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## Chemical reagents for natural and modified nucleoside triphosphates synthesis

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### BRIEF DESCRIPTION

Traditional synthesis of nucleoside triphosphates (NTPs), the building blocks of our genetic material, requires expensive purification yet produces small scale quantities. UCI researchers have developed novel reagents as well as a synthetic route that enables cost-effective and larger scale production of NTPs critical for biomedical research, as well as in certain diagnostic and therapeutic modalities.

### FULL DESCRIPTION

Nucleoside triphosphates (NTPs) are the basis of every major therapeutic and diagnostic application involving nucleic acid components in DNA. Commercial synthesis of natural NTPs use enzymes whereas synthesis of modified NTPs use chemical reagents. Both syntheses, however, require purification to remove truncated synthesis products. Commercial approaches are limited by (a) difficult synthesis of unnatural NTPs because enzymes are specific to natural substrates and prone to contamination and (b) expensive and inefficient purification schemes prone to compound degradation resulting in small scale mg-quantities of NTP. Thus, there is a need for improved synthetic routes toward natural and modified NTPs, especially on a large commercial scale. UCI researchers have developed low-cost reagents for synthesizing natural and unnatural NTPs. These new reagents enable faster, cheaper, and more efficient production of gram-scale quantities of NTPs.

### SUGGESTED USES

Synthesis of natural and modified NTPs for research applications, therapeutic applications from DNA sequencing to nucleic acid diagnostics

### ADVANTAGES

- Cheaper, faster, more efficient synthesis of both natural and unnatural NTPs
- HPLC-free purification
- Larger gram-scale production

### PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11/858,953	01/02/2024	2018-245
United States Of America	Issued Patent	11,021,497	06/01/2021	2018-245

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### OTHER INFORMATION

#### CATEGORIZED AS

- » **Materials & Chemicals**
  - » Chemicals
- » **Research Tools**
  - » Nucleic Acids/DNA/RNA
  - » Reagents

#### RELATED CASES

2018-245-0

## STATE OF DEVELOPMENT

Synthesis of both natural and unnatural triphosphates, and completion of preliminary validation studies.

## RELATED MATERIALS

» Sau, S., Chaput J. A Gram-Scale HPLC-Free Synthesis of TNA Triphosphates Using an Iterative Phosphorylation Strategy. *Org. Let.* 2017, 19, 4379. - 08/18/2017

» Bala, S. et. al. Synthesis of  $\alpha$ -l-Threofuranosyl Nucleoside 3'-Monophosphates, 3'-Phosphoro(2-Methyl)imidazolides, and 3'-Triphosphates. *J. Org. Chem.* 2017, 82, 5910. - 06/02/2017

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