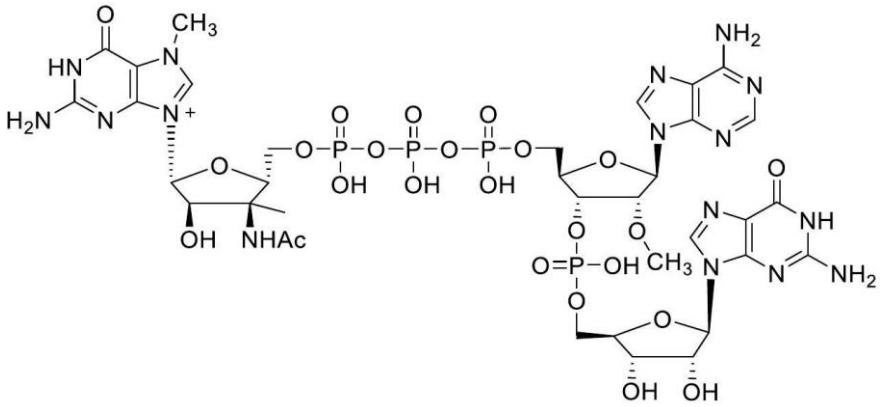
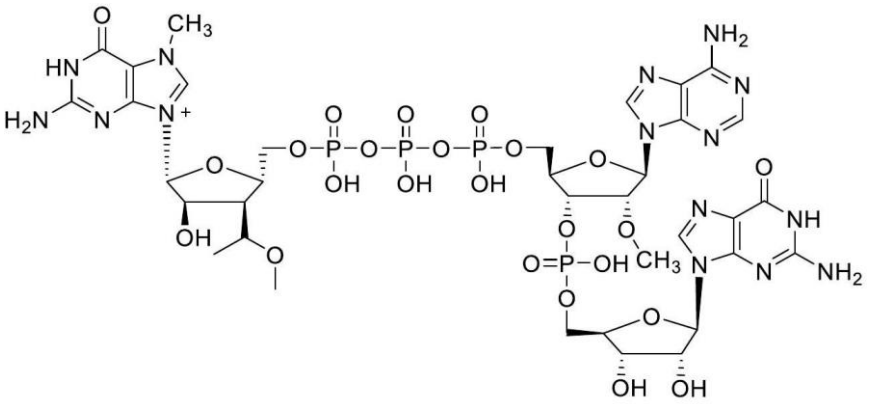
What is claimed is:

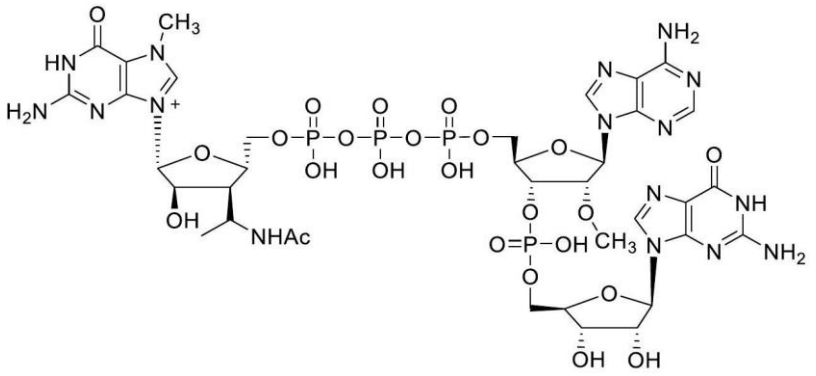
1. A ribose-modified cap analog or a pharmaceutically acceptable salt thereof, wherein the ribose-modified cap analog has a structure of YK-CAP-106, YK-CAP-107, YK-CAP-108, YK-CAP-109, YK-CAP-110, YK-CAP-111, YK-CAP-112, YK-CAP-113, YK-CAP-114, YK-CAP-115, YK-CAP-116, YK-CAP-117, YK-CAP-118, or YK-CAP-119 as shown below:



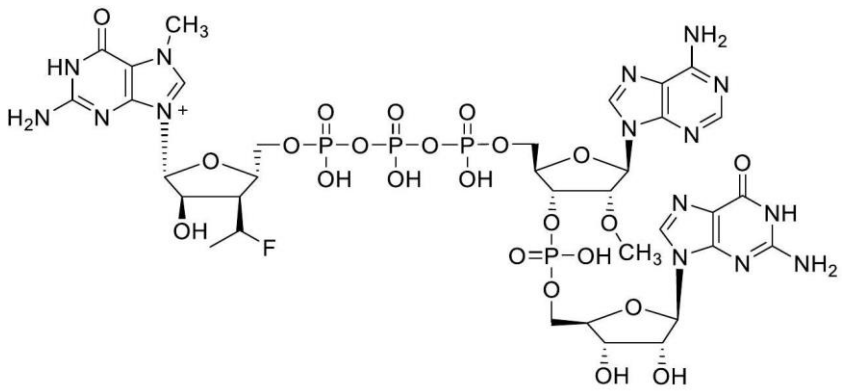
YK-CAP-106 ;



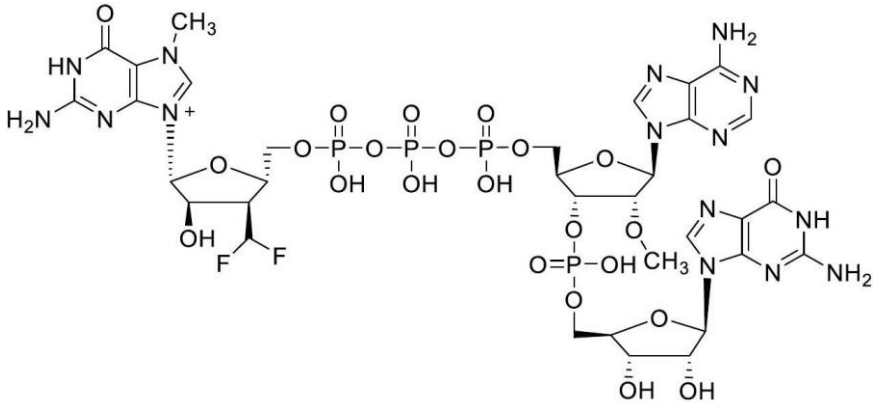
YK-CAP-107 ;



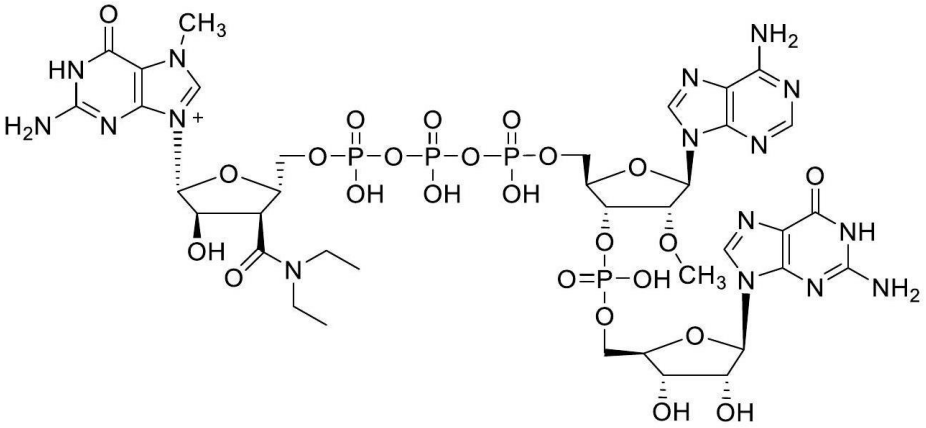
YK-CAP-108 ;



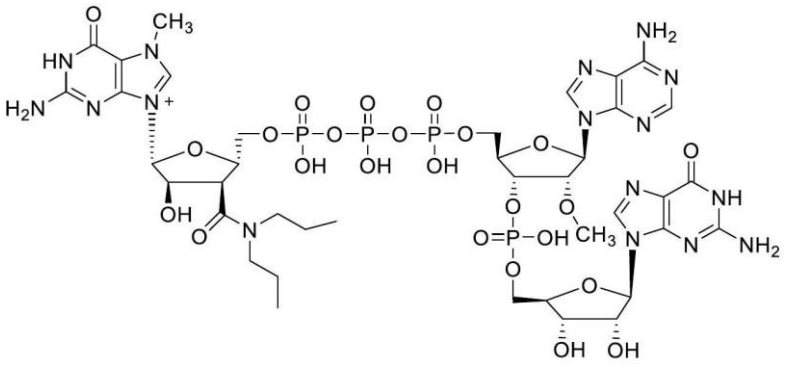
YK-CAP-109 ;



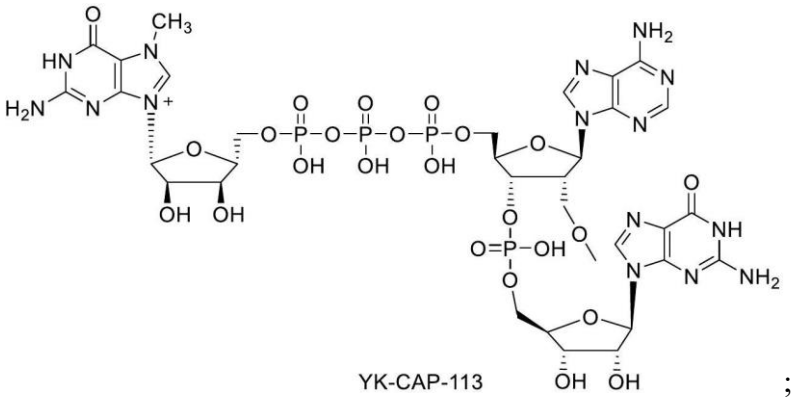
YK-CAP-110 ;



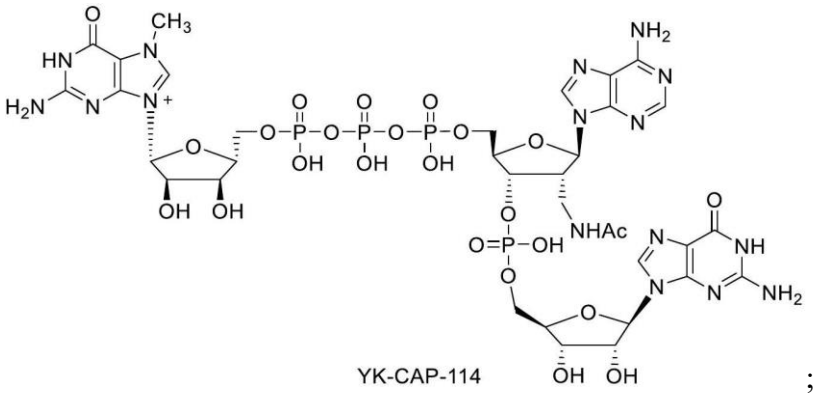
YK-CAP-111 ;



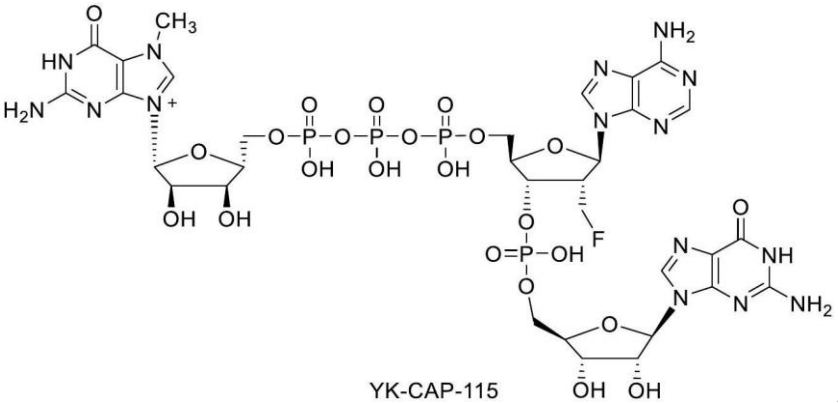
YK-CAP-112 ;



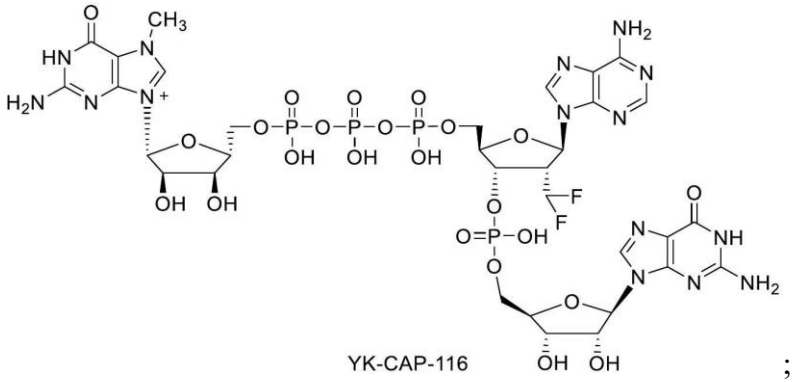
YK-CAP-113 ;



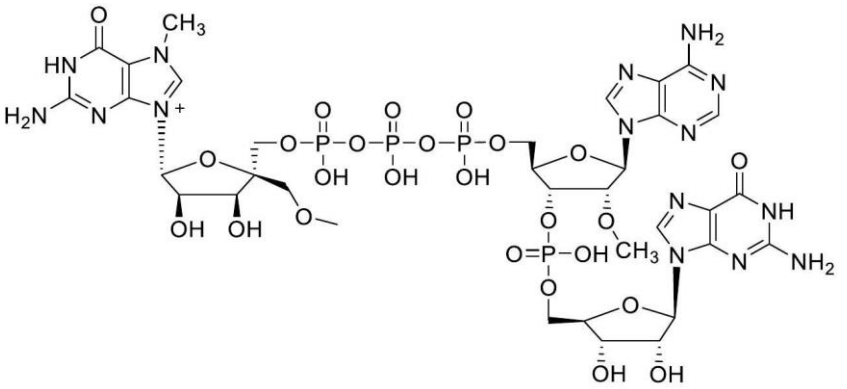
YK-CAP-114 ;



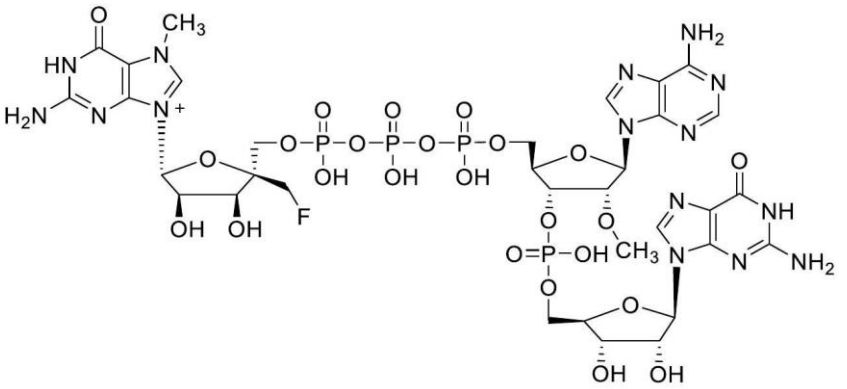
YK-CAP-115 ;



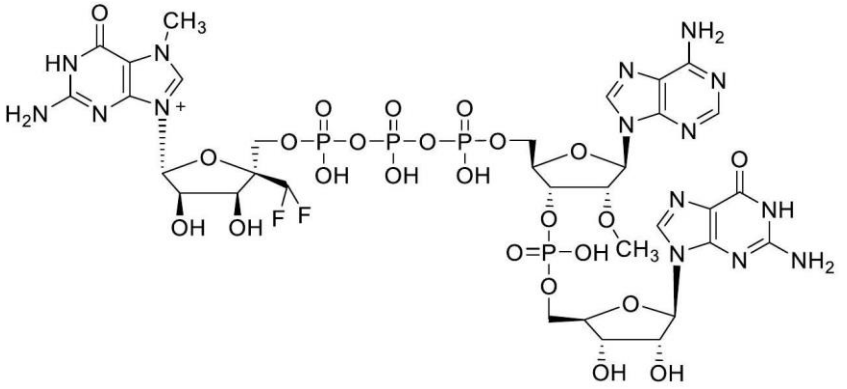
YK-CAP-116 ;



YK-CAP-117 ;



YK-CAP-118 ;



YK-CAP-119 .

2. An RNA molecule, comprising the ribose-modified cap analog or the pharmaceutically acceptable salt thereof according to claim 1 as a cap structure.

3. A pharmaceutical composition, comprising the RNA molecule according to claim 2.

4. A kit comprising:

(1) the ribose-modified cap analog, or the stereoisomer, the pharmaceutically acceptable

salt thereof according to claim 1; and

(2) a nucleotide triphosphate molecule and an RNA polymerase.

5. The kit according to claim 4, wherein the kit further comprises one or a combination of at least two of an RNAase inhibitor, an inorganic pyrophosphatase, Mg^{2+}, or a buffer.