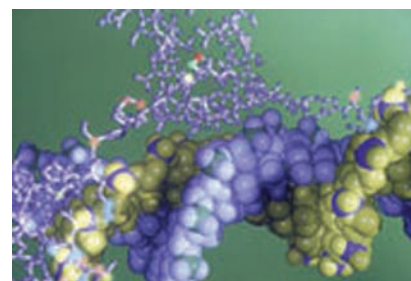


# ISOTEC® Stable Isotopes

## Accelerate Your Nucleic Acid Research

The usage of stable isotope labeled DNA and RNA enhances spectral sensitivity and resolution expanding the utility of NMR in structural research<sup>(1)</sup>. Availability of isotopically labeled nucleic acids facilitates the measurement of residual dipolar couplings, which provides long-range distance restraints for the refinement of solution structures<sup>(2,3)</sup>. With modern *in vitro* synthesis techniques, sufficient quantities of stable isotope labeled DNA and RNA can be generated for NMR experimentation. For this application, Isotec offers a full complement of high-purity [U-<sup>13</sup>C, U-<sup>15</sup>N] nucleotide monophosphates, ribonucleotides, and deoxyribonucleotides as well as [U-<sup>15</sup>N] nucleotide monophosphates and triphosphates.



### NEW [U-<sup>15</sup>N] Labeled NTPs

Cat. No.	Description	Isotopic Purity
707783	ATP- <sup>15</sup> N <sub>5</sub>	98 atom % <sup>15</sup> N
707759	CTP- <sup>15</sup> N <sub>3</sub>	98 atom % <sup>15</sup> N
707775	GTP- <sup>15</sup> N <sub>5</sub>	98 atom % <sup>15</sup> N
707767	UTP- <sup>15</sup> N <sub>2</sub>	98 atom % <sup>15</sup> N

- NTPs are supplied as the sodium salt, in 100 mM solution in H<sub>2</sub>O with 5 mM Tris buffer
- NTPs are packaged in convenient 1 mg, 10 mg, and 25 mg quantities

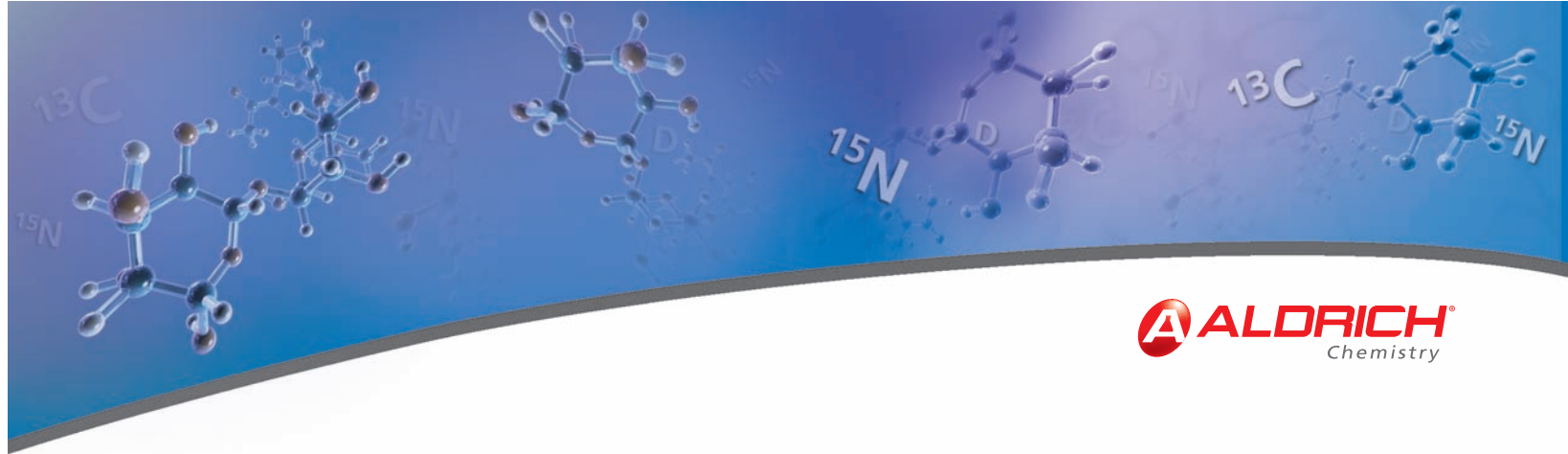
### [U-<sup>13</sup>C, U-<sup>15</sup>N] Labeled NTPs

Cat. No.	Description	Isotopic Purity
645702	ATP- <sup>13</sup> C <sub>10</sub> , <sup>15</sup> N <sub>5</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
645699	CTP- <sup>13</sup> C <sub>9</sub> , <sup>15</sup> N <sub>3</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
645680	GTP- <sup>13</sup> C <sub>10</sub> , <sup>15</sup> N <sub>5</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
646202	TTP- <sup>13</sup> C <sub>10</sub> , <sup>15</sup> N <sub>2</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
645672	UTP- <sup>13</sup> C <sub>9</sub> , <sup>15</sup> N <sub>2</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
646237	dATP- <sup>13</sup> C <sub>10</sub> , <sup>15</sup> N <sub>5</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
646229	dCTP- <sup>13</sup> C <sub>9</sub> , <sup>15</sup> N <sub>3</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
646210	dGTP- <sup>13</sup> C <sub>10</sub> , <sup>15</sup> N <sub>5</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N

For more information on nucleotides and related products, visit [sigma-aldrich.com/bionmr](http://sigma-aldrich.com/bionmr)

#### References:

1. Dayie K.T. J. *Biomol. NMR* (2005) 32: 129-139.
2. Casiano-Negroni A., Sun X., and Al-Hashimi H.M. *Biochemistry*. (2007) 46: 6525-6535.
3. Dethoff, E. A., Hansen, A. L., Musselman, C., Watt, E. D., Andricioaei, I, and Al-Hashimi, H. *Biophys. J.* (2008) 95: 3906.



# ISOTEC sets the industry standard for nucleotides

## [U-<sup>15</sup>N] and [U-<sup>13</sup>C, U-<sup>15</sup>N] Labeled NMPs

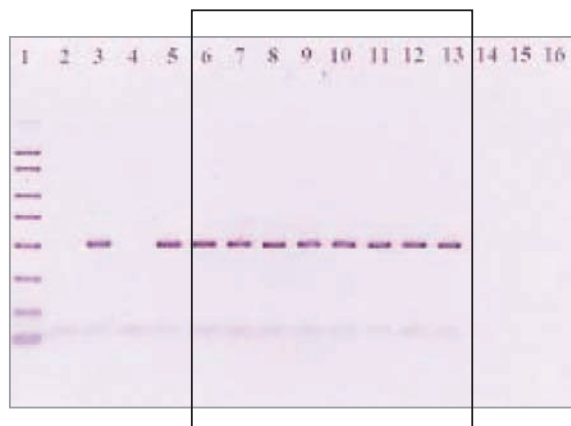
Cat. No.	Description	Isotopic Purity
662658	AMP- <sup>15</sup> N <sub>5</sub>	98 atom % <sup>15</sup> N
662682	CMP- <sup>15</sup> N <sub>3</sub>	98 atom % <sup>15</sup> N
662674	GMP- <sup>15</sup> N <sub>5</sub>	98 atom % <sup>15</sup> N
662666	UMP- <sup>15</sup> N <sub>2</sub>	98 atom % <sup>15</sup> N
650676	AMP- <sup>13</sup> C <sub>10</sub> , <sup>15</sup> N <sub>5</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
650692	CMP- <sup>13</sup> C <sub>9</sub> , <sup>15</sup> N <sub>3</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
650684	GMP- <sup>13</sup> C <sub>10</sub> , <sup>15</sup> N <sub>5</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
648590	TMP- <sup>13</sup> C <sub>10</sub> , <sup>15</sup> N <sub>2</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
651370	UMP- <sup>13</sup> C <sub>9</sub> , <sup>15</sup> N <sub>2</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
648620	dAMP- <sup>13</sup> C <sub>10</sub> , <sup>15</sup> N <sub>5</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
648612	dCMP- <sup>13</sup> C <sub>9</sub> , <sup>15</sup> N <sub>3</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N
648604	dGMP- <sup>13</sup> C <sub>10</sub> , <sup>15</sup> N <sub>5</sub>	98 atom % <sup>13</sup> C, 98 atom % <sup>15</sup> N

- NMPs are supplied as a solid sodium salt powder
- Rigorous analytical testing confirms the product's isotopic and chemical purity:

- Structure verification and isotopic enrichment are determined by <sup>13</sup>C- and <sup>1</sup>H-NMR.

- The chemical purity of each NTP and NMP is demonstrated to be a minimum of 90% of the sum of the individual NTP, NDP, and NMP components by HPLC.

High purity nucleotides are suitable for downstream applications such as PCR as seen below:



### PCR reactions utilizing ISOTEC's dNTPs

Lane 1: PCR Marker	Lane 6 & 7: ISOTEC dATP
Lane 2: D7295, control (-)	Lane 8 & 9: ISOTEC TTP
Lane 3: D7295, control (+)	Lane 10 & 11: ISOTEC dCTP
Lane 4: Individual Nucleotides, control (-)	Lane 12 & 13: ISOTEC dGTP
Lane 5: Individual Nucleotides, control (+)	

For more information, please contact:

### Stable Isotopes Technical Service

Phone: (937) 859-1808

US and Canada: (800) 448-9760

Fax: (937) 859-4878

Email: [isosales@sial.com](mailto:isosales@sial.com)