxyadenosine-3',5'-cyclic monophosphate
	L-023 8-BnO-cAMP	8-Benzyloxyadenosine-3',5'-cyclic monophosphate
	L-024 8-MeT-cAMP	8-Methylthioadenosine-3',5'-cyclic monophosphate
	L-025 8-BnT-cAMP	8-Benzylthioadenosine-3',5'-cyclic monophosphate
	L-026 8-pCPT-cAMP	8-(4-Chlorophenylthio)adenosine-3',5'-cyclic monophosphate
	L-027 8-MeSe-cAMP	8-Methylselenoadenosine-3',5'-cyclic monophosphate
	L-028 8-BnSe-cAMP	8-Benzylselenoadenosine-3',5'-cyclic monophosphate

Table S1. Continuation 1 of 2

	N-001	N ⁶ -Bn-cAMP	N ⁶ -Benzyladenosine-3',5'-cyclic monophosphate
	N-002	N ⁶ -Bnz-cAMP	N ⁶ -Benzoyladenosine-3',5'-cyclic monophosphate
	N-003	N ⁶ -Phe-cAMP	N ⁶ -Phenyladenosine-3',5'-cyclic monophosphate
2'-modification + 8-modification	D-001	8-MeA-2'-Cl-cAMP	8-Methylamino-2'-deoxy-2'-chloroadenosine-3',5'-cyclic monophosphate
	D-002	8,2'-DMeT-cAMP	8,2'-Dimethylthioadenosine-3',5'-cyclic monophosphate
	D-003	8-Br-2'-Cl-cAMP	8-Bromo-2'-deoxy-2'-chloroadenosine-3',5'-cyclic monophosphate
	D-004	8-Br-2'-F-cAMP	8-Bromo-2'-deoxy-2'-fluoroadenosine-3',5'-cyclic monophosphate
	D-005	8-Br-2'-O-Me-cAMP	8-Bromo-2'-O-methyladenosine-3',5'-cyclic monophosphate
	D-006	8,2'-DCI-cAMP	8,2'-Dichloroadenosine-3',5'-cyclic monophosphate
	D-007	8-pCPT-2'-O-Me-cAMP	8-(4-Chlorophenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate
	D-008	8-pOHT-2'-O-Me-cAMP	8-(4-Hydroxyphenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate
	D-009	8-pMeOPT-2'-O-Me-cAMP	8-(4-Methoxyphenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate
	D-010	8-OH-2'-O-Me-cAMP	8-Hydroxy-2'-O-methyladenosine-3',5'-cyclic monophosphate
	D-011	8-BnT-2'-F-cAMP	8-Benzylthio-2'-deoxy-2'-fluoroadenosine-3',5'-cyclic monophosphate
	D-012	8-BnSe-2'-O-Bn-cAMP	8-Benzylseleno-2'-O-benzyladenosine-3',5'-cyclic monophosphate
	D-013	8-BnSe-2'-O-Me-cAMP	8-Benzylseleno-2'-O-methyladenosine-3',5'-cyclic monophosphate
	S-000	Sp-cAMPS	Adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
phosphorothioate with 8- and/or 2'-modification	S-010	Sp-8-Br-cAMPS	8-Bromoadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-011	Sp-8-Br-2'dcAMPS	8-Bromo-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-012	Sp-8-Br-2'-F-cAMPS	8-Bromo-2'-deoxy-2'-fluoroadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-013	Sp-8-Br-2'-Cl-cAMPS	8-Bromo-2'-deoxy-2'-chloroadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-014	Sp-8-Br-2'-O-Me-cAMPS	8-Bromo-2'-O-methyladenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-020	Sp-8-Cl-cAMPS	8-Chloroadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-021	Sp-8,2'-Cl-cAMPS	8,2'-Dichloroadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-030	Sp-8-MeA-cAMPS	8-Methylaminoadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-031	Sp-8-MeA-2'-dcAMPS	8-Methylamino-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-032	Sp-8-MeA-2'-F-cAMPS	8-Methylamino-2'-deoxy-2'-fluoroadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-033	Sp-8-MeA-2'-Cl-cAMPS	8-Methylamino-2'-deoxy-2'-chloroadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-034	Sp-8-MeA-2'-O-Me-cAMPS	8-Methylamino-2'-O-methyladenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-040	Sp-8-EA-cAMPS	8-Ethylaminoadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-050	Sp-8-iPrA-cAMPS	8- <i>iso</i> Propylaminoadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-060	Sp-8-ADOA-cAMPS	8-(8-Amino-3,6-dioxaoctylamino)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-070	Sp-8-DMeA-cAMPS	8-Dimethylaminoadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-080	Sp-8-EMeA-cAMPS	8-Ethylmethylaminoadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-090	Sp-8-DEA-cAMPS	8-Diethylaminoadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-100	Sp-8-iPrMeA-cAMPS	8- <i>iso</i> Propylmethylaminoadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-110	Sp-8-PIP-cAMPS	8-Piperidinoadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer

Table S1. Continuation 2 of 2

phosphorothioate with 8- and/or 2'-modification	S-120	Sp-8-PIA-cAMPS	8-Piperazinoadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-130	Sp-8-OH-cAMPS	8-Hydroxyadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-140	Sp-8-MeO-cAMPS	8-Methoxyadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-150	Sp-8-BnO-cAMPS	8-Benzyloxyadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-160	Sp-8-MeT-cAMPS	8-Methylthioadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-170	Sp-8-MeT-2'-F-cAMPS	8-Methylthio-2'-deoxy-2'-fluoroadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-180	Sp-8-MeT-2'-O-Me-cAMPS	8-Methylthio-2'-O-methyladenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-190	Sp-8-PheET-cAMPS	8-Phenylethylthioadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-200	Sp-8-pOHPT-cAMPS	8-(4-Hydroxyphenylthio)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-201	Sp-8-pOHPT-2'-F-cAMPS	8-(4-Hydroxyphenylthio)-2'-deoxy-2'-fluoroadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-202	Sp-8-pOHPT-2'-O-Me-cAMPS	8-(4-Hydroxyphenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-210	Sp-8-pCPT-cAMPS	8-(4-Chlorophenylthio)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-211	Sp-8-pCPT-2'-O-Me-cAMPS	8-(4-Chlorophenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-220	Sp-8-BnT-cAMPS	8-Benzylthioadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-221	Sp-8-BnT-2'-dcAMPS	8-Benzylthio-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-222	Sp-8-BnT-2'-F-cAMPS	8-Benzylthio-2'-deoxy-2'-fluoroadenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-223	Sp-8-BnT-2'-O-Me-cAMPS	8-Benzylthio-2'-O-methyladenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-230	Sp-8-pMeBnT-cAMPS	8-(4-Methylbenzylthio)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-240	Sp-8-ptBuBnT-cAMPS	8-(4- <i>tert</i> Butylbenzylthio)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-250	Sp-8-pMeOBnT-cAMPS	8-(4-Methoxybenzylthio)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-260	Sp-8-pCBnT-cAMPS	8-(4-Chlorobenzylthio)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-270	Sp-8-oCBnT-cAMPS	8-(2-Chlorobenzylthio)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-280	Sp-8-pFBnT-cAMPS	8-(4-Fluorobenzylthio)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-290	Sp-8-mNBnT-cAMPS	8-(3-Nitrobenzylthio)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-300	Sp-8-mTFMeBnT-cAMPS	8-(3-Trifluoromethylbenzylthio)adenosine-3',5'-cyclic monophosphorothioate, Sp- isomer
	S-400	Sp-5,6-DCI-cBIMPS	5,6-Dichlorobenzimidazole riboside-3',5' cyclic monophosphorothioate, Sp- isomer
	R-000	Rp-cAMPS	Adenosine-3',5'-cyclic monophosphorothioate, Rp- isomer

Analogues printed in bold were synthesised for the first time, to our knowledge, during this study. For a visualisation of the chemical structures see Figure 2.