Method for synthesis of nucleoside triphosphates

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This is a more efficient and lower cost method for synthesis of triphosphates using a polymer-supported reagent. Using a supported reagent eliminates many of the processing stages of other systems generating far greater yields and higher purity material.

The importance of triphosphates and their analogues in DNA sequencing, PCR and enzyme and inhibition studies has led to various approaches for their synthesis. Yet existing methodologies do not generate triphosphates that are suitable for use in a wide range of downstream reactions or for use in library synthesis. Additionally, current methodologies involve many stages (purification, filtration etc) and are low yielding or unreliable – particularly for more complex modified or labelled nucleosides.

To overcome these limitations, researchers have developed a new production technique using a supported phosphorylation reagent for the synthesis of nucleoside triphosphates. This new process provides high yields, produces clean product and reduces the need for complex purification processes. Significantly, this methodology has been proven to efficiently produce complex modified nucleosides. This technology can be used efficiently and cheaply produce a range of triphosphate compounds including modified and (fluorogenically) labelled nucleosides.

Key benefits
- Efficient syntheses, high product yields
- Lower cost process for production of high value products
- Can use excess reagent to complete reactions in a shorter time
- Fewer contaminants to remove
- By-products can be washed away
- Compound of interest stays immobilised until release is desired
- Immobilised intermediate product is released by controlled cleavage procedure
- Triphosphate compound isolated with a single chromatography procedure

Potential applications
- Triphosphate production
- Manufacture of high value complex modified or labelled nucleosides and nucleotides
- Phosphate-based pro-drug production
- Production of other phosphate compounds

Key publications

Open technology
Access to the ‘protocol for preparation of tris(tributylammonium) pyrophosphate’ will be provided following acceptance of the University’s Open Technology standard terms and conditions.