

Polyphosphate and Polyphosphate Derivatives - updated

TECHNOLOGY NUMBER: 2020-175



Technology ID

2020-175

Category

Research Tools and Reagents
Life Sciences

Inventor

James Morrissey
Stephanie Smith

Further information

John Corthell
corthell@umich.edu

Learn more



Overview

- Novel regulator of fibrin function
- Useful tool for studying blood clotting

Background

Dr. Morrissey's lab makes carefully size-fractionated preparations of inorganic polyphosphate that are useful to researchers working to understand the biological functions of this polymer. The lab also makes modified forms of polyphosphate in which organic molecules such as biotin are covalently attached to the terminal phosphates of polyphosphate, typically by phosphoramidate linkages. Many of these polyphosphate preparations are not commercially available.

Additional Details

Request Now P100 (Phosphate, Short chain) P700 (Phosphate, Long chain) Biotinylated- α -
Phosphate (Short chain) Biotinylated- α -
Phosphate (Long chain)

References

- [1] Smith, S. A., Choi, S. H., Davis-Harrison, R., Huyck, J., Boettcher, J., Rienstra, C. M., and Morrissey, J. H. (2010) Polyphosphate exerts differential effects on blood clotting, depending on polymer size, *Blood* 116, 4353-4359.
- [2] Choi, S. H., Collins, J. N., Smith, S. A., Davis-Harrison, R. L., Rienstra, C. M., and Morrissey, J. H. (2010) Phosphoramidate end labeling of inorganic polyphosphates: facile manipulation of polyphosphate for investigating and modulating its biological activities, *Biochemistry* 49, 9935-9941.
- [3] Choi, S. H., Smith, S. A., and Morrissey, J. H. (2011) Polyphosphate is a cofactor for the activation of factor XI by thrombin, *Blood* 118, 6963-6970.
- [4] Smith, S. A., Choi, S. H., Collins, J. N., Travers, R. J., Cooley, B. C., and Morrissey, J. H. (2012) Inhibition of polyphosphate as a novel strategy for preventing thrombosis and inflammation, *Blood* 120, 5103-5110.
- [5] Puy, C., Tucker, E. I., Wong, Z. C., Gailani, D., Smith, S. A., Choi, S. H., Morrissey, J. H., Gruber, A., and McCarty, O. J. (2013) Factor XII promotes blood coagulation independent of factor XI in the presence of long-chain polyphosphates, *J Thromb Haemost* 11, 1341-1352.
- [6] Choi, S. H., Smith, S. A., and Morrissey, J. H. (2014) Polyphosphate accelerates factor V activation by factor XIa, *Thromb Haemost* 113.
- [7] Wijeyewickrema, L. C., Lameignere, E., Hor, L., Duncan, R. C., Shiba, T., Travers, R. J., Kapopara, P. R., Lei, V., Smith, S. A., Kim, H., Morrissey, J. H., Pike, R. N., and Conway, E. M. (2016) Polyphosphate is a novel cofactor for regulation of complement by a serpin, C1 inhibitor, *Blood* 128, 1766-1776.
- [8] Zilberman-Rudenko, J., Reitsma, S. E., Puy, C., Rigg, R. A., Smith, S. A., Tucker, E. I., Silasi, R., Merkulova, A., McCrae, K. R., Maas, C., Urbanus, R. T., Gailani, D., Morrissey, J. H., Gruber, A., Lupu, F., Schmaier, A. H., and McCarty, O. J. T. (2018) Factor XII Activation Promotes Platelet Consumption in the Presence of Bacterial-Type Long-Chain Polyphosphate In Vitro and In Vivo, *Arterioscler Thromb Vasc Biol* 38, 1748-1760.
- [9] Wang, Y., Ivanov, I., Smith, S. A., Gailani, D., Morrissey, J. H., Baker, C. J., Smith, S. A., and Morrissey, J. H. (2019) Polyphosphate, Zn(2+) and high-molecular-weight kininogen modulate individual reactions of the contact pathway of blood clotting, *J Thromb Haemost* 3, 18-25.