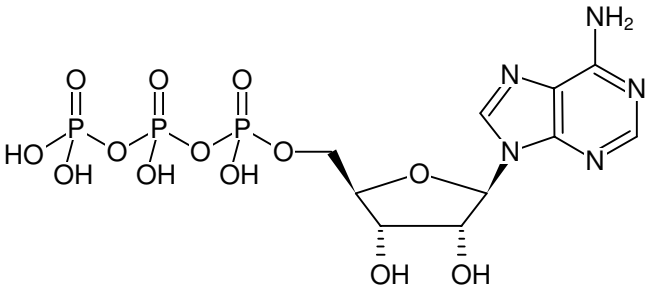
DATA SHEET

LAROVA
The Nucleotide Company

ATP - Solution

Adenosine-5'-triphosphate, Sodium salt

Cat. No.	Amount
ATP_1ML	1 ml (100 mM)
ATP_10ML	10 ml (100 mM)
ATP_100ML	100 ml (100 mM)
ATP_200ML	200 ml (100 mM)



Structural formula of ATP - Solution

For *in vitro* use only!

Shipping: shipped on blue ice

Storage Conditions: store at -20 °C

Additional Storage Conditions: Short term exposure (up to 1 week cumulative) to ambient temperature possible.

Shelf Life: 12 months

Molecular Formula: $C_{10}H_{16}N_5O_{13}P_3$ (free acid)

Molecular Weight: 507.18 g/mol (free acid)

Exact Mass: 507.00 g/mol (free acid)

CAS#: 987-65-5

Purity: ≥ 99.0 % (HPLC)

Form: clear aqueous solution

Concentration: 100 mM ±2 %

pH: 8.0 ±0.2 (22 °C)

Spectroscopic Properties: λ_{max} 259 nm, ε 15.1 L mmol^{-1} cm^{-1} (Tris-HCl pH 7.0)

Applications:
ATP-sensitive calcium channels[1]

V-ATPases (cellular proton pumps)[2]

ATP-coupled chromatin remodelling[3]

ATP-binding cassette transporters[4]

ATP-grasp enzymes[5]

Agonistic ligand, mainly for nucleoside receptor A_1
Nucleoside-triphosphates can be converted by different membrane-bound phosphatases into nucleosides acting as nucleoside receptor ligands.

Specific Ligands:

Ligand for purinergic receptors:
$P2X_1$-$P2X_3$[6,7]
$P2X_{1/4}$[8]
$P2X_4$[7]
$P2X_7$[9,10,11]
$P2X_1$ - $P2X_7$[12]
$P2Y_1$[10,14]
$P2Y_2$[13,14]
$P2Y_{11}$[14]

Quality Control Specifications: in vitro transcription (T7 RNA polymerase): visible RNA fragments after 5 min incubation, DNases, RNases, Nicking Activity: not detectable, Proteases: not detectable

Selected References:

[1] Wang *et al.* (2011) The biological effect of endogenous sulfur dioxide in the cardiovascular system. *Eur. J. Pharmacol.* **670 (1)**:1.

[2] Scott *et al.* (2011) Duelling functions of the V-ATPase. *EMBO J.* **30 (20)**:4113.

[3] Erdel *et al.* (2011) Chromatin remodelling in mammalian cells by ISWI-type complexes–where, when and why? *FEBS J.* **278 (19)**:3608.

[4] Gatti *et al.* (2011) Novel insights into targeting ATP-binding cassette transporters for antitumor therapy. *Curr. Med. Chem.* **18 (27)**:4237.

[5] Fawaz *et al.* (2011) The ATP-grasp enzymes. *Bioorg. Chem.* **39 (5)**:185.

[6] Lambertucci *et al.* (2015) Medicinal chemistry of P2X receptors: Agonists and orthosteic antagonists. *Curr. Med. Chem.* **22 (7)**:915.

[7] Ralevic (2015) P2X receptors in the cardiovascular system and their potential as therapeutic targets in disease. *Curr. Med. Chem.* **22 (7)**:851.

[8] Harhun *et al.* (2014) ATP-evoked sustained vasoconstrictions mediated by heteromeric P2X1/4 receptors in cerebral arteries. *Stroke* **45 (8)**:2444.

ATP - Solution

Adenosine-5'-triphosphate, Sodium salt

[9] Facci *et al.* (2014) Toll-like receptors 2, -3 and -4 prime microglia but not astrocytes across central nervous system regions for ATP-dependent interleukin-1β release. *Sci. Rep.* **4**:6824.

[10] Stolz *et al.* (2015) Homodimeric anoctamin-1, but not homodimeric anoctamin-6, is activated by calcium increases mediated by the P2Y1 and P2X7 receptors. *Pflugers Archiv* DOI:10.1007/s00424-015-1687-3.

[11] Lord *et al.* (2014) Pharmacology of a novel central nervous system-penetrant P2X7 antagonist JNJ-42253432. *J. Pharmacol. Exp. Ther.* **351 (3)**:628.

[12] Dal Ben *et al.* (2015) Purinergic P2X receptors: Structural models and analysis of ligand-target interaction. *Eur. J. Med. Chem.* **89**:561.

[13] Xie *et al.* (2014) The P2Y2 nucleotide receptor mediates the proliferation and migration of human hepatocellular carcinoma cells induced by ATP. *J. Biol. Chem.* **289 (27)**:19137.

[14] Kim *et al.* (2002) Methanocarba modification of uracil and adenine nucleotides: High potency of northern ring conformation at P2Y1, P2Y2, P2Y4 and P2Y11 but not P2Y6 receptors. *J. Med. Chem.* **45**:208.

Volonte *et al.* (2009) Membrane components and purinergic signalling: the purinome, a complex interplay among ligands, degrading enzymes, receptors and transporters. *FEBS J.* **276**:318.

Yegutkin (2008) Nucleotide and nucleoside converting enzymes: Important modulators of purinergic signalling cascade. *Biochim. Biophys. Acta* **1783**:673.

Hasko *et al.* (2007) Shaping of monocyte and macrophage function by adenosine receptors. *Pharmacol.& Therapeutics* **113**:264.

Holland *et al.* (1991) Detection of specific polymerase chain reaction product by utilizing the 5'—-3' exonuclease activity of *Thermus aquaticus* DNA polymerase. *Proc. Natl. Acad. Sci. USA* **88 (16)**:7276.

Erlich *et al.* (1988) Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase. *Science* **29 (239)**:487.

Williams *et al.* (1986) Effects of purine nucleotides on the binding of [3H]cyclopentyladenosine to adenosine A1-receptors in rat brain membranes. *J. Neurochem.* **47 (1)**:88.

Sanger *et al.* (1977) DNA sequencing with chain-terminating inhibitors. *Proc. Natl. Acad. Sci. USA* **74**:5463.

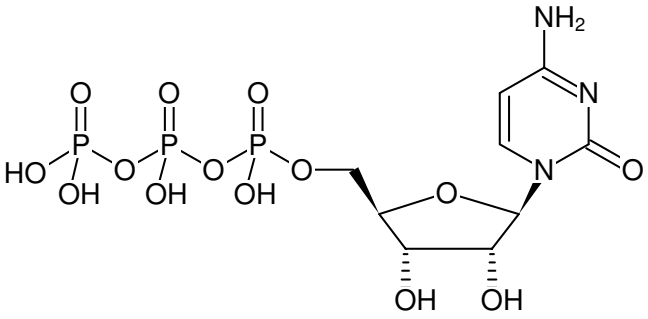
DATA SHEET

LAROVA
The Nucleotide Company

CTP - Solution

Cytidine-5'-triphosphate, Sodium salt

Cat. No.	Amount
CTP_1ML	1 ml (100 mM)
CTP_10ML	10 ml (100 mM)
CTP_100ML	100 ml (100 mM)
CTP_200ML	200 ml (100 mM)



Structural formula of CTP - Solution

For *in vitro* use only!

Shipping: shipped on blue ice

Storage Conditions: store at -20 °C

Additional Storage Conditions: Short term exposure (up to 1 week cumulative) to ambient temperature possible.

Shelf Life: 12 months

Molecular Formula: $C_9H_{16}N_3O_{14}P_3$ (free acid)

Molecular Weight: 483.16 g/mol (free acid)

CAS#: 36051-68-0

EC number: 252-849-3

Purity: ≥ 99.0 % (HPLC)

Form: clear aqueous solution

Concentration: 100 mM ±2 %

pH: 8.0 ±0.2 (22 °C)

Spectroscopic Properties: λ_{max} 271 nm, ε 8.9 L mmol^{-1} cm^{-1} (Tris-HCl pH 7.0)

Applications:
Physiological role in coronary artery disease[1]

Physiolocal role in lipid metabolism[2]

Physiological role in farnesol induced apoptosis[3]

Specific Ligands:

CTP synthase[4]

Phosphocholine cytidyltransferase alpha[2]

Ligand for purinergic receptors:
$P2Y_6$[5]
$P2X_3$[6]

Quality Control Specifications:
in vitro transcription (T7 RNA polymerase): visible RNA fragments after 5 min incubation, DNases, RNases, Nicking Activity: not detectable, Proteases: not detectable

Selected References:

[1] Lui *et al.* (2010) Evaluation of CT perfusion in setting of cerebral ischemia:patterns and pitfalls. *American Journal of Neuroradiology* **31**:1552.

[2] Luoma (2010) Gene activation regresses artheriosclerosis, promotes health, and enhances longevity. *Lipids in health and disease* **9**:67.

[3] Joo *et al.* (2010) Molecular mechanisms involved in farnesol-induced apotosis. *Cancer letters* **287**:123.

[4] Cabeen *et al.* (2010) A metabolic assembly line in bacteria. *Nature Cell Biology* **12**:731.

[5]Jayasekara *et al.* (2013) 4-Alkoxyimino-cytosine nucleotides: tethering approaches to molecular probes for the P2Y6 receptor. MedChemComm. **4 (8)**:1156.

[6]Garzia-Guzman *et al.* (1997) Molecular characterization and pharmacological properties of the human P2X3 purinoreceptor. *Mol. Brain Res.* **47 (1)**:59.

Spangler *et al.* (2011) Interaction of the diguanylate cyclase YdeH of Escherichia coli with 2', (3')-substituted purine and pyrimidine nucleotides. *J. Pharmacol. Exp. Ther.* **336 (1)**:234.

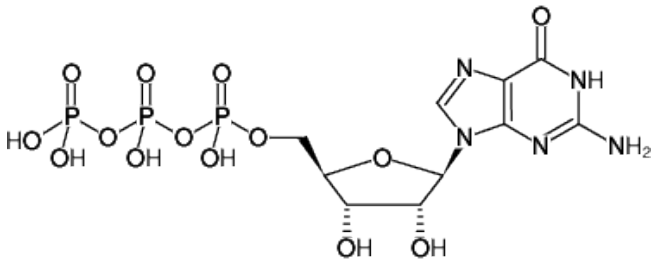
DATA SHEET

LAROVA
The Nucleotide Company

GTP - Solution

Guanosine-5'-triphosphate, Sodium salt

Cat. No.	Amount
GTP_1ML	1 ml (100 mM)
GTP_10ML	10 ml (100 mM)
GTP_100ML	100 ml (100 mM)
GTP_200ML	200 ml (100 mM)



Structural formula of GTP - Solution

For *in vitro* use only!

Shipping: shipped on blue ice

Storage Conditions: store at -20 °C

Additional Storage Conditions: Short term exposure (up to 1 week cumulative) to ambient temperature possible.

Shelf Life: 12 months

Molecular Formula: $C_{10}H_{16}N_5O_{14}P_3$ (free acid)

Molecular Weight: 523.18 g/mol (free acid)

Exact Mass: 522.99 g/mol (free acid)

CAS#: 36051-31-7

Purity: ≥ 99.0 % (HPLC)

Form: clear aqueous solution

Concentration: 100 mM ±2 %

pH: 8.0 ±0.2 (22 °C)

Spectroscopic Properties: λ_{max} 252 nm, ε 14.2 L mmol^{-1} cm^{-1} (Tris-HCl pH 7.0)

Applications:
Assembly of ribosomal units[1]

Microdomain formation by small GTPases[2]

Antiviral activity of large GTPases (dynamin superfamily)[3]

Regulation of exocytosis by Rho GTPases[4]

Mechanism of hydrolysis by ADP-ribosylation factors[5]

Specific Ligands:

Guanylate binding proteins[6]

Yeast septins[7]

Quality Control Specifications: in vitro transcription (T7 RNA polymerase): visible RNA fragments after 5 min incubation, DNases, RNases, Nicking Activity: not detectable, Proteases: not detectable

Selected References:

[1] Blombach *et al.* (2011) Assembling the archeal ribosome: roles for transition factor-related GTPases. *Biochemical Society Transactions* **39**:45.

[2] Stuermer (2011) Microdomain-forming proteins and the role of the reggies/flottilins during axon regeneration in zebrafish. *Biochimica Biophysica Acta, Molecular Basis of Disease* **1812**:415.

[3] Haller *et al.* (2011) Human MxA protein: An Interferon-induced Dynamin-like GTPase with broad antiviral activity. *J. Interferon and Cytokine Research* **31**:79.

[4] Stephane *et al.* (2011) Rho GTPases and exocytosis: what are the molecular links? *Seminars in Cell and Developmental Biology* **22**:27.

[5] East *et al.* (2011) Models for the function of Arf GAPs. *Seminars in Cell and Developmentan Biology* **22**:3.

[6] Vestal *et al.* (2011) The guanylate binding proteins: Emerging insights into the biochemical properties and functions of this family of large interferon-induced guanosine triphosphatase. *J. Interferon and Cytokine Research* **31**:89.

[7] Younghoon *et al.* (2011) Septin structure and function in yeast and beyond. *Trends in Cell Biology* **21**:141.

Drummond *et al.* (2011) Reconstitution and Organization of Escherichia coli Proto-ring Elements (FtsZ and FtsA) inside Giant Unilamellar Vesicles Obtained from Bacterial Inner Membranes. *Methods Mol. Biol.* **777** :29.

Katsuki *et al.* (2011) Preparation of dual-color polarity-marked fluorescent microtubule seeds. *Methods Mol. Biol.* **777**:117.

Ramachandran *et al.* (2009) Membrane Insertion of the Pleckstrin Homology

GTP - Solution

Guanosine-5'-triphosphate, Sodium salt

Domain Variable Loop 1 Is Critical for Dynamin-catalyzed Vesicle Scission.
Molecular Biology of the Cell **20 (22)**:4630.

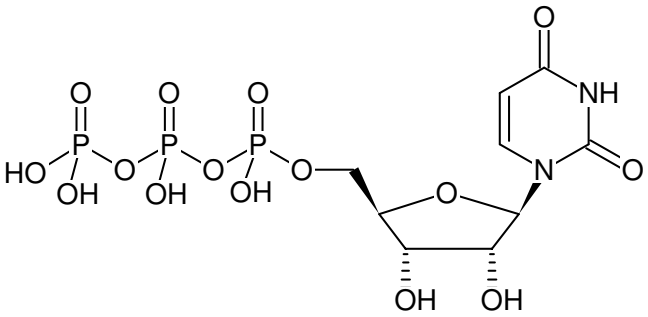
DATA SHEET

LAROVA
The Nucleotide Company

UTP - Solution

Uridine-5'-triphosphate, Sodium salt

Cat. No.	Amount
UTP_1ML	1 ml (100 mM)
UTP_10ML	10 ml (100 mM)
UTP_100ML	100 ml (100 mM)
UTP_200ML	200 ml (100 mM)



Structural formula of UTP - Solution

For *in vitro* use only!

Shipping: shipped on blue ice

Storage Conditions: store at -20 °C

Additional Storage Conditions: Short term exposure (up to 1 week cumulative) to ambient temperature possible.

Shelf Life: 12 months

Molecular Formula: $C_9H_{15}N_2O_{15}P_3$ (free acid)

Molecular Weight: 484.14 g/mol (free acid)

CAS#: 19817-92-6

Purity: ≥ 99.0 % (HPLC)

Form: clear aqueous solution

Concentration: 100 mM ±2 %

pH: 8.0 ±0.2 (22 °C)

Spectroscopic Properties: λ_{max} 262 nm, ε 9.8 L mmol^{-1} cm^{-1} (Tris-HCl pH 7.0)

Applications:
Activation of purinergic receptors[1,2,3,4]

Cardioprotection against hypoxic damage[2]

Enzyme kinetic parameters[5]

Phosphorylation of EGF-receptor vie purinergic receptors[3]

Stimulation of neurogenesis and dopaminergic neurons[6]

Specific Ligands:

Enterovirus 71 3D RNA polymerase[7]

Ligand for purinergic receptors:
$P2X_1$[4]
$P2Y_2$[7,8,9,10]
$P2Y_4$[8,10,11]
$P2Y_6$[8]

Quality Control Specifications: in vitro transcription (T7 RNA polymerase): visible RNA fragments after 5 min incubation, DNases, RNases, Nicking Activity: not detectable, Proteases: not detectable

Selected References:

[1] Raqeeb *et al.* (2011) Purinergic P2Y2 receptors mediate rapid Ca2+ mobilization, membrane hyperpolarization and nitric oxide production in human vascular endothelial cells. *Cell Calcium* **49**:240.

[2] Golan *et al.* (2011) Extracellular nucleotide derivatives protect cardiomyocytes against hypoxic stress. *Biochemical Pharmacology* **81**:1219.

[3] Boucher *et al.* (2011) Distinct activation of epidermal growth factor receptor by UTP contributes to epithelial cell wound repair. *American Journal Pathology* **178**:1092.

[4] Sugihara *et al.* (2011) Dual signaling pathway of arterial constriction by extracellular uridine-5-triphosphate in the rat. *J. Pharmacological Sciences (Japan)* **115**:293.

[5] Ma *et al.* (2011) Molecular cloning and analysis of the UDP-glucose pyrophosphorylase in Streptococcus equi subsp. Zooepidemicus. *Molecular Biology Reports* **38**:2751.

[6] Delic *et al.* (2011) Nucleotides affect neurogenesis and dopaminergic differentiation of mouse fetal midbrain-derived neural precursor cells. *Puronergic Signalling* **6**:417.

[7] Jiang *et al.* (2011) Biochemical characterization of enterovirus 71 3D RNA polymerase. *Biochim. Biophys. Acta, Gene Regulatory Mechanisms* **1809**:211.

UTP - Solution

Uridine-5'-triphosphate, Sodium salt

[8] Pendergast *et al.* (2001) Synthesis and P2Y receptor activity of a series of uridine dinucleoside 5'-polyphosphates. *Bioorg. Med. Chem. Lett.* **11 (2)**:157.

[9] Shaver *et al.* (1997) 4-substituted uridine 5'-triphosphates as agonists of the P2Y2 purinergic receptor. *Nucleosides and Nucleotides* **16 (7)**:1099.

[10] Kim *et al.* (2002) Methanocarba modification of uracil and adenine nucleotides: High potency of northern ring conformation at P2Y1, P2Y2, P2Y4 and P2Y11 but not P2Y6 receptors. *J. Med. Chem.* **45**:208.

[11] Nguyen *et al.* (1995) Cloning, expression, and chromosomal localization of human uridine nucleotide receptors. *J. Biol. Chem.* **270 (52)**:30845.