

Technical Information about ε-Ap₄U / ε-AppppU

Update: May 12, 2022 ss

Abbreviation:

ε-Ap₄U / ε-AppppU

Formula	CAS No.	Molecular Weight	UV	BIOLOG Cat.No.
C ₂₁ H ₂₇ N ₇ O ₂₁ P ₄ (free acid)	[pending]	837.4 (free acid)	$λ_{max}$ 265 nm / $ε$ 14140 / pH 7	E 031

Name: P1- (5'- [1, N6- Ethenoadenosyl])- P4- (5'- uridyl)- tetraphosphate, sodium salt

Description: ε-Ap₄U is a fluorescent modification of the purinoceptor agonist Up₄A (Cat. No. U 008), which is a dinucleoside polyphosphate containing both, a purine nucleobase as well as a pyrimidine nucleobase moiety. Adenosine and uridine moieties are linked via their 5' positions by four phosphate groups. The N 1 and the N 6 nitrogen atoms in the adenine nucleobase are connected by an etheno bridge forming a tricyclic ring system.

Properties: The etheno group of ϵ -Ap₄U fluoresces with λ_{exc} 230 nm and λ_{em} 420 nm.

Specification: Lyophilized or crystallized sodium salt. Other salt forms are available upon request. Equal concentrations of ε-Ap₄U can appear very different in volume due to sensitivity of the lyophilized form to humidity. The compound can even contract to small volume droplets. Normally the product is located in the conical bottom of the tube. Micromolar quantities are determined by UV at λ_{max} .

Purity: Typical analysis is better than 95% (HPLC / UV / 265 nm). The product is not sterile and has not been tested for endotoxins.

Solubility: ε-Ap₄U is soluble to at least 3 mM in water. Please rinse tube walls carefully and preferably use ultrasonic or vortex to achieve total and uniform mixing. When opening the tube please make sure that no substance is lost within the cap.

Stability and Storage: ε-Ap₄U has sufficient stability for short-term exposure to room temperature and does not need special care during handling or shipment. Nevertheless, we recommend that the compound should be protected from light and stored in the freezer, for longer storage periods preferably in freeze-dried form.

Toxicity and Safety: Please keep in mind that the *in vivo* properties of this compound are not sufficiently characterized up to now. Avoid skin contact or ingestion and allow only trained personnel to handle the product.

Our products are designed, developed and sold for research purposes only! They are intended for *in vitro* and nonhuman *in vivo* laboratory applications. Any other use requires approval of health authorities.

Not for drug, household or related uses!

Selected Reference for ε-Ap₄U:

Durnin, L.; Hwang, S.J.; Kurahashi, M.; Drumm, B.T.; Ward, S.M.; Sasse, K.C.; Sanders, K.M.; Mutafova-Yambolieva, V.N., *Proc. Natl. Acad. Sci. USA*, **111**, 15821 - 15826 (2014): "Uridine Adenosine Tetraphosphate is a Novel Neurogenic P2Y1 Receptor Activator in the Gut"

Selected References for the Parent Compound Up₄A (Cat. No. U 008):

Zhou, Z.; Matsumoto, T.; Jankowski, V.; Pernow, J.; Mustafa, S. J.; Duncker, D. J.; & Merkus, D., *Pharmacol. Res.*, **141**, 32 - 45 (2019): "Uridine Adenosine Tetraphosphate and Purinergic Signaling in Cardiovascular System: An Update"



Zhou, Z.; Lankhuizen, I. M.; van Beusekom, H. M.; Cheng, C.; Duncker, D. J.; Merkus, D., Front. Pharmacol., 9:255 (2018): "Uridine Adenosine Tetraphosphate-Induced Coronary Relaxation Is Blunted in Swine With Pressure Overload: A Role for Vasoconstrictor Prostanoids"

Wiedon, A.; Tölle, M.; Bastine, J.; Schuchardt, M.; Huang, T.; Jankowski, V.; Jankowski, J.; Zidek, W.; van der Giet, M., Biochem. Biophys. Res. Commun., 417, 1035 - 1040 (2012): "Uridine Adenosine Tetraphosphate (Up₄A) is a Strong Inductor of Smooth Muscle Cell Migration via Activation of the P2Y2 Receptor and Cross-communication to the PDGF Receptor

Matsumoto, T.; Tostes, R.C.; Webb, R.C., Adv. Pharmacol. Sci., Article ID 435132 (2011): "The Role of Uridine Adenosine Tetraphosphate in the Vascular System"

Linder, A.E.; Tumbri, M.; Linder, F.F.P.; Webb, R.C.; Leite, R., Vasc. Pharmacol., 48, 202 - 207 (2008): "Uridine Adenosine Tetraphosphate Induces Contraction and Relaxation in Rat Aorta"

Jankowski, V.; Patzak, A.; Herget-Rosenthal, S.; Tran, T.N.A.; Lai, E.Y.; Günthner, T.; Buschmann, I.; Zidek, W.; Jankowski, J., J. Mol. Med., 86, 333 - 340 (2008): "Uridine Adenosine Tetraphosphate Acts as an Autocrine Hormone Affecting Glomerular Filtration Rate"

Gui, Y.; Walsh, M.P.; Jankowski, V.; Jankowski, J.; Zheng, X.L., Am. J. Physiol. Lung Cell. Mol. Physiol., 294, L733 - L738 (2008): "Up₄A Stimulates Endothelium-independent Contraction of Isolated Rat Pulmonary Artery"

Hristovska, A.; Hansen, P.B.; Wolff, H.; Vanhoutte, P.M.; Jensen, B.L.; Bie, P., Acta Physiol., 190, Supplement 656, P03, (2007): "Dual Effect of Uridine Adenosine Tetraphosphate (Up4A) on Vascular Tone in Mouse Aorta"

Jankowski, V.; Meyer, A.-A.; Schlattmann, P.; Gui, Y.; Zheng, X.-I.; Stamcou, I.; Radtke, K.; Tran, T.N.A.; van der Giet, M.; Tölle, M.; Zidek, W.; Jankowski, J., *Arterioscler. Thromb. Vasc. Biol.*, **27**, 1776 - 1781 (2007): "Increased Uridine Adenosine Tetraphosphate Concentrations in Plasma of Juvenile Hypertensives"

Leite, R.; Linder, F.F.P.; Linder, E.; Webb, R.C., FASEB J., 20, A1185 (2006): "Uridine Adenosine Tetraphosphate-induced Contraction is Modulated by the Endothelium and Involves an Increased Superoxide Formation in DOCA-Salt Hypertension"

Jankowski, V.; Tölle, M.; Vanholder, R.; Schönfelder, G.; van der Giet, M.; Henning, L.; Schlüter, H.; Paul, M.; Zidek, W.; Jankowski, J., *Nature Medicine*, **11**, 223 - 227 (2005): "Uridine Adenosine Tetraphosphate: A Novel Endothelium-derived Vasoconstrictive Factor"