TABLE 4

Summary of Antiviral Activity of (2'R)-2'-deoxy-2'-fluoro-2'-C-methylcytidine

| Virus | Cell | $EC_{50}$, CPE (μM) | $EC_{50}$, NR[a] (μM) | $CC_{50}$, CPE (μM) | $CC_{50}$, NR[a] (μM) |
|---|---|---|---|---|---|
| West Nile | Vero | 32 | 12 | >100 | 32 |
| Dengue Type 2 | Vero | 32/55 | >100/>100 | >100 | >100 |
| Yellow Fever | Vero | 19/3.2 | 32/12 | >100 | >100 |
| Influenza A (H1N1) | MDCK | >100 | >100 | >100 | >100 |
| Influenza A (H3N2) | MDCK | >100 | >100 | >100 | >100 |
| Influenza B | MDCK | >100 | >100 | >100 | >100 |
| Rhinovirus Type 2 | KB | 25 | 20 | >100 | >100 |
| VEE | Vero | >100 | >100 | >100 | >100 |
| SARSCoV | Vero | >100 | >100 | >100 | >100 |

[a]NR = Neutral Red.

TABLE 5

Summary of Antiviral Activity of (2'R)-2'-deoxy-2'-fluoro-2'-C-methylcytidine

| Virus | (2'R)-2'-deoxy-2'-fluoro-2'-C-methylcytidine ($EC_{90}$, μM) | 2'-C-methylcytidine ($EC_{90}$, μM) | 2'-C-methyladenosine ($EC_{90}$, μM) |
|---|---|---|---|
| BVDVncp | >22 | 0.5 | 1.2 |
| BVDVcp | >100 | 2 | 1.5 |
| RSV | >100 | >100 | >100 |
| HIV[a] | >100 | ND | ND |
| HBV | >10 | >10 | ND |
| Coronavirus 229E | >100 | ND | ND |

ND = Not determined.

TABLE 6

Cytotoxicity Studies[a]

| Cell Line | (2'R)-2'-deoxy-2'-fluoro-2'-C methylcytidine $CC_{50}$, μM | 2'-C-methylcytidine $CC_{50}$, μM | 2'-C-methyladenosine $CC_{50}$, μM |
|---|---|---|---|
| CloneA | >100 | >100 | 37 |
| Huh7 | >100 | >100 | 30 |
| HepG2 | 75 | >100 | 58 |
| MDBK | >100 | >100 | |
| PBM | >100 | | |
| CEM | >100 | | |
| Vero | >100 | | |
| MRC-5 | >100 | | |

[a]Results determined using MTS assay.

TABLE 7

Mitochondrial Toxicity Study

| Compound | mtDNA Synthesis ($IC_{50}$, μM) | Lactic Acid Increase |
|---|---|---|
| (2'R)-2'-deoxy-2'-fluoro-2'-C-methylcytidine | >25 | No effect ≧33 μM |
| 2'-C-methylcytidine | >25 | No effect ≧33 μM |

TABLE 8

Preliminary PK Parameters in Rhesus Monkeys Following a Single Oral Dose of (2'R)-2'-deoxy-2'-fluoro-2'-C-methylcytidine at 33.3 mg/kg

| Parameter | Units | Mean ± SD |
|---|---|---|
| $C_{max}$ | μM | 9.6 ± 2.7 |
| $T_{max}$ | hours | 2 ± 1 |
| $AUC_{0\text{-last}}$ | μM × h | 44.2 ± 22.2 |
| T ½ | hours | 3.9 ± 0.1 |
| Bioavailability | F % | 21 ± 11 |

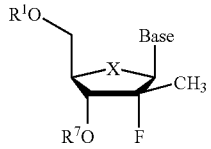
TABLE 9

Effect of Nucleoside Analogs on Human Bone Marrow Cells

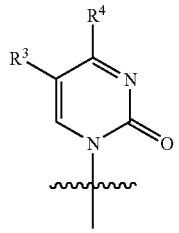
| Compound (β-D-analog) | BFU-E $IC_{50}$ (μM) | CFU-GM $IC_{50}$ (μM) |
|---|---|---|
| 2'-fluoro-2'-C-methylcytidine | 98.2 | 93.9 |
| 2'-C-methylcytidine | 20.1 | 13.2 |
| AZT | 0.08 | 0.95 |

What is claimed is:

**1**. A (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β-D or β-L) or its pharmaceutically acceptable salt of the structure:




wherein Base is a pyrimidine base represented by the following formula




X is O; $R^1$ and $R^7$ are independently H, a monophosphate, a diphosphate, a triphosphate, a H-phosphonate, alkyl, an alkyl sulfonyl, or an arylalkyl sulfonyl; and

$R^3$ is H and $R^4$ is $NH_2$ or OH.

**2**. The (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β-D or β-L) of claim **1** or its pharmaceutically acceptable salt thereof, wherein $R^7$ is H and $R^1$ is a monophosphate, or diphosphate, or a triphosphate.

**3**. The (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β-D) of claim **1** or its pharmaceutically acceptable salt thereof, $R^7$ is H and $R^1$ is a diphosphate or a triphosphate.

**4**. A (2'R)-2'-deoxy-2'-fluoro-2'-C-methyl nucleoside (β-D or β-L) of claim **1** or its pharmaceutically acceptable salt thereof wherein $R^7$ is H and $R^1$ is a triphosphate.