

**Supplementary Material**  
**Table S1**

**Substrate abbreviations.**

<b>Abbreviation</b>	<b>Name</b>
2'-3'-ddGTP	2', 3'-Dideoxyguanosine-5'-triphosphate
2-OH-dATP	2-hydroxy-deoxyadenosine-5'-triphosphate
2'-O-Me-ATP	2'-O-methyladenosine-5'-triphosphate
2'-O-Me-CTP	2'-O-methylcytidine-5'-triphosphate
2'-O-Me-GTP	2'-O-methylguanosine-5'-triphosphate
2'-O-Me-UTP	2'-O-methyluridine-5'-triphosphate
3'-dGTP	3'-Deoxyguanosine-5'-triphosphate
5-Me-CTP	5-methylcytidine-5'-triphosphate
5-Me-dCTP	5-methyl-2'-deoxycytidine-5'-triphosphate
5-MeOH-dCTP	5-hydroxymethyl-2'-deoxycytidine-5'-triphosphate
5-MeOH-dUTP	5-Hydroxymethyl-2'-deoxyuridine-5'-triphosphate
5-Me-UTP	5-Methyluridine-5'-triphosphate
5-OH-dCTP	5-hydroxy-2'-deoxycytidine-5'-triphosphate
8-oxo-dATP	8-Oxo-2'-deoxyadenosine-5'-triphosphate
8-oxo-dGTP	8-Oxo-2'-deoxyguanosine-5'-triphosphate
8-oxo-GTP	8-Oxoguanosine-5'-triphosphate
ADP-glucose	Adenosine-5'-diphosphoglucose
ADP-ribose	Adenosine 5'-diphosphoribose
Ap <sub>3</sub> A	P <sup>1</sup> ,P <sup>3</sup> -Di(adenosine-5') triphosphate
Ap <sub>4</sub> A	P <sup>1</sup> ,P <sup>4</sup> -Di(adenosine-5') tetraphosphate
Ap <sub>4</sub> dT	P <sup>1</sup> (-5'-Adenosyl)-P <sup>4</sup> -[5'-(2'-deoxy-thymidyl)]-tetraphosphate
Ap <sub>4</sub> G	P <sup>1</sup> (-5'-Adenosyl)-P <sup>4</sup> -(5'-guanosyl)-tetraphosphate
Ap <sub>4</sub> U	P <sup>1</sup> (-5'-Adenosyl)-P <sup>4</sup> -(5'-uridyl)-tetraphosphate
Ap <sub>5</sub> A	P <sup>1</sup> ,P <sup>5</sup> -Di(adenosine-5') pentaphosphate
Ap <sub>5</sub> dT	P <sup>1</sup> (-5'-Adenosyl)-P <sup>5</sup> -[5'-(2'-deoxy-thymidyl)]-pentaphosphate
Ap <sub>5</sub> G	P <sup>1</sup> (-5'-Adenosyl)-P <sup>5</sup> -(5'-guanosyl)-pentaphosphate
Ap <sub>5</sub> U	P <sup>1</sup> (-5'-Adenosyl)-P <sup>5</sup> -(5'-uridyl)-pentaphosphate
Ap <sub>6</sub> A	P <sup>1</sup> (-5'-Adenosyl)-P <sup>6</sup> -(5'-adenosyl)-hexaphosphate
CDP-choline	Cytidine 5'-diphosphocholine
CDP-glycerol	Cytidine 5'-diphosphoglycerol
CF <sub>3</sub> -HMP	4-amino-2-trifluoromethyl-5-hydroxymethylpyrimidine
CF <sub>3</sub> -HMP-PP	4-amino-2-trifluoromethyl-5-hydroxymethylpyrimidine pyrophosphate
Deamino-NAD+	Nicotinamide hypoxanthine dinucleotide
dITP	2'-Deoxyinosine-5'-triphosphate
GDP-fucose	Guanosine 5'-diphospho-β-L-fucose
GDP-glucose	Guanosine 5'-diphosphoglucose
GDP-mannose	Guanosine 5'-diphospho-D-mannose
Gp <sub>2</sub> G	P <sup>1</sup> (-5'-guanosyl)-P <sup>2</sup> -(5'-guanosyl)-diphosphate
Gp <sub>3</sub> G	P <sup>1</sup> (-5'-guanosyl)-P <sup>3</sup> -(5'-guanosyl)-triphosphate
Gp <sub>4</sub> G	P <sup>1</sup> (-5'-guanosyl)-P <sup>4</sup> -(5'-guanosyl)-tetraphosphate
Gp <sub>5</sub> G	P <sup>1</sup> ,P <sup>5</sup> -di(guanosine-5') pentaphosphate
DHNTp	7,8-Dihydroneopterin triphosphate
DHUTp	5,6-Dihydrouridine-5'-triphosphate
HMP-pp	4-amino-2-methyl-5-hydroxymethylpyrimidine pyrophosphate
ITP	Inosine-5'-triphosphate
MeO-HMP-PP	4-amino-2-methoxy- 5-hydroxymethylpyrimidine pyrophosphate
MeO-TPP	2'-methoxythiamin pyrophosphate
m <sup>7</sup> Gp <sub>3</sub> C	P <sup>1</sup> -(5'-7-methyl-guanosyl)-P <sup>3</sup> -(5'-cytidyl)-triphosphate
m <sup>7</sup> Gp <sub>5</sub> G	P <sup>1</sup> -(5'-7-methyl-guanosyl)-P <sup>5</sup> -(5'-guanosyl)-pentaphosphate

N <sup>1</sup> -Me-ATP	N <sup>1</sup> -methyladenosine-5'-triphosphate
N <sup>1</sup> -Me-GTP	N <sup>1</sup> -methylguanosine-5'-triphosphate
N <sup>4</sup> -Me-dCTP	N <sup>4</sup> -Methyl-2'-deoxycytidine-5'-triphosphate
N <sup>6</sup> -Me-ATP	N <sup>6</sup> -methyladenosine-5'-triphosphate
oxidized-CoA	Coenzyme A, oxidized (CoA-S-S-CoA)
p <sub>4</sub> G	Guanosine 5'-tetrphosphate
ppGpp	Guanosine-3',5'-Bisdiphosphate
PRPP	5-Phospho-D-ribose 1-diphosphate
TDP-glucose	Thymidine-5'-diphospho- $\alpha$ -D-glucose
UDP-acetylgalactosamine	Uridine 5'-diphospho-N-acetylgalactosamine
UDP-acetylglucosamine	Uridine 5'-diphospho-N-acetylglucosamine
UDP-galactose	Uridine 5'-diphosphogalactose
UDP-glucose	Uridine 5'-diphosphoglucose
UDP-glucuronic acid	Uridine 5'-diphosphoglucuronic acid
XTP	Xanthosine-5'-triphosphate