

# Stable Isotope labeled RNA and DNA Building Blocks: rNTPs and dNTPs



## P1: Stable Isotope Labeled rNTPs and dNTPs

NMRによる分子量の大きなDNAとRNA構造解明には、これら分子が安定同位体に標識（ラベル化）される必要があります。

シランテス社（Silantes）は幅広い安定同位体ラベル化したリボ、デオキシリボヌクレオシド三リン酸の様々な核種の組み合わせ $^2\text{H}$ 、 $^{13}\text{C}$ 、 $^{15}\text{N}$ 、 $^{19}\text{F}$ と $^{18}\text{O}$ を提供しています。

ラベル化されたrNTPとdNTPの全製品リストは、次の添付した表をご確認ください。

### Silantes Technology

シランテス社の安定同位体ラベルのヌクレオチドは、バクテリア由来のDNAとRNAから製造されます。バクテリア株が有機物 $\text{H}_2$ 、 $\text{O}_2$ と $\text{CO}_2$ 上で増殖され、化学的に得られます。抽出されたDNAまたはRNAは酵素によって加水分解されます。単離された5'-NMPは酵素でリン酸化された5'-NDPと5'-NTPとなり、IC-およびRP-HPLCによって精製されます。



図1: シランテス社のバイオテクノロジーによるNTP製造プロセス

安定同位体を用いたバイオマスの*in vivo*濃縮技術により、以下の結果が得られます。

- ラベル化されたrNTPとdNTPの費用対効果として、安定同位体の効率的な導入
- クローズドシステムを使用することによるヌクレオチドの効率的で均一な安定同位体ラベル (>98atom%)

### High Quality Commitment

シランテス社は、HPLCによって決定された同位体純度>98atom%と化学純度>95%を保証します。図2はrCTPのHPLC溶出データの例を示しています。

さらに、生物学的能力、例えば酵素オリゴ合成のrNTPとdNTPの適合性は、それぞれ*in vivo*でのRNAおよびDNAの合成によって検証されています。

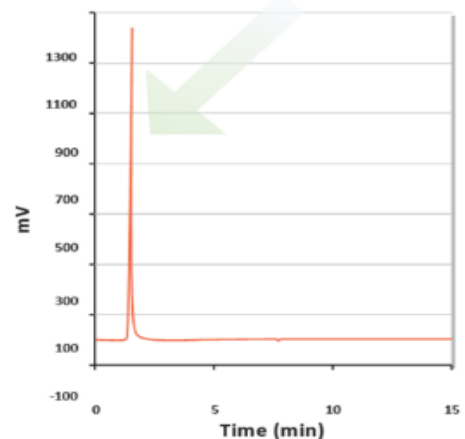


図2: rCTPのRP-HPLC溶出データ



## Appendix I: Product List of Stable Isotope-Labeled and fluorinated rNTPs and dNTPs

Article #	Description	Isotope	Unit
Nucleoside-Triphosphates (NTPs)			
Deoxy-Nucleoside-Triphosphates 2H-labeled			
120103601	Deoxyadenosine 5'-triphosphate, lithium salt, solution	2H (Uniform)	10 mg
120103602	Deoxycytidine 5'-triphosphate, lithium salt, solution	2H (Uniform)	10 mg
120103603	Deoxyguanosine 5'-triphosphate, lithium salt, solution	2H (Uniform)	10 mg
120103604	Thymidine 5'-triphosphate, lithium salt, solution	2H (Uniform)	10 mg
120103801	Deoxyadenosine 5'-triphosphate, lithium salt, solution	2H (Uniform)	50 mg
120103802	Deoxycytidine 5'-triphosphate, lithium salt, solution	2H (Uniform)	50 mg
120103803	Deoxyguanosine 5'-triphosphate, lithium salt, solution	2H (Uniform)	50 mg
120103804	Thymidine 5'-triphosphate, lithium salt, solution	2H (Uniform)	50 mg
120106100	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	2H (Uniform)	4x10mg
120106200	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	2H (Uniform)	4x50mg
Deoxy-Nucleoside-Triphosphates 13C-labeled			
120203601	Deoxyadenosine 5'-triphosphate, lithium salt, solution	13C (Uniform)	10 mg
120203602	Deoxycytidine 5'-triphosphate, lithium salt, solution	13C (Uniform)	10 mg
120203603	Deoxyguanosine 5'-triphosphate, lithium salt, solution	13C (Uniform)	10 mg
120203604	Thymidine 5'-triphosphate, lithium salt, solution	13C (Uniform)	10 mg
120203801	Deoxyadenosine 5'-triphosphate, lithium salt, solution	13C (Uniform)	50 mg
120203802	Deoxycytidine 5'-triphosphate, lithium salt, solution	13C (Uniform)	50 mg
120203803	Deoxyguanosine 5'-triphosphate, lithium salt, solution	13C (Uniform)	50 mg
120203804	Thymidine 5'-triphosphate, lithium salt, solution	13C (Uniform)	50 mg
120206100	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	13C (Uniform)	4x10mg
120206200	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	13C (Uniform)	4x50mg
Deoxy-Nucleoside-Triphosphates 15N-labeled			
120303601	Deoxyadenosine 5'-triphosphate lithium salt, solution	15N (Uniform)	10 mg
120303602	Deoxycytidine 5'-triphosphate, lithium salt, solution	15N (Uniform)	10 mg
120303603	Deoxyguanosine 5'-triphosphate, lithium salt, solution	15N (Uniform)	10 mg
120303604	Thymidine 5'-triphosphate lithium salt, solution	15N (Uniform)	10 mg
120303801	Deoxyadenosine 5'-triphosphate lithium salt, solution	15N (Uniform)	50 mg
120303802	Deoxycytidine 5'-triphosphate, lithium salt, solution	15N (Uniform)	50 mg
120303803	Deoxyguanosine 5'-triphosphate, lithium salt, solution	15N (Uniform)	50 mg
120303804	Thymidine 5'-triphosphate lithium salt, solution	15N (Uniform)	50 mg
120306100	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	15N (Uniform)	4x10mg
120306200	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	15N (Uniform)	4x50mg
Deoxy-Nucleoside-Triphosphates 2H15N-labeled			
120503601	Deoxyadenosine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	10 mg
120503602	Deoxycytidine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	10 mg
120503603	Deoxyguanosine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	10 mg
120503604	Thymidine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	10 mg

# Appendix: Product Lists

## rNTPs and dNTPs



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120503801	Deoxyadenosine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	50 mg
120503802	Deoxycytidine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	50 mg
120503803	Deoxyguanosine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	50 mg
120503804	Thymidine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	50 mg
120506100	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	2H,15N (Uniform)	4x10mg
120506200	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	2H,15N (Uniform)	4x50mg
	Deoxy-Nucleoside-Triphosphates 13C15N-labeled		
120603601	Deoxyadenosine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	10 mg
120603602	Deoxycytidine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	10 mg
120603603	Deoxyguanosine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	10 mg
120603604	Thymidine 5'-triphosphate lithium salt, solution	13C,15N (Uniform)	10 mg
120603801	Deoxyadenosine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	50 mg
120603802	Deoxycytidine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	50 mg
120603803	Deoxyguanosine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	50 mg
120603804	Thymidine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	50 mg
120606100	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	13C,15N (Uniform)	4x10mg
120606200	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	13C,15N (Uniform)	4x50mg
	Deoxy-Nucleoside-Triphosphates 2H13C15N-labeled		
120703601	Deoxyadenosine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	10 mg
120703602	Deoxycytidine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	10 mg
120703603	Deoxyguanosine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	10 mg
120703604	Thymidine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	10 mg
120703801	Deoxyadenosine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	50 mg
120703802	Deoxycytidine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	50 mg
120703803	Deoxyguanosine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	50 mg
120703804	Thymidine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	50 mg
120706100	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	2H,13C,15N (Uniform)	4x10mg

# Appendix: Product Lists

## rNTPs and dNTPs



120706200	Set of 4 deoxyribonucleoside 5'-triphosphates, lithium salt, solution	2H,13C,15N (Uniform)	4x50mg
Ribo-Nucleoside-Triphosphates 2H-labeled			
121103601	Adenosine 5'-triphosphate, lithium salt, solution	2H (Uniform)	10 mg
121103602	Cytidine 5'-triphosphate, lithium salt, solution	2H (Uniform)	10 mg
121103603	Guanosine 5'-triphosphate, lithium salt, solution	2H (Uniform)	10 mg
121103604	Uridine 5'-triphosphate, lithium salt, solution	2H (Uniform)	10 mg
121103801	Adenosine 5'-triphosphate, lithium salt, solution	2H (Uniform)	50 mg
121103802	Cytidine 5'-triphosphate, lithium salt, solution	2H (Uniform)	50 mg
121103803	Guanosine 5'-triphosphate, lithium salt, solution	2H (Uniform)	50 mg
121103804	Uridine 5'-triphosphate, lithium salt, solution	2H (Uniform)	50 mg
121106100	Set of 4 ribonucleoside 5'-triphosphates, lithium salt, solution	2H (Uniform)	4x10mg
121106200	Set of 4 ribonucleoside 5'-triphosphates, lithium salt, solution	2H (Uniform)	4x50mg
Ribo-Nucleoside-Triphosphates 13C-labeled			
121203601	Adenosine 5'-triphosphate, lithium salt, solution	13C (Uniform)	10 mg
121203602	Cytidine 5'-triphosphate, lithium salt, solution	13C (Uniform)	10 mg
121203603	Guanosine 5'-triphosphate, lithium salt, solution	13C (Uniform)	10 mg
121203604	Uridine 5'-triphosphate, lithium salt, solution	13C (Uniform)	10 mg
121203801	Adenosine 5'-triphosphate, lithium salt, solution	13C (Uniform)	50 mg
121203802	Cytidine 5'-triphosphate, lithium salt, solution	13C (Uniform)	50 mg
121203803	Guanosine 5'-triphosphate, lithium salt, solution	13C (Uniform)	50 mg
121203804	Uridine 5'-triphosphate, lithium salt, solution	13C (Uniform)	50 mg
121206100	Set of 4 ribonucleoside 5'-triphosphates, lithium salt, solution	13C (Uniform)	4x10mg
121206200	Set of 4 ribonucleoside 5'-triphosphates, lithium salt, solution	13C (Uniform)	4x50mg
121213601	Adenosine 5'-triphosphate (site-specifically 13C8-labeled), lithium salt, solution	13C (Site specific)	10 mg
121213603	Guanosine 5'-triphosphate (site-specifically 13C8-labeled), lithium salt, solution	13C (Site specific)	10 mg
121213801	Adenosine 5'-triphosphate (site-specifically 13C8-labeled), lithium salt, solution	13C (Site specific)	50 mg
121213803	Guanosine 5'-triphosphate (site-specifically 13C8-labeled), lithium salt, solution	13C (Site specific)	50 mg
Ribo-Nucleoside-Triphosphates 15N-labeled			
121303601	Adenosine 5'-triphosphate lithium salt, solution	15N (Uniform)	10 mg
121303602	Cytidine 5'-triphosphate, lithium salt, solution	15N (Uniform)	10 mg
121303603	Guanosine 5'-triphosphate, lithium salt, solution	15N (Uniform)	10 mg
121303604	Uridine 5'-triphosphate, lithium salt, solution	15N (Uniform)	10 mg
121303605	Inosine 5'-triphosphate, lithium salt, solution	15N (Uniform)	10 mg
121303801	Adenosine 5'-triphosphate lithium salt, solution	15N (Uniform)	50 mg
121303802	Cytidine 5'-triphosphate, lithium salt, solution	15N (Uniform)	50 mg
121303803	Guanosine 5'-triphosphate, lithium salt, solution	15N (Uniform)	50 mg
121303804	Uridine 5'-triphosphate, lithium salt, solution	15N (Uniform)	50 mg
121303805	Inosine 5'-triphosphate, lithium salt, solution	15N (Uniform)	50 mg
121306100	Set of 4 ribonucleoside 5'-triphosphates, lithium salt, solution	15N (Uniform)	4x10mg
121306200	Set of 4 ribonucleoside 5'-triphosphates, lithium salt, solution	15N (Uniform)	4x50mg
Ribo-Nucleoside-Triphosphates 2H13C-labeled			
121413602	Cytidine 5'-triphosphate (site-specifically 2H5 13C6-labeled), lithium salt, solution	2H,13C (Site specific)	10 mg
121413604	Uridine 5'-triphosphate (site-specifically 2H5,13C6-labeled), lithium salt, solution	2H,13C (Site specific)	10 mg

# Appendix: Product Lists

## rNTPs and dNTPs



121413802	Cytidine 5'-triphosphate (site-specifically 2H5 13C6-labeled), lithium salt, solution	2H,13C (Site specific)	50 mg
121413804	Uridine 5'-triphosphate (site-specifically 2H5,13C6-labeled), lithium salt, solution	2H,13C (Site specific)	50 mg
Ribo-Nucleoside-Triphosphates 2H15N-labeled			
121503601	Adenosine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	10 mg
121503602	Cytidine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	10 mg
121503603	Guanosine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	10 mg
121503604	Uridine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	10 mg
121503801	Adenosine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	50 mg
121503802	Cytidine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	50 mg
121503803	Guanosine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	50 mg
121503804	Uridine 5'-triphosphate, lithium salt, solution	2H,15N (Uniform)	50 mg
121506100	Set of 4 ribonucleoside 5'-triphosphates, lithium salt, solution	2H,15N (Uniform)	4x10mg
121506200	Set of 4 ribonucleoside 5'-triphosphates, lithium salt, solution	2H,15N (Uniform)	4x50mg
Ribo-Nucleoside-Triphosphates 13C15N-labeled			
121603601	Adenosine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	10 mg
121603602	Cytidine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	10 mg
121603603	Guanosine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	10 mg
121603604	Uridine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	10 mg
121603605	Inosine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	10 mg
121603801	Adenosine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	50 mg
121603802	Cytidine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	50 mg
121603803	Guanosine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	50 mg
121603804	Uridine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	50 mg
121603805	Inosine 5'-triphosphate, lithium salt, solution	13C,15N (Uniform)	50 mg
121606100	Set of 4 ribonucleoside 5'-triphosphates, lithium salt, solution	13C,15N (Uniform)	4x10mg
121606200	Set of 4 ribonucleoside 5'-triphosphates, lithium salt, solution	13C,15N (Uniform)	4x50mg

Ribo-Nucleoside-Triphosphates 2H13C15N-labeled

# Appendix: Product Lists

## rNTPs and dNTPs



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121703601	Adenosine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	10 mg
121703602	Cytidine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	10 mg
121703603	Guanosine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	10 mg
121703604	Uridine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	10 mg
121703801	Adenosine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	50 mg
121703802	Cytidine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	50 mg
121703803	Guanosine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	50 mg
121703804	Uridine 5'-triphosphate, lithium salt, solution	2H,13C,15N (Uniform)	50 mg
121706100	Set of 4 ribonucleoside 5'-triphosphates, solution	2H,13C,15N (Uniform)	4x10mg
121706200	Set of 4 ribonucleoside 5'-triphosphates, solution	2H,13C,15N (Uniform)	4x50mg