INHIBITORS FOR CORONAVIRUSES

FIELD OF THE DISCLOSURE

[0001] This disclosure relates generally to inhibitors of norovirus and coronavirus replication, and methods of treating or preventing norovirus and coronavirus infections by administering the inhibitors to a patient in need of treatment thereof.

BACKGROUND

[0002] Noroviruses are important enteric pathogens involved in non-bacterial gastroenteritis outbreaks worldwide. Noroviruses mainly occur from person to person via the fecal-oral route but also through contaminated food or water. Indirect contamination is also possible owing to the persistence of the virus in the environment. Human noroviruses belong to the genus Norovirus, family Caliciviridae and are non-enveloped viruses with a positive-sense, single-stranded RNA genome. Norovirus strains are classified into seven groups. Viruses belonging to groups GI, GII, and GIV infect humans, while groups GII, GIII, GIV, GV, GVI and GVII NoVs have been described in animals.

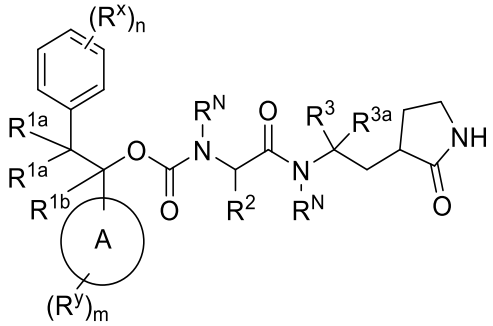
[0003] Coronaviruses are a family of common viruses that cause a range of illnesses in humans from the common cold to severe acute respiratory syndrome (SARS). Coronaviruses can also cause a number of diseases in animals. Coronaviruses are enveloped, positive-stranded RNA viruses whose name derives from their characteristic crown-like appearance in electron micrographs. Coronaviruses are classified as a family within the Nidovirales order, viruses that replicate using a nested set of mRNAs. The coronavirus subfamily is further classified into four genera: alpha, beta, gamma, and delta coronaviruses. The human coronaviruses (HCoVs) are in two of these genera: alphacoronaviruses (including HCoV-229E and HCoV-NL63) and betacoronaviruses (including HCoV-HKU1, HCoV-OC43, Middle East respiratory syndrome coronavirus (MERS-CoV), the severe acute respiratory syndrome coronavirus (SARS-CoV), and SARS-CoV-2).

[0004] In 2012, a novel coronavirus emerged in Saudi Arabia and became known as Middle East Respiratory Syndrome coronavirus (MERS-CoV). About half of reported cases of MERS-CoV infection have resulted in death and a majority of reported cases have occurred in older to middle age men. Only a small number of reported cases involved subjects with mild respiratory illness. Human to human transmission of MERS-CoV has been found to be possible, but very limited. Another novel coronavirus emerged in Wuhan, China in late 2019. This virus is known as SARS-CoV-2, 2019-nCoV, or Wuhan coronavirus, and it the cause of a worldwide pandemic in late 2019 and 2020.

[0005] Given the widespread transmission and potential health effects of these viruses, there is a need for drugs for treating norovirus and coronavirus infections.

SUMMARY

[0005a] In an aspect of the present disclosure, there is provided a compound, or pharmaceutically acceptable salt thereof, having a structure of Formula (I):



(I),

wherein

each R^N is independently H or C_{1-6}alkyl;

each R^{1a} is independently hydrogen, halo, C_{1-6}alkyl, or C_{1-6}haloalkyl,

or both R^{1a} with the carbon to which they are attached form a spiro C_{3-6}carbocyclyl or spiro 4-8-membered heterocyclyl having 1-3 ring heteroatoms selected from N, O, and S, which is optionally substituted with $C(O)OR^N$;

R^{1b} is hydrogen, halo, hydroxyl, C_{1-6}alkyl, or C_{1-6}haloalkyl;

n is 0, 1, or 2;

each R^x is independently halo, C_{1-6}alkyl, C_{3-6}carbocyclyl, or C_{6-10}aryl, wherein the aryl is optionally substituted with 1 or 2 substituents independenly selected from OH, halo, C_{1-6}alkyl, C_{1-6}haloalkyl, and C_{1-6}alkoxy;

m is 0, 1, or 2;

each R^y is independently halo or C_{1-6}alkyl;

R^2 is C_{1-6}alkyl, C_{1-6}haloalkyl, C_{1-6}alkylene-C_{3-8}carbocyclyl, or C_{1-6}alkylene-C_{6-10}aryl, wherein the aryl is optionally substituted with 1 or 2 substituents independenly selected from OH, halo, C_{1-6}alkyl, C_{1-6}haloalkyl, and C_{1-6}alkoxy;

R^3 is CN, C_{1-6}alkylene-O(O)C-C_{1-6}alkyl substituted with SO_3H, C_{1-6}alkenylene-C(O)O-C_{1-6}alkyl, C_{1-6}alkylene-OH substituted with $PO(OCH_2CH_2)_2$, CHO, or -$[C(O)]_2$-NR^N-B, wherein B is C_{1-6}alkyl, C_{1-6}hydroxyalkyl, C_{3-8}carbocyclyl, or 4-12-membered heterocyclyl having 1-3 ring heteroatoms selected from N, O, and S, and the carbocyclyl or heterocyclyl is optionally mono-substituted with C_{1-6}alkyl;

R^{3a} is H or C_{1-6}alkyl; and

ring A is C_{6-10}cycloalkyl, C_{6-10}aryl, or 5-10 membered heteroaryl comprising one nitrogen heteroatom,

with the proviso that when each R^{1a} is hydrogen or each R^{1a} is methyl, ring A is phenyl, m is 0 or 1, R^y is halo, and n is 1, then R^x is other than chloro, and

with the proviso that the compound is not:

1,2-diphenylethyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;

2-(2-(((1,2-diphenylethoxy)carbonyl)amino)-4-methylpentanamido)-1-hydroxy-3-(2-oxopyrrolidin-3-yl)propane-1-sulfonic acid;

2-(3-chlorophenyl)-1-phenylethyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;

2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;

1,2-bis(3-chlorophenyl)-2-methylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-

2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-1-phenylethyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(2-(((2-(3-chlorophenyl)-1-phenylethoxy)carbonyl)amino)-4-methylpentanamido)-1-hydroxy-3-(2-oxopyrrolidin-3-yl)propane-1-sulfonic acid;
2-(2-(((2-(3-chlorophenyl)-1-phenylethoxy)carbonyl)amino)-3-cyclohexylpropanamido)-1-hydroxy-3-(2-oxopyrrolidin-3-yl)propane-1-sulfonic acid;
2-(3-chlorophenyl)-1-phenylethyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-(naphthalen-2-yl)propyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-(m-tolyl)propyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-(naphthalen-2-yl)propyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-chlorophenyl)-2-methylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-fluorophenyl)-2-methylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-(m-tolyl)propyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-fluorophenyl)-2-methylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-chlorophenyl)-2-methylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-fluorophenyl)-2-methylpropyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-chlorophenyl)-2-methylpropyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;

2-(3-chlorophenyl)-1-phenylethyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)hexan-2-yl)carbamate;
2-(3-chlorophenyl)-1-phenylethyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
1-(2-chlorophenyl)-2-(3-chlorophenyl)-2-methylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxohexan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxohexan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
1-(2-chlorophenyl)-2-(3-chlorophenyl)-2-methylpropyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(4-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(4-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (3-cyclohexyl-1-((4-(ethylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-(naphthalen-2-yl)propyl (3-cyclohexyl-1-((4-(diethylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-

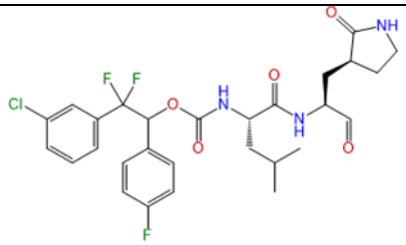
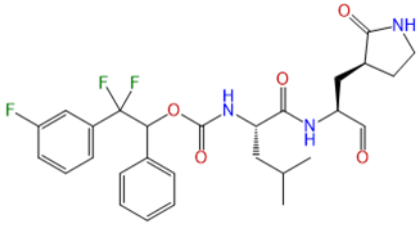
yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-chlorophenyl)-2-methylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
ethyl (E)-4-(2-(((1,2-diphenylethoxy)carbonyl)amino)-4-methylpentanamido)-5-(2-oxopyrrolidin-3-yl)pent-2-enoate;
3-(2-(((2-(3-chlorophenyl)-2-methyl-1-(naphthalen-2-yl)propoxy)carbonyl)amino)-3-cyclohexylpropanamido)-2-oxo-4-(2-oxopyrrolidin-3-yl)butanoic acid;
2-(3-chlorophenyl)-1-(4-fluorophenyl)-2-methylpropyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)ethyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)ethyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-chlorophenyl)-2-methylpropyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-fluorophenyl)-2-methylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2,2-difluoro-1-phenylethyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2,2-difluoro-1-phenylethyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxo-3-phenylpropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)-3-phenylpropan-2-yl)carbamate;
2-(3-chlorophenyl)-2,2-difluoro-1-phenylethyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)-2,2-difluoroethyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)heptan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)ethyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-

2-yl)carbamate;
(1-(3-chlorophenyl)cyclobutyl)(phenyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclopentyl)(phenyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)ethyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxo-3-phenylpropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)-2,2-difluoroethyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxoheptan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclohexyl)(phenyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclopropyl)(4-fluorophenyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(4-chlorophenyl)(1-(3-chlorophenyl)cyclopentyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclobutyl)(phenyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-ethyl-1-phenylbutyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-fluorophenyl)-2-methyl-1-phenylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclopentyl)(phenyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(4-chlorophenyl)(1-(3-chlorophenyl)cyclopentyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (4-methyl-1-((4-((1-methylazetidin-3-yl)amino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-ethyl-1-(4-fluorophenyl)butyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopentyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopentyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-

2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)-2-methylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclopropyl)(phenyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclopropyl)(4-fluorophenyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-fluorophenyl)cyclopropyl)(phenyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-fluorophenyl)cyclopropyl)(phenyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(4-chlorophenyl)(1-(3-chlorophenyl)cyclobutyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate; or
(4-chlorophenyl)(1-(3-chlorophenyl)cyclobutyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate.

[0005b] In another aspect of the present disclosure, there is provided a compound as recited in Table A or Table B, or a pharmaceutically acceptable salt thereof:

TABLE A

Compound no.	**Structure**
A1	
A2	

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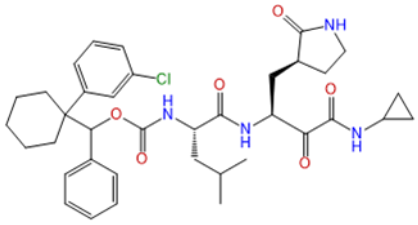
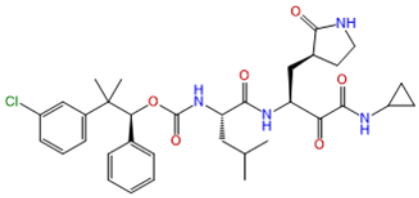
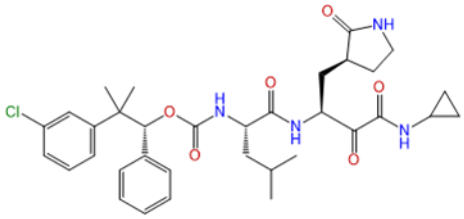
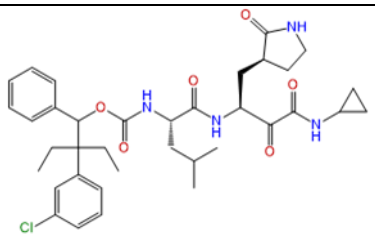
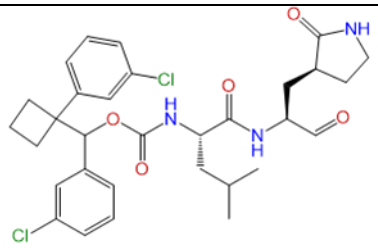
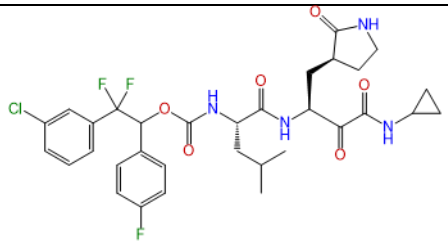
A3	
A4	
A5	
A6	
A7	
A9	

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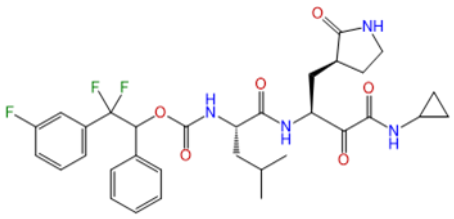
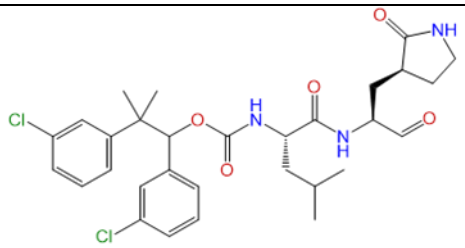
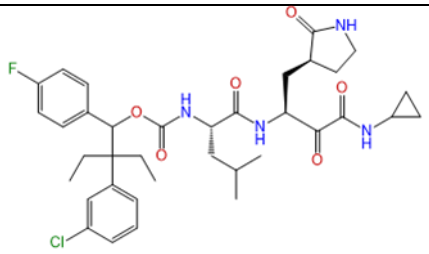
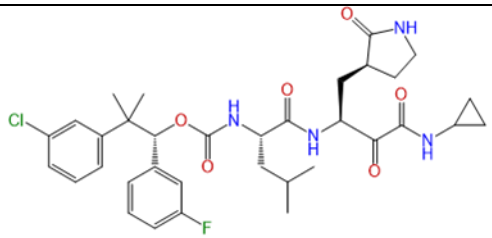
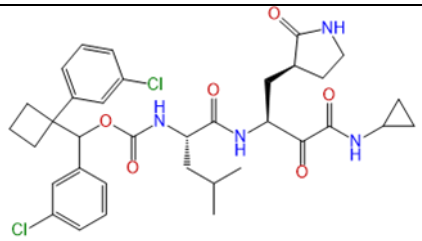
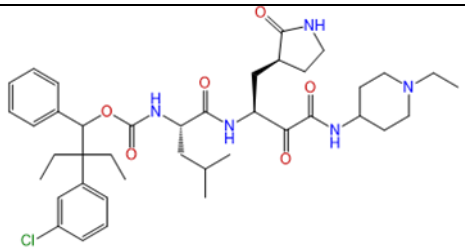
A10	
A11	
A14	
A15	
A16	
A17	

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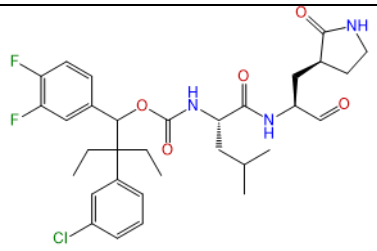
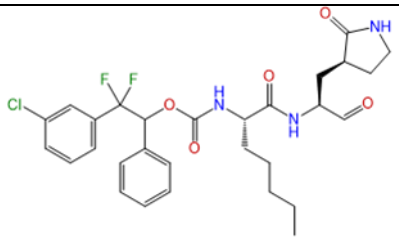
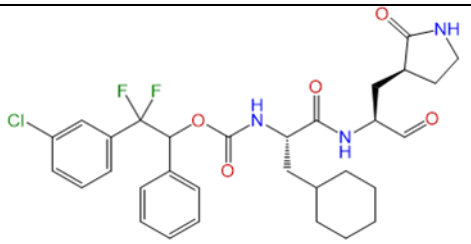
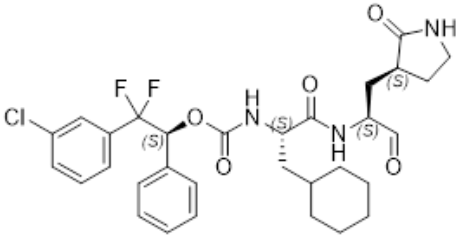
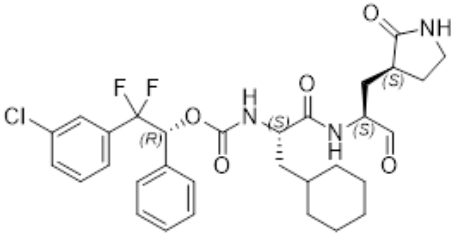
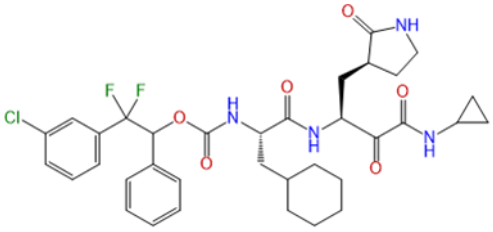
A18	
A19	
A20	
A20-1	
A20-2	
A21	

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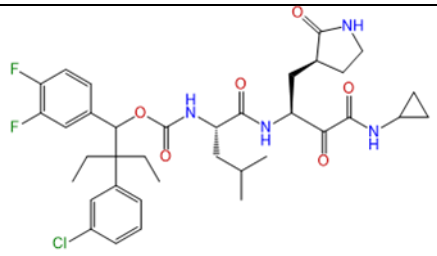
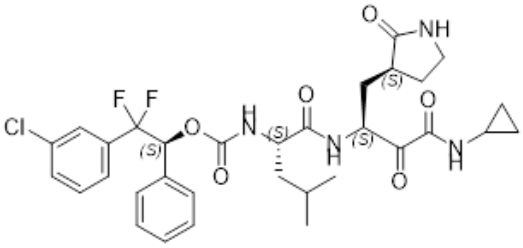
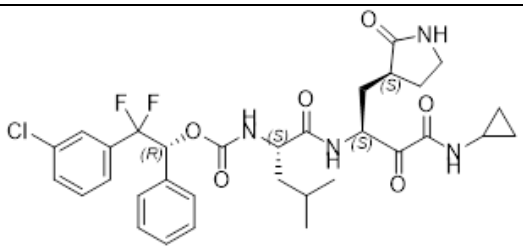
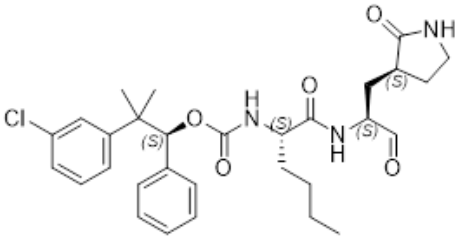
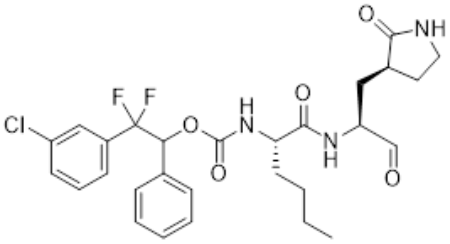
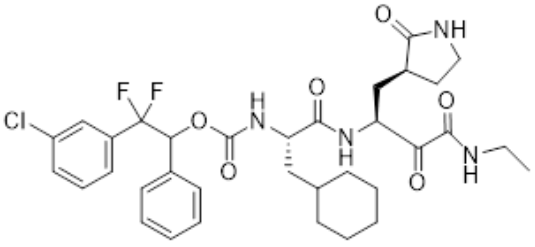
A22	
A25-1	
A25-2	
A26P	
A27	
A29	

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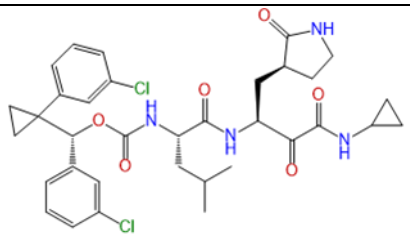
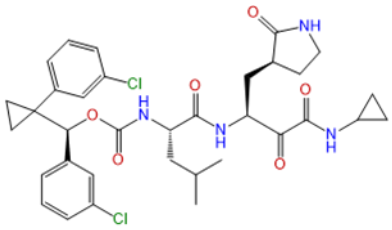
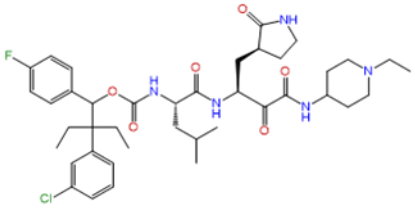
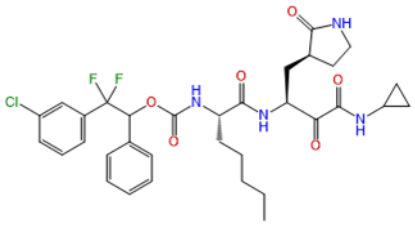
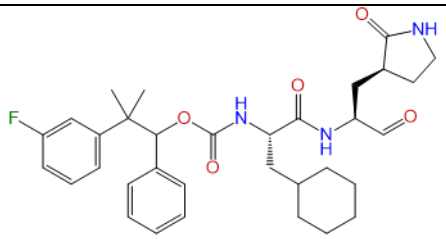
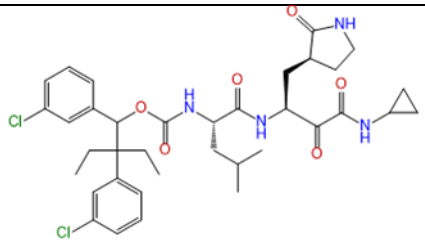
A30	
A31	
A32	
A33	
A34	
A35	

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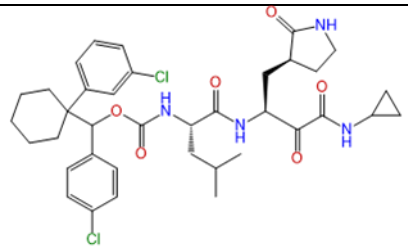
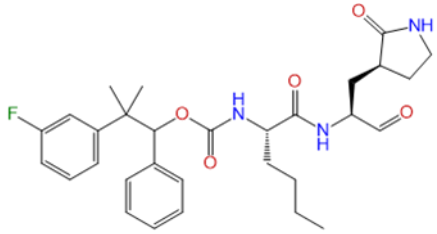
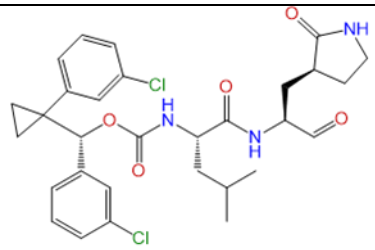
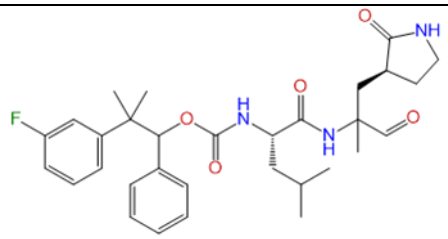
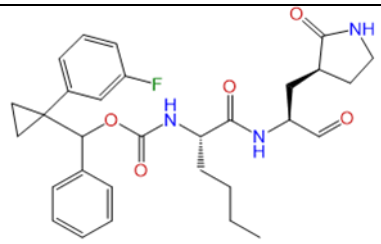
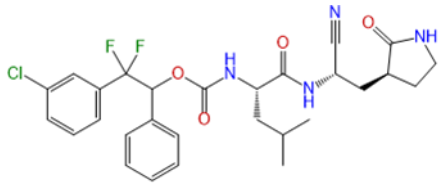
A36	
A37	
A38	
A39	
A40	
A41	

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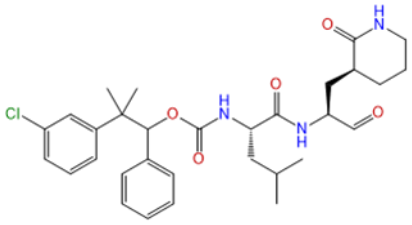
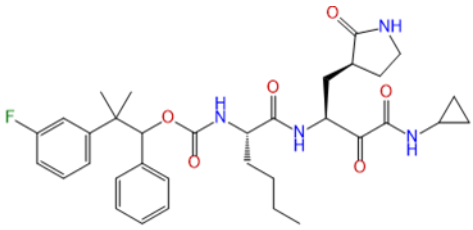
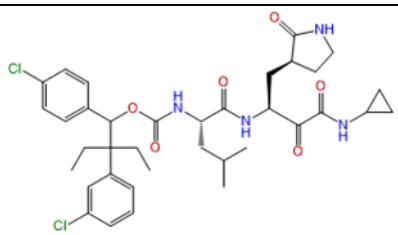
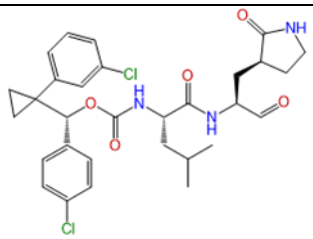
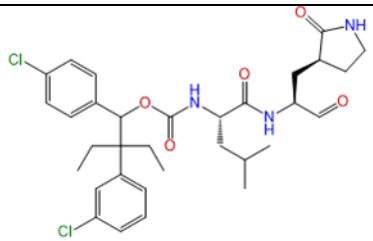
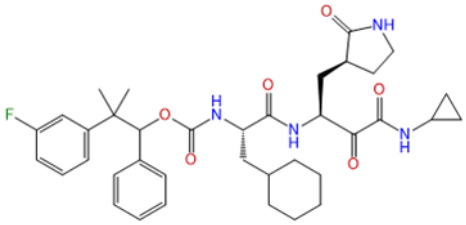
A42	
A43	
A44	
A45	
A46	
A47	

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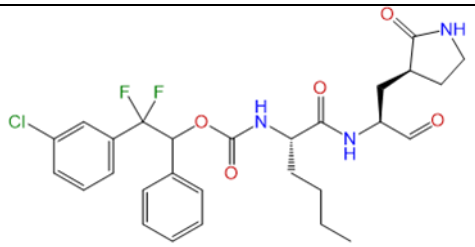
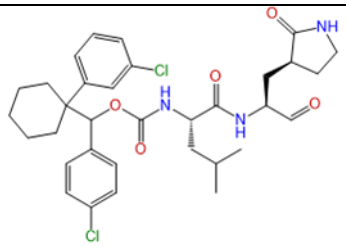
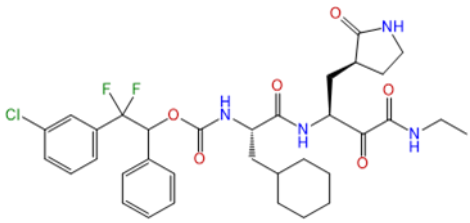
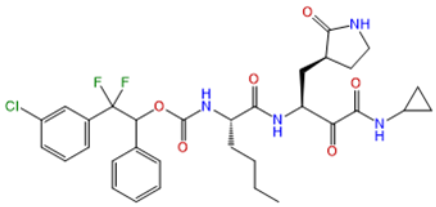
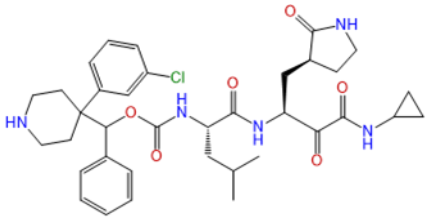
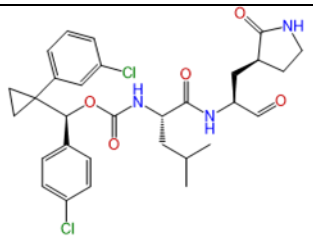
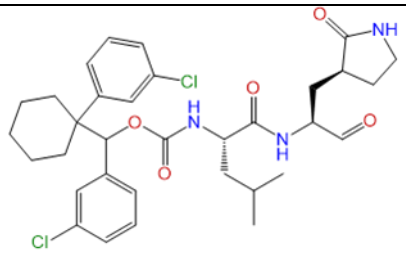
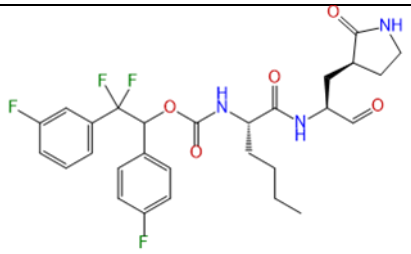
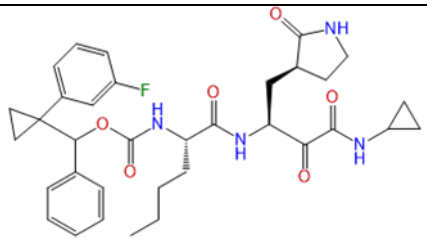
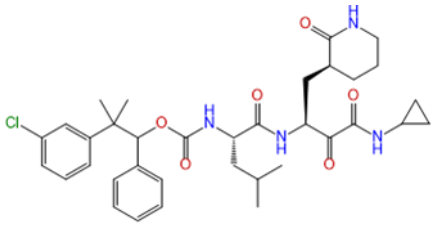
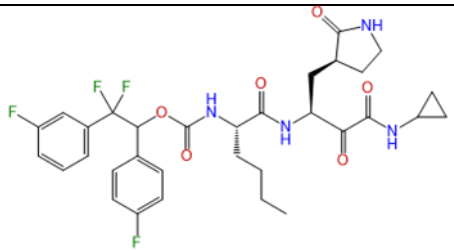
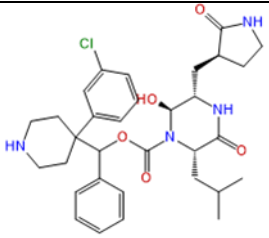
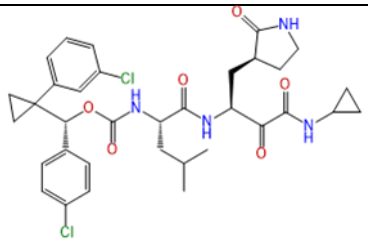
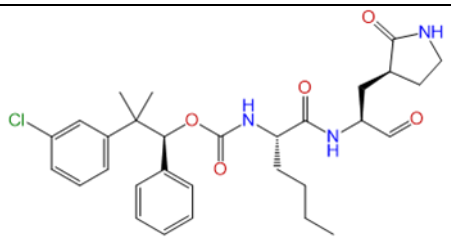
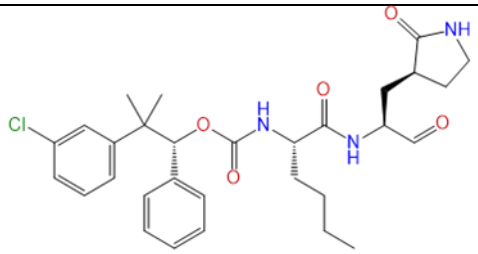
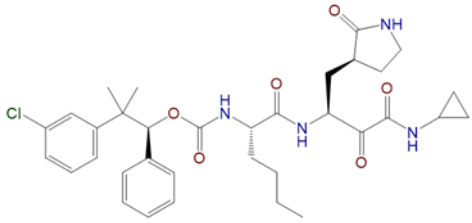
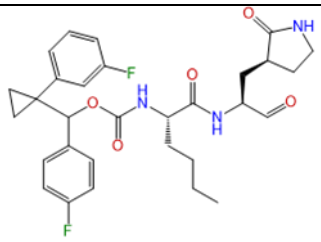
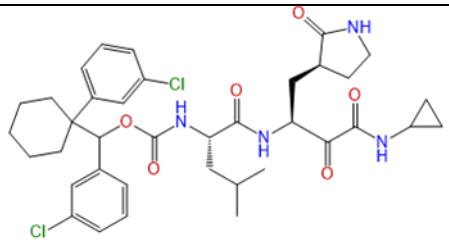
A48	
A49	
A50	
A51	
A52	
A53	

Compound no.	Structure
A54	
A55	
A56	
A57	
A58	
A59	

Compound no.	Structure
A60	
A61	
A62	
A63	
A64	
A65	

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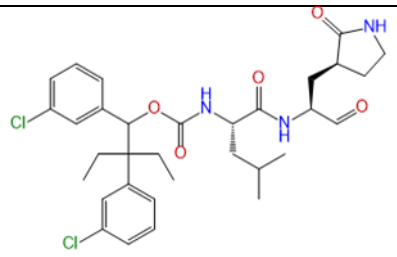
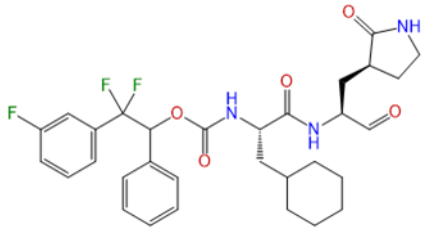
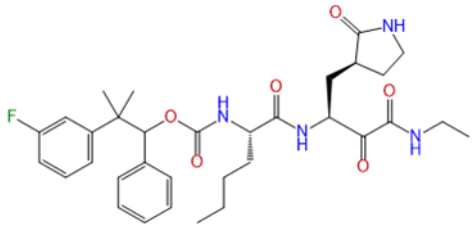
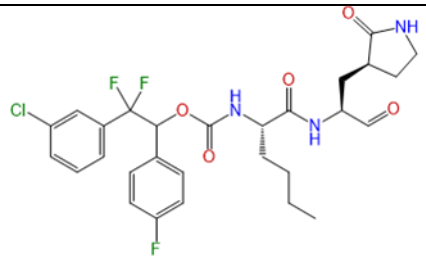
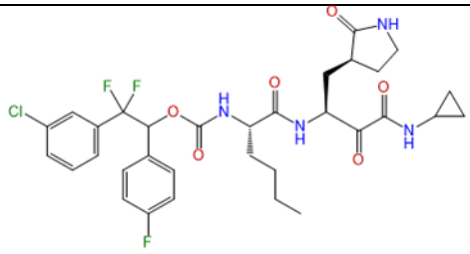
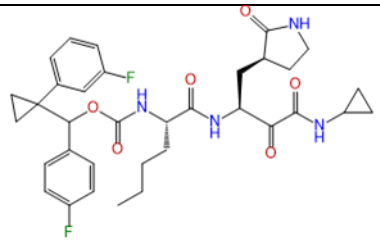
A66	
A67	
A68	
A69	
A70	
A71	

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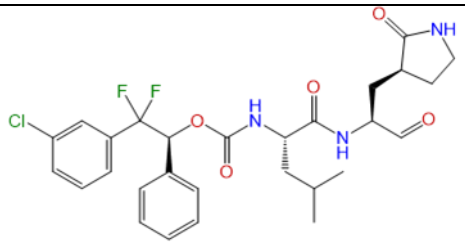
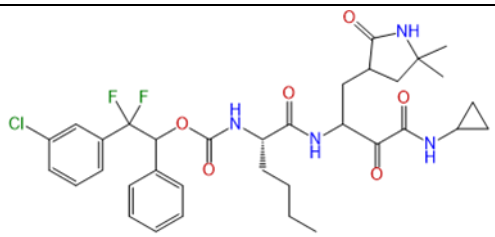
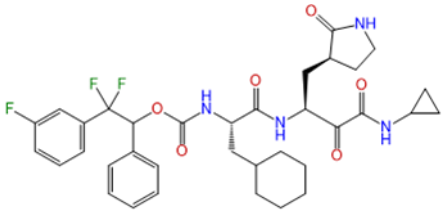
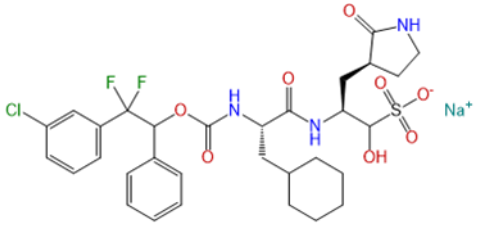
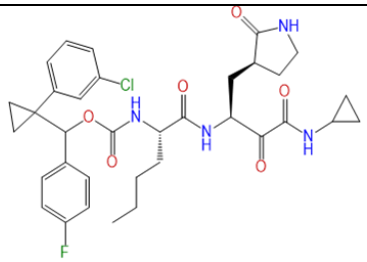
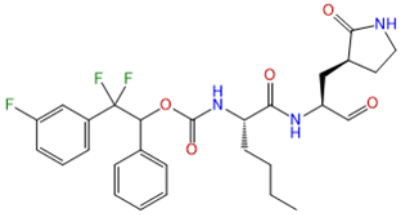
A72	
A73	
A74	
A75	
A76	
A77	

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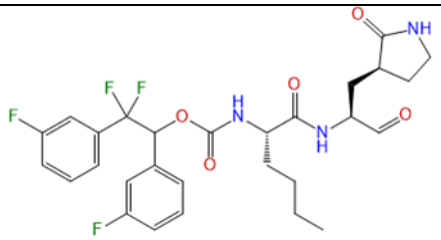
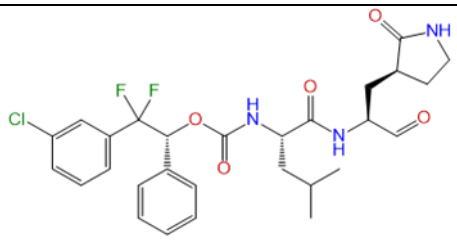
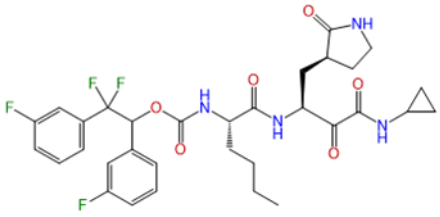
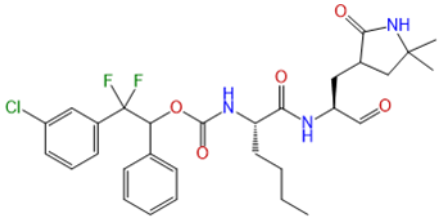
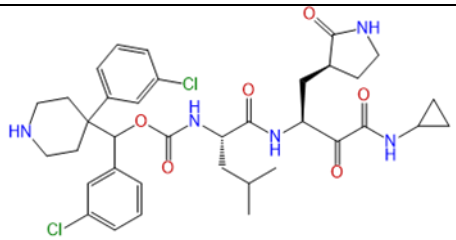
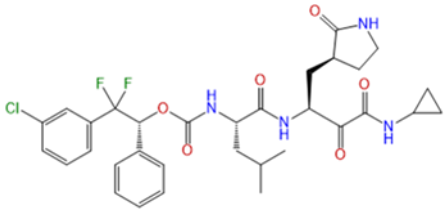
A78	
A79	
A80	
A81	
A83	
A84	

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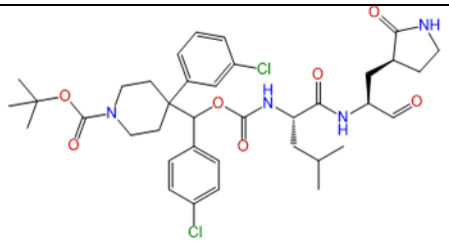
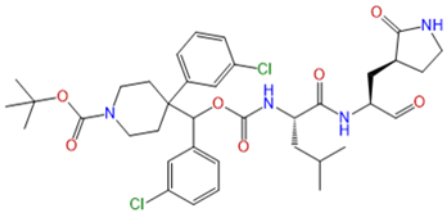
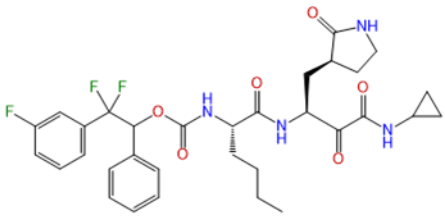
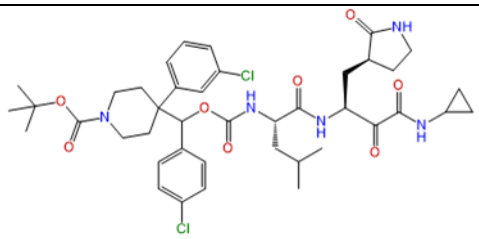
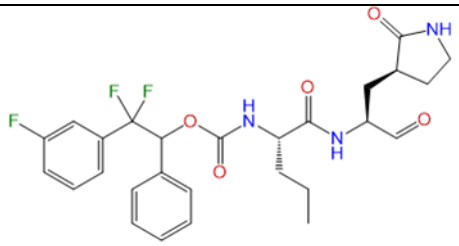
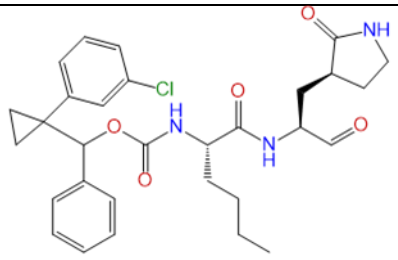
A85	
A86	
A87	
A88	
A89	
A90	

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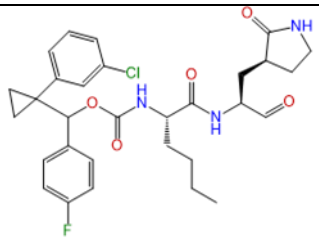
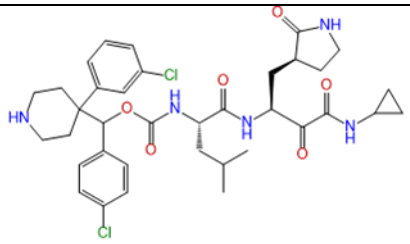
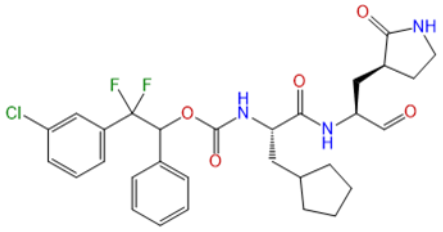
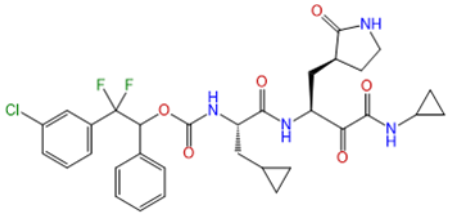
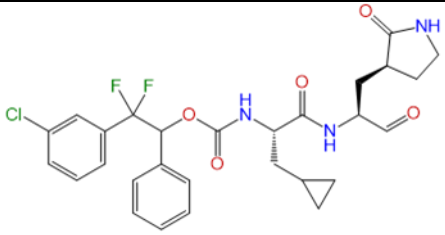
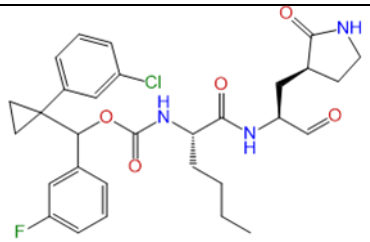
A91	
A92	
A93	
A94	
A95	
A96	

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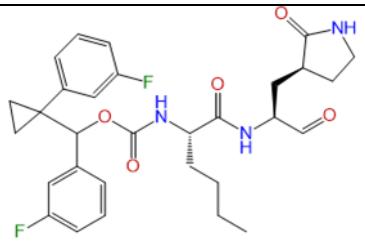
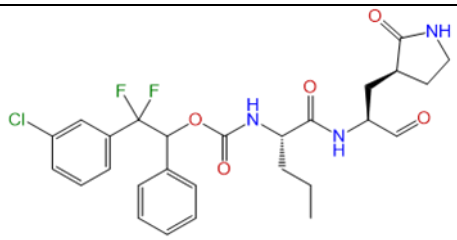
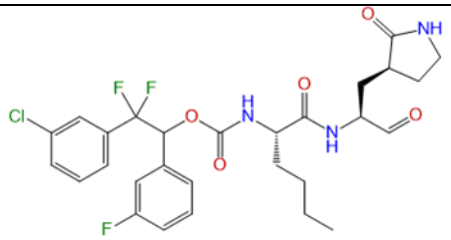
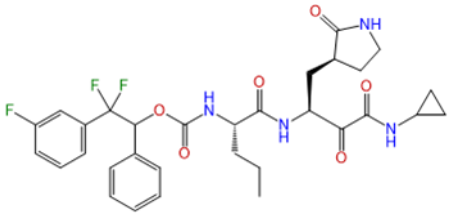
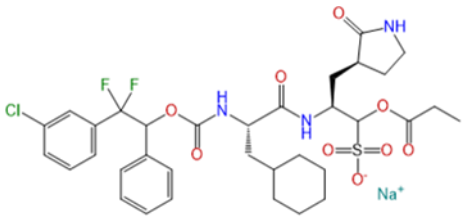
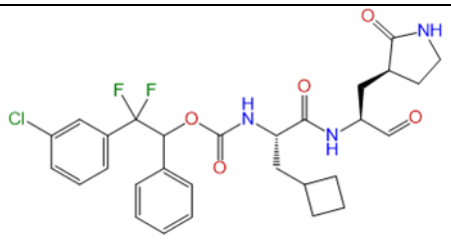
A97	
A98	
A99	
A100	
A101	
A102	

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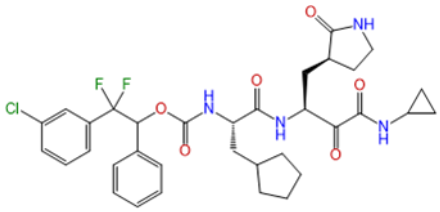
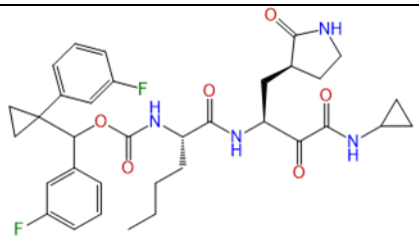
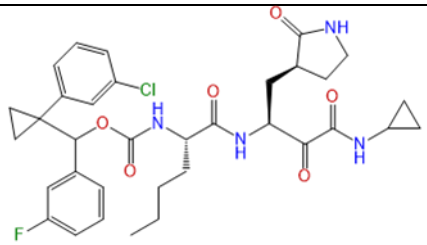
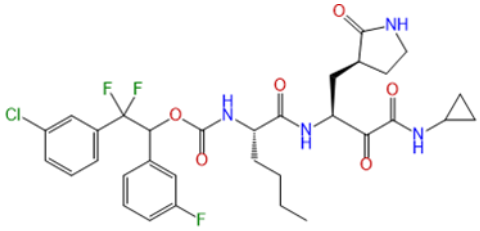
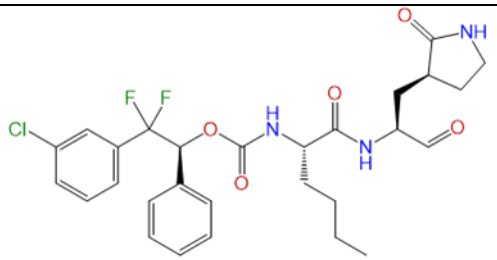
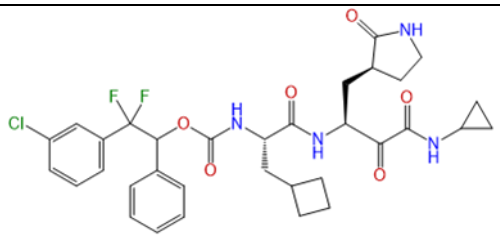
A103	
A104	
A105	
A106	
A107	
A108	

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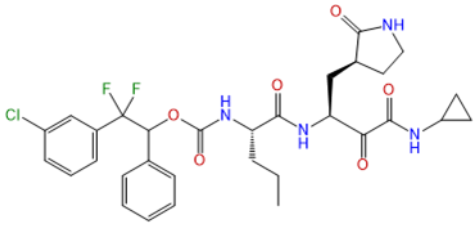
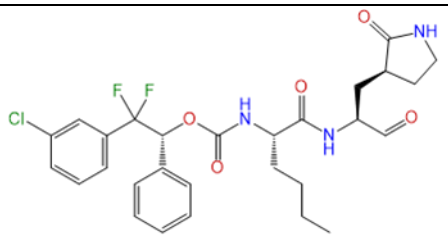
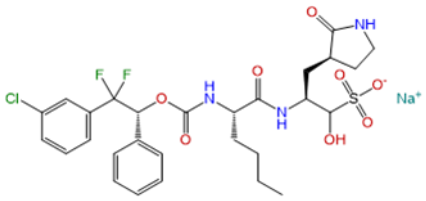
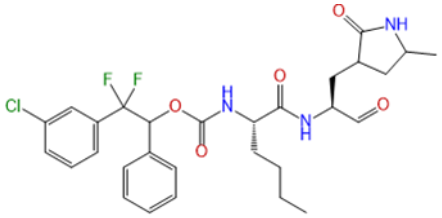
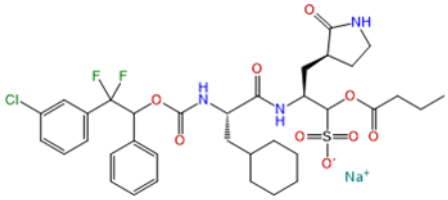
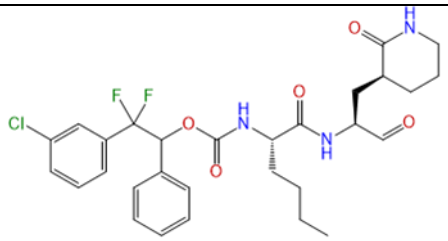
A109	
A110	
A111	
A112	
A113	
A114	

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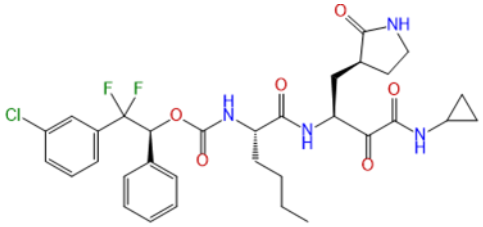
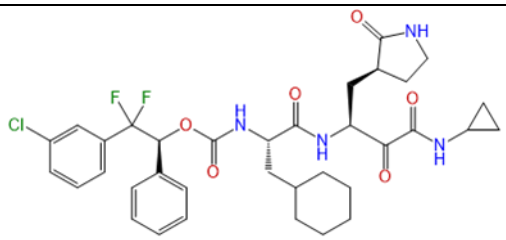
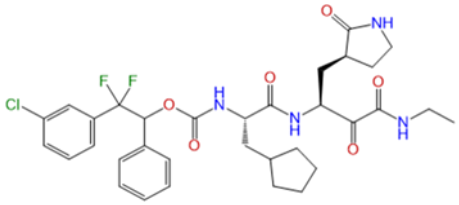
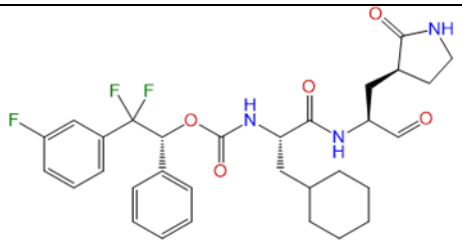
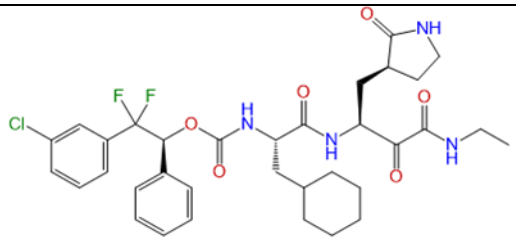
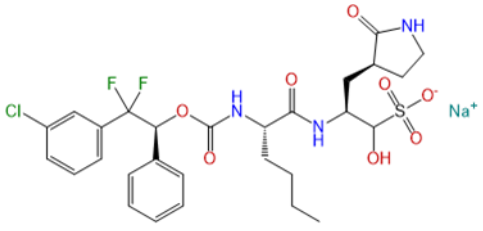
A115	
A116	
A117	
A119	
A120	
A121	

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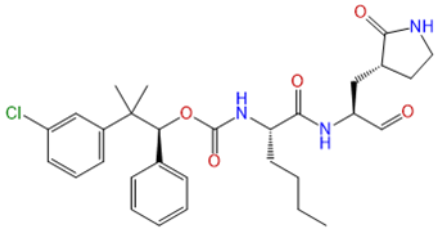
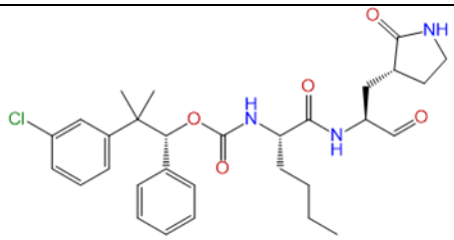
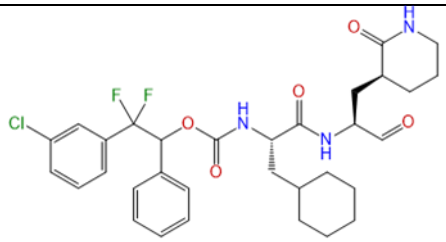
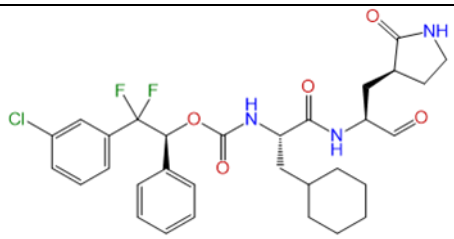
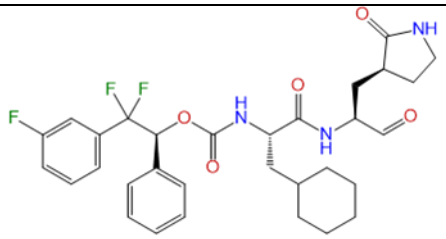
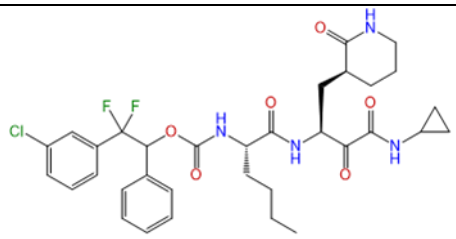
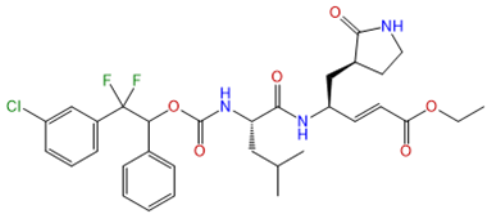
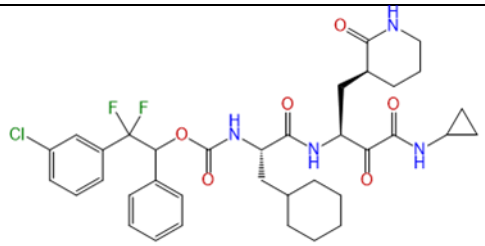
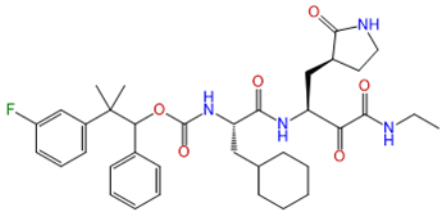
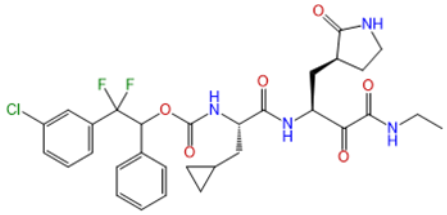
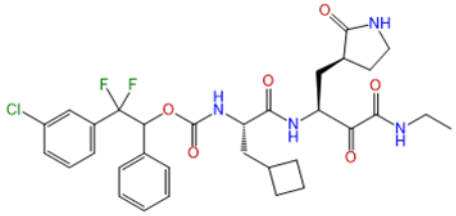
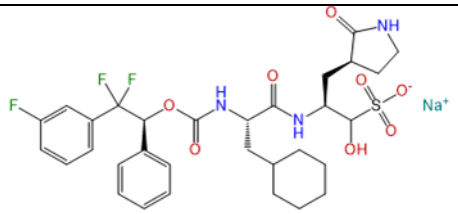
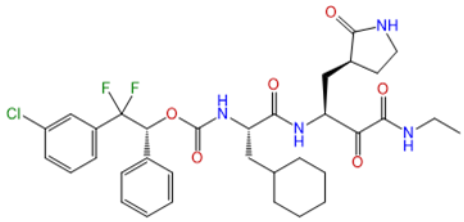
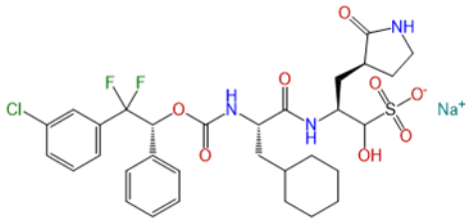
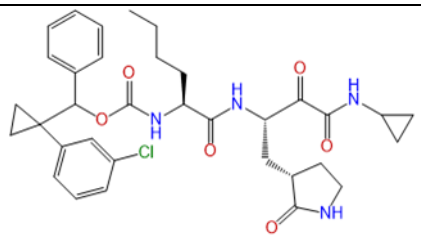
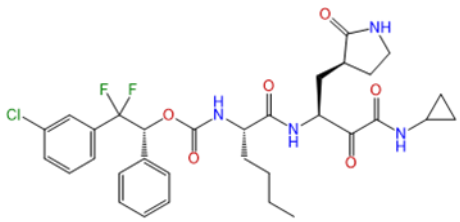
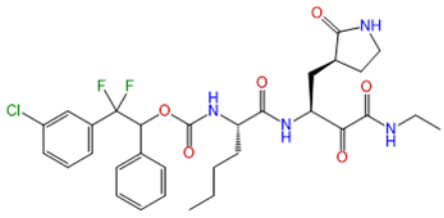
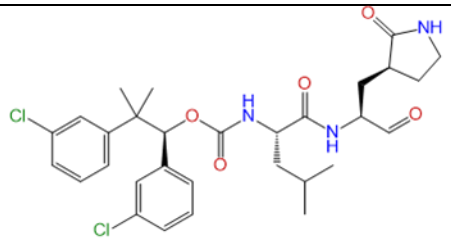
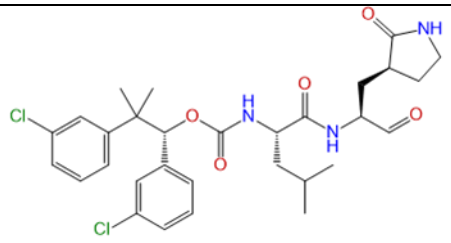
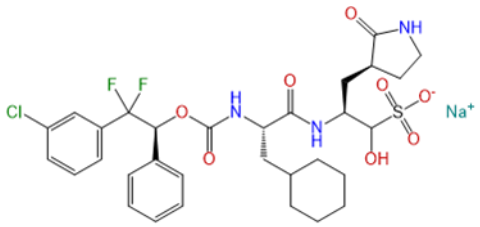
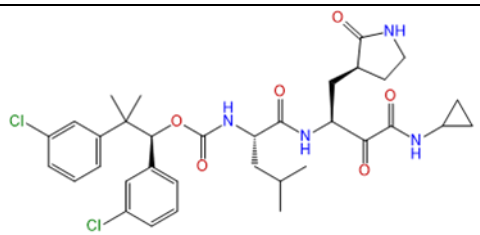
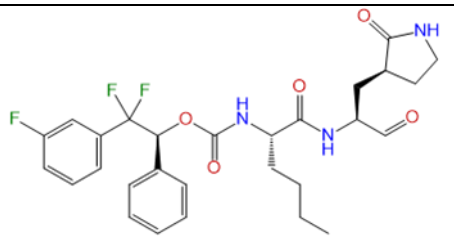
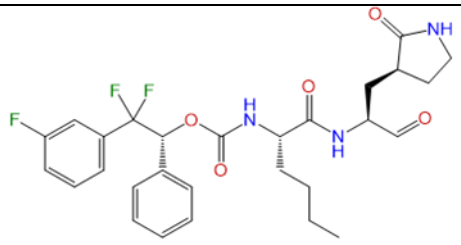
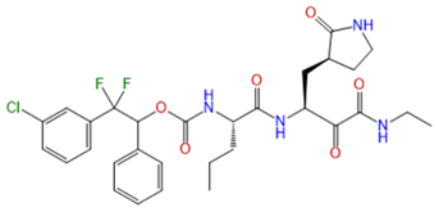
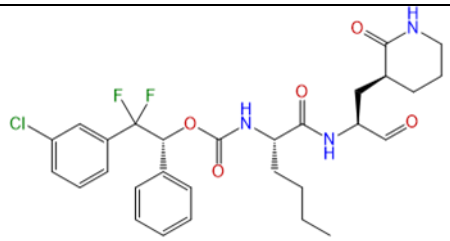
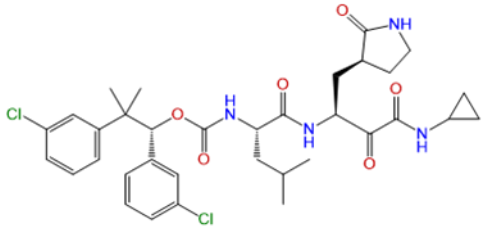
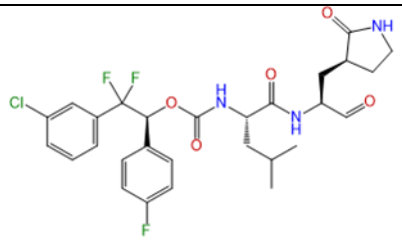
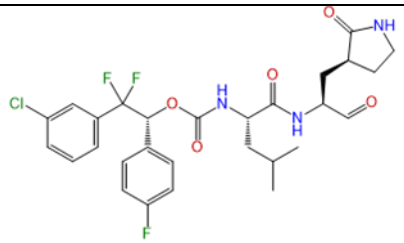
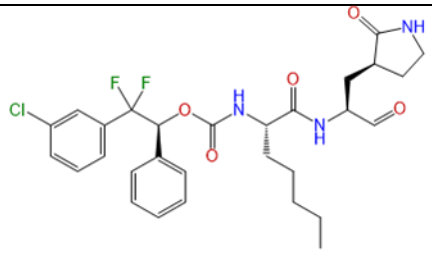
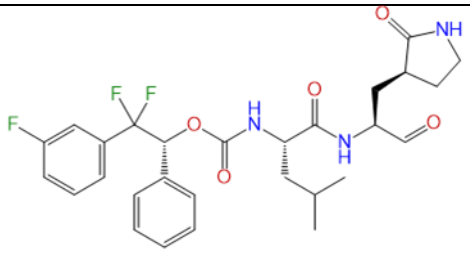
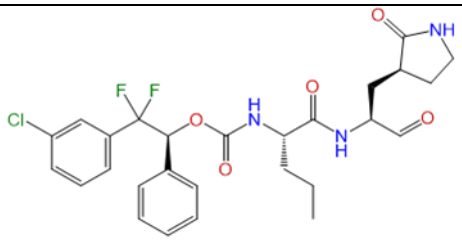
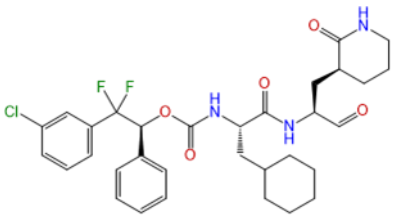
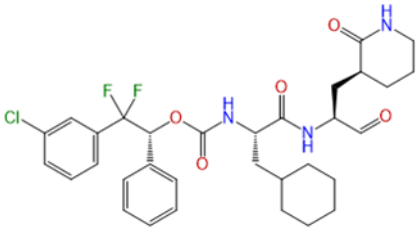
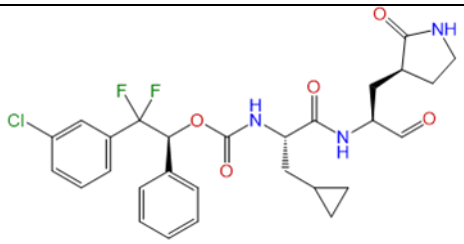
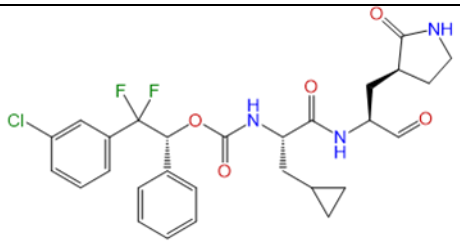
A122	
A123	
A124	
A125	
A126	

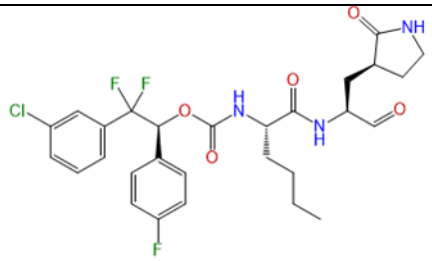
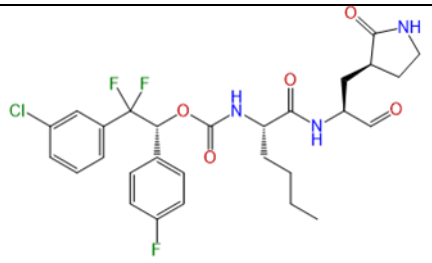
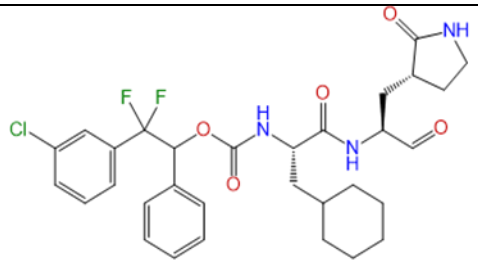
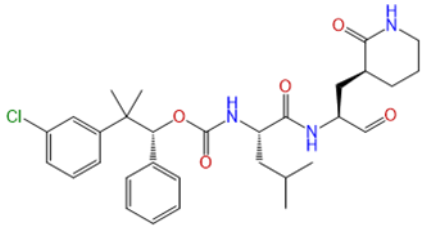
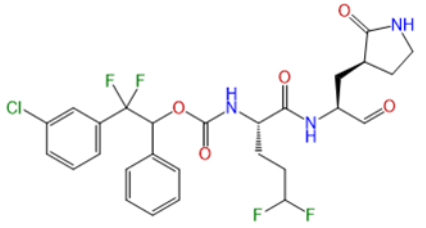
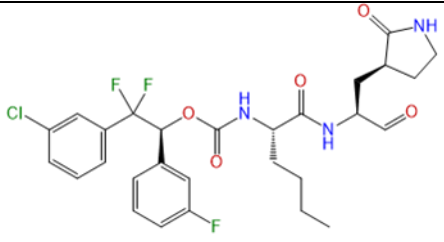
A127	
A128	
A129	
A130	
A131	
A132	

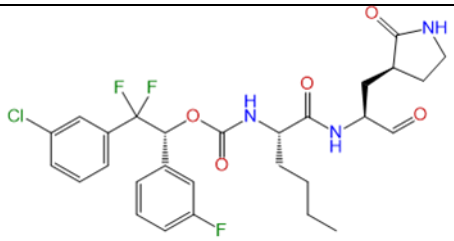
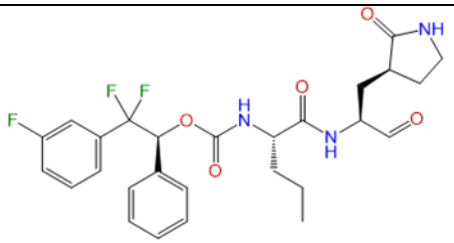
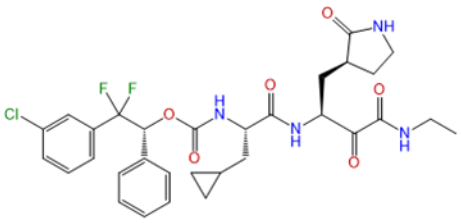
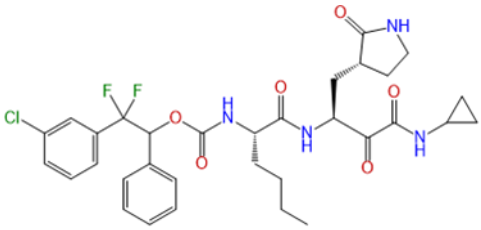
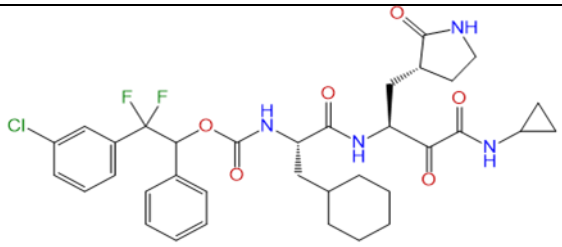
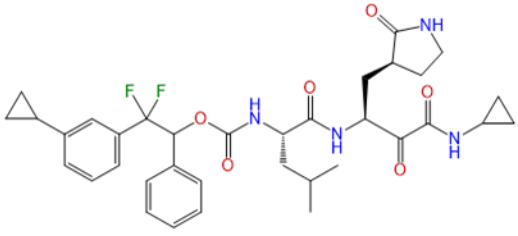
A133	
A134	
A135	
A136	
A137	
A138	

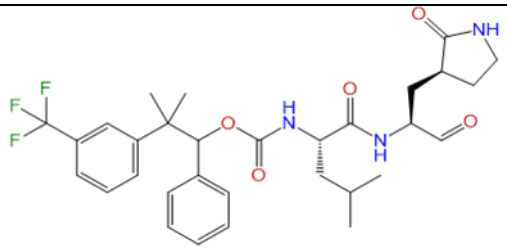
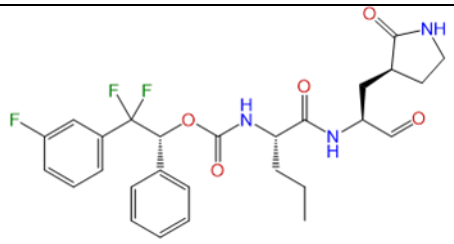
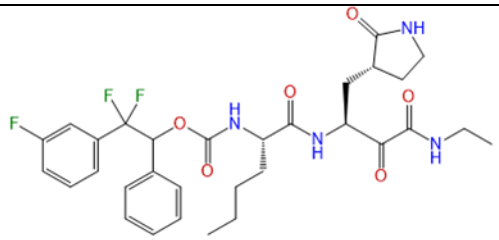
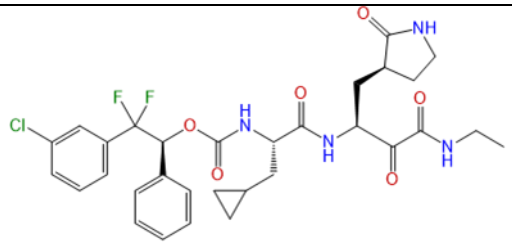
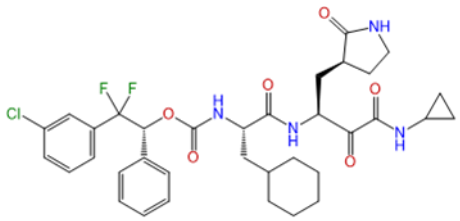
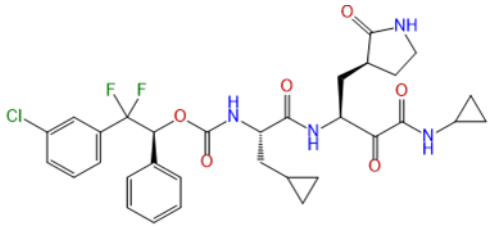
A139	
A140	
A141	
A142	
A143	
A144	

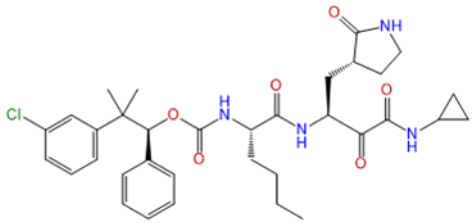
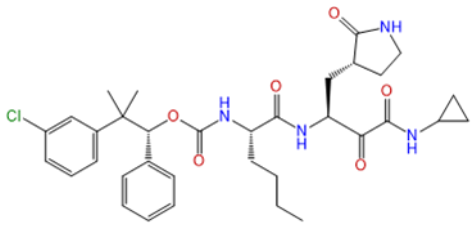
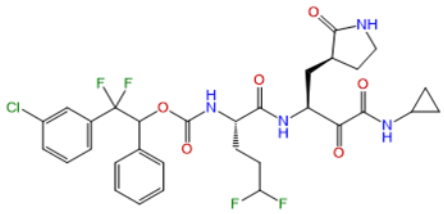
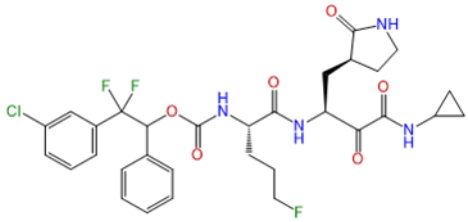
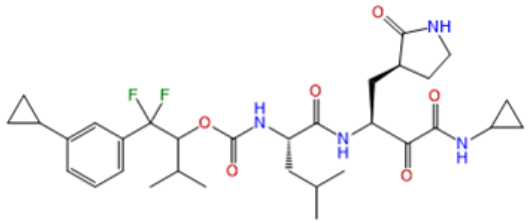
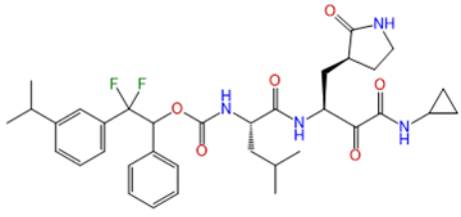
A145	
A146	
A147	
A148	
A149	
A151	

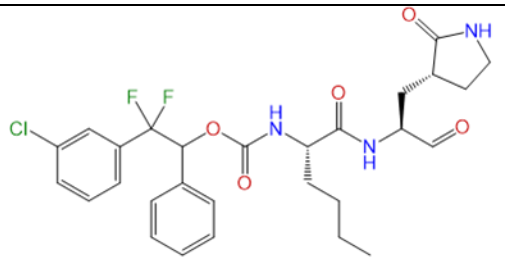
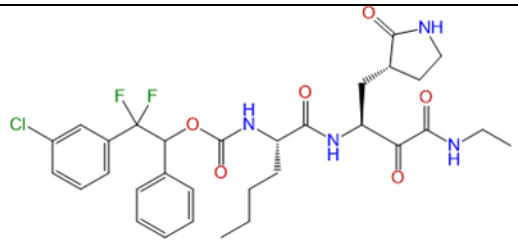
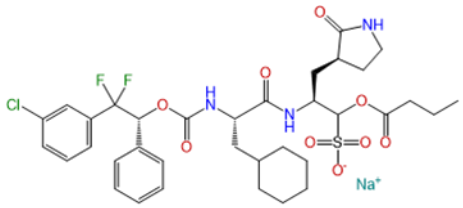
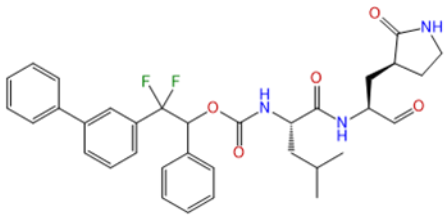
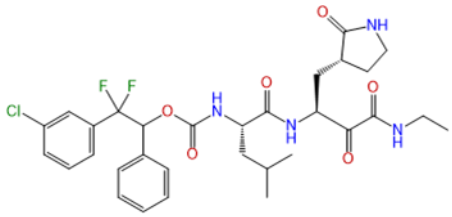
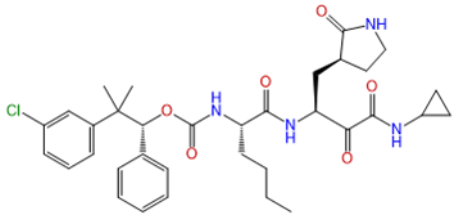
A152	
A153	
A154	
A155	
A156	
A157	

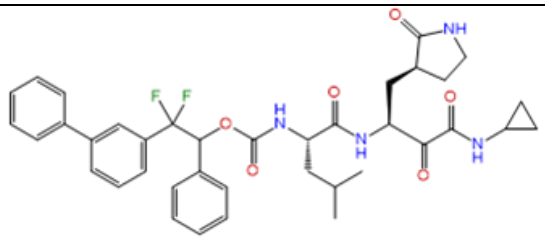
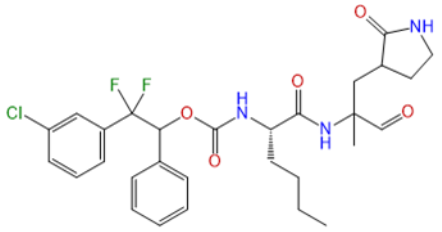
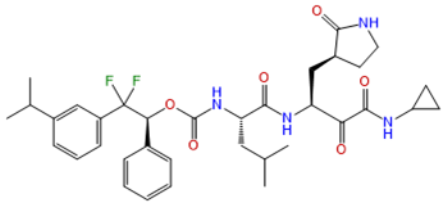
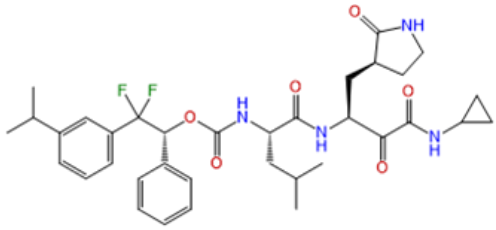
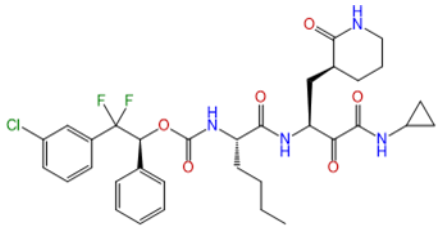
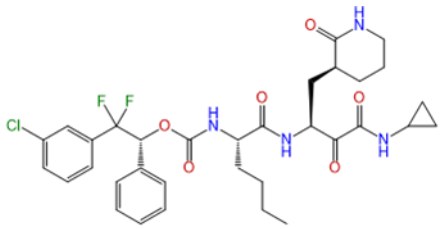
A159	
A160	
A161	
A162	
A163	
A164	

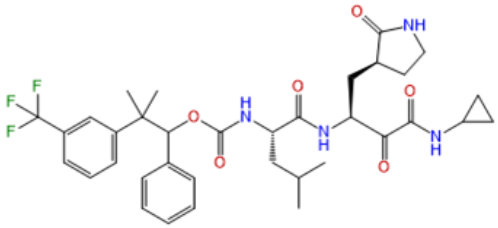
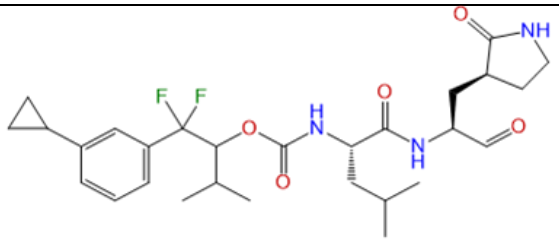
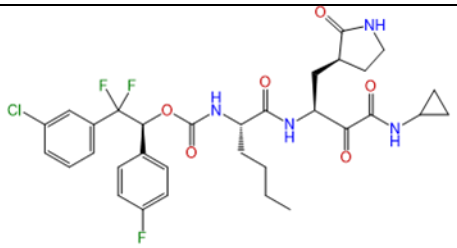
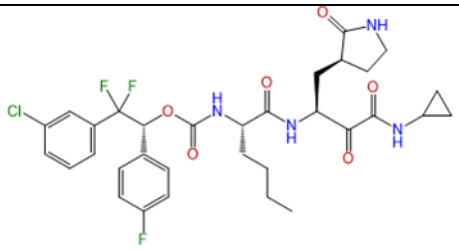
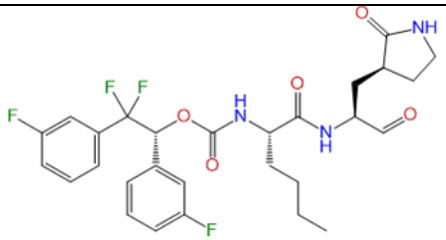
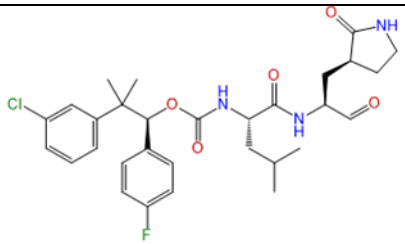
A165	
A166	
A167	
A168	
A169	
A170	

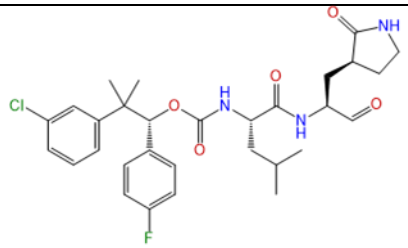
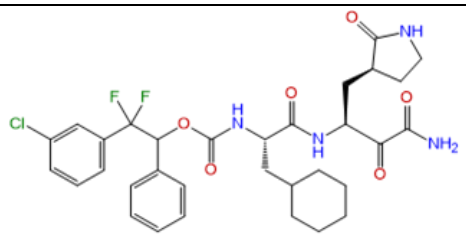
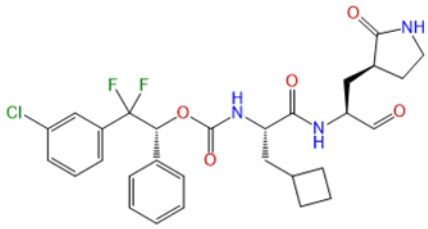
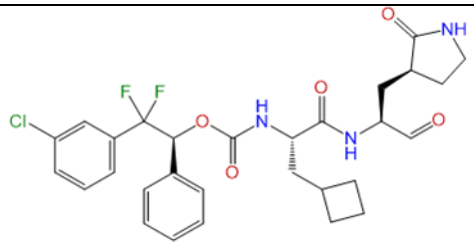
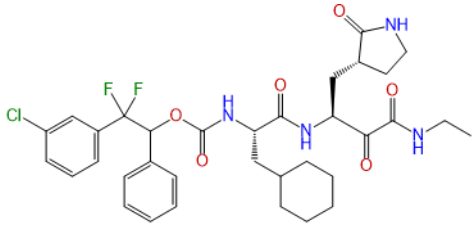
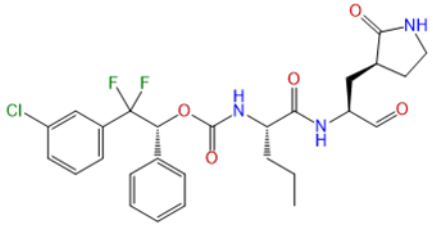
A171	
A172	
A173	
A174	
A175	
A176	

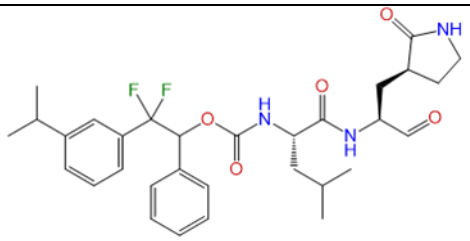
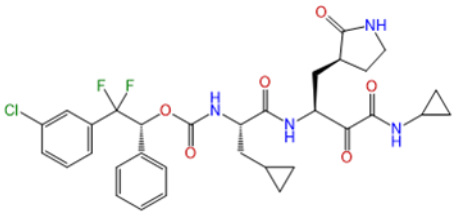
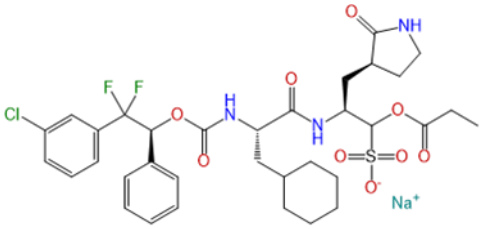
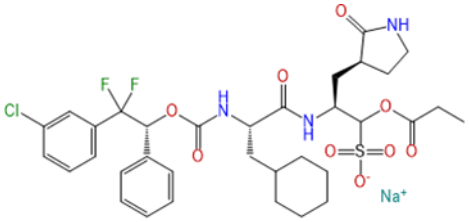
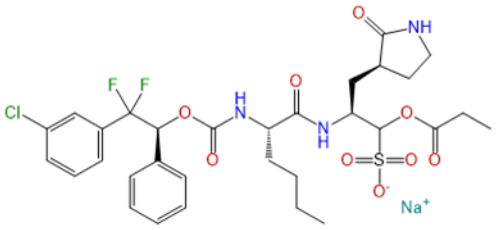
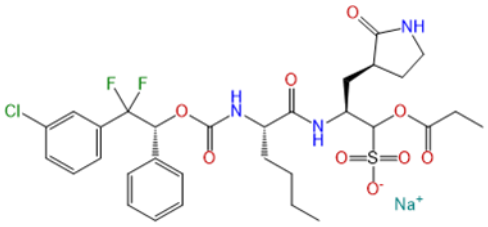
A177	
A178	
A179	
A180	
A181	
A182	

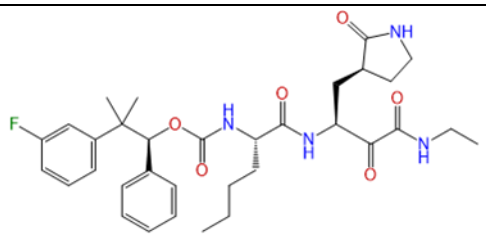
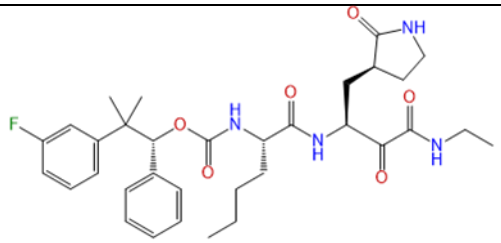
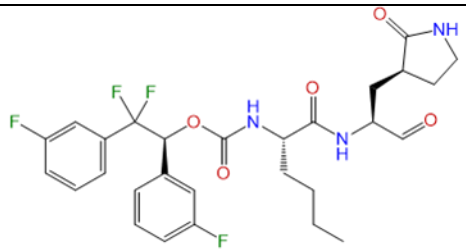
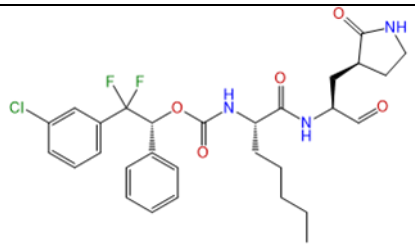
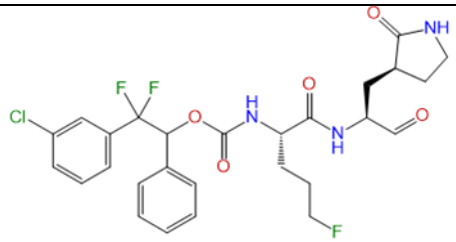
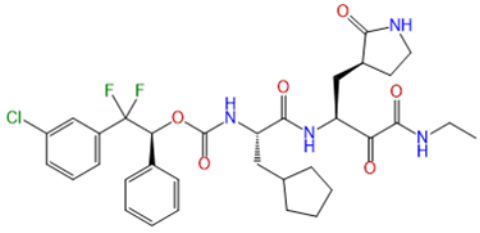
A183	
A185	
A186	
A187	
A188	
A189	

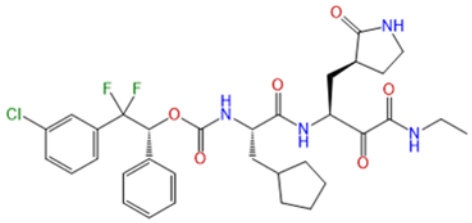
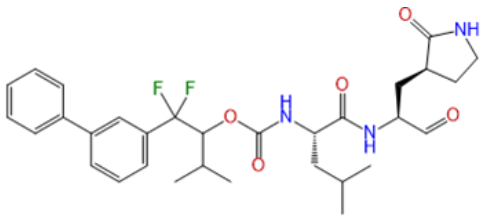
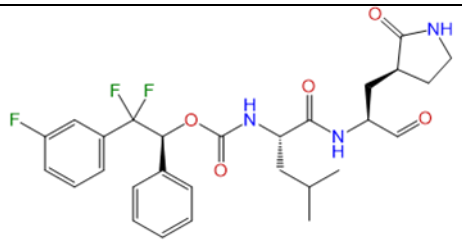
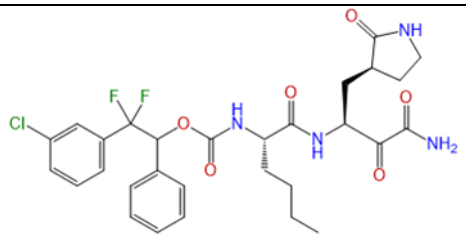
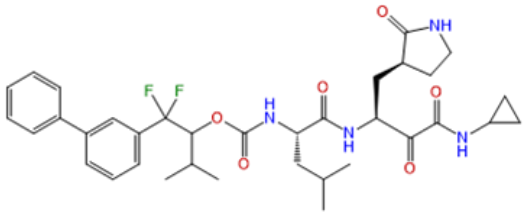
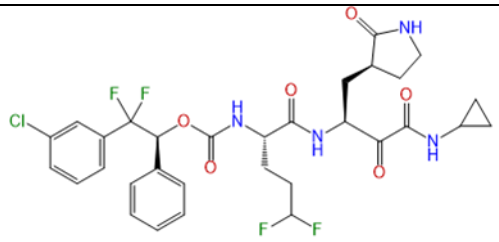
A191	
A192	
A193	
A194	
A195	
A196	

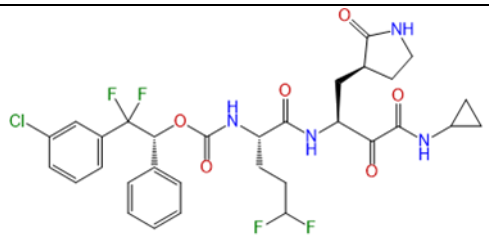
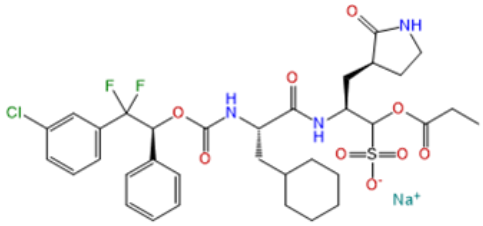
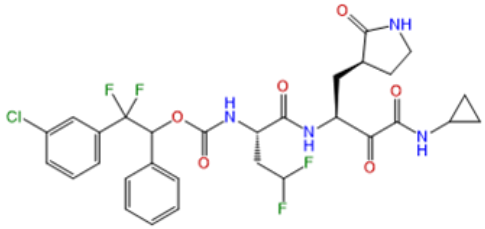
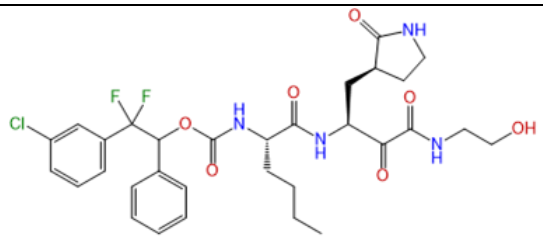
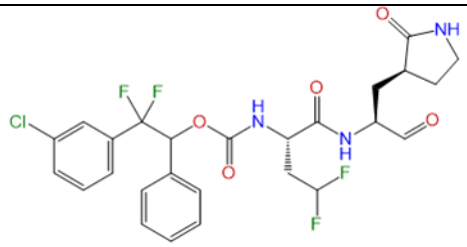
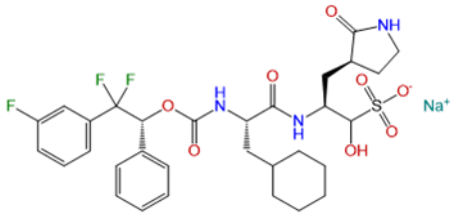
A197	
A198	
A199	
A200	
A201	
A202	

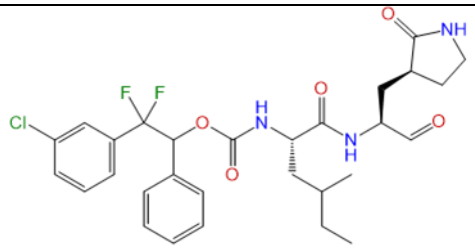
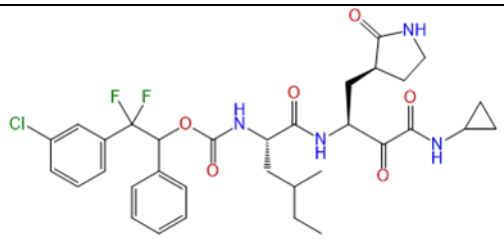
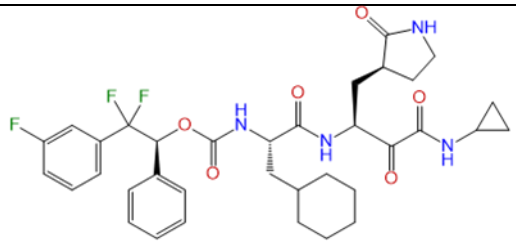
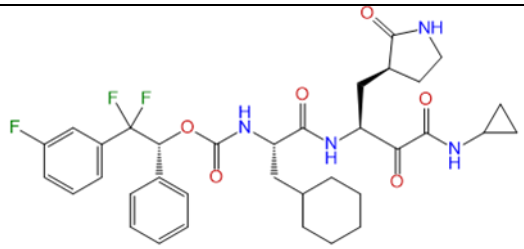
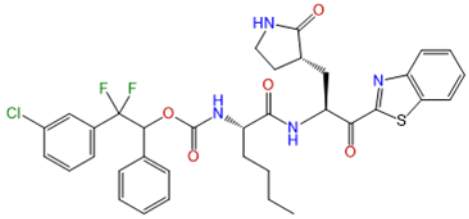
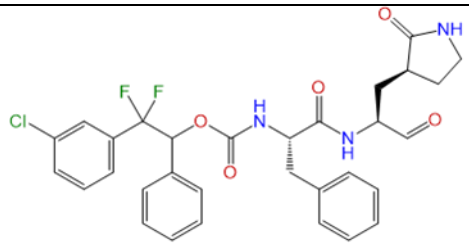
A203	
A204	
A205	
A206	
A207	
A208	

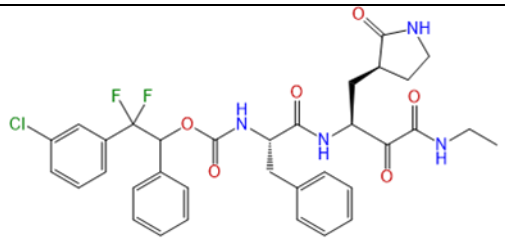
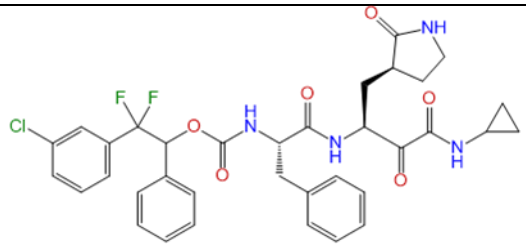
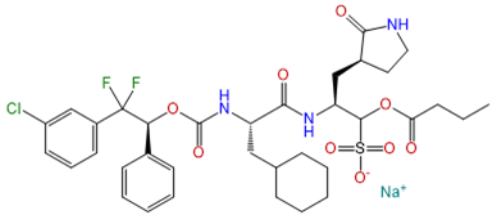
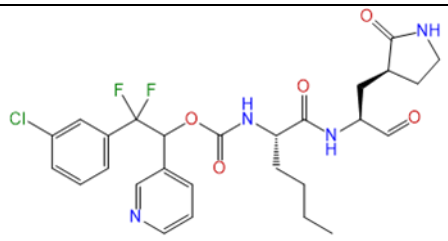
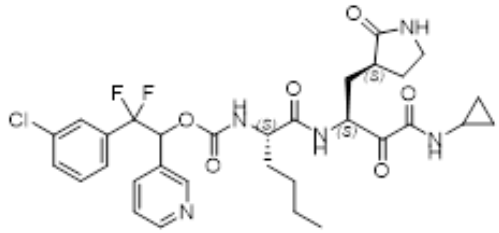
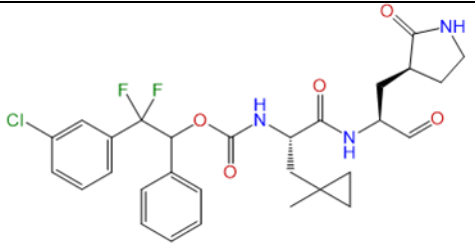
A209	
A210	
A211	
A212	
A213	
A214	

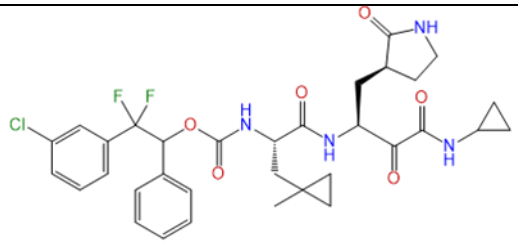
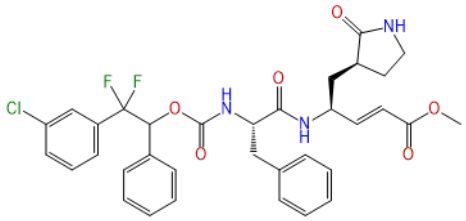
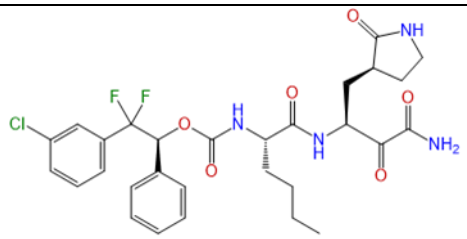
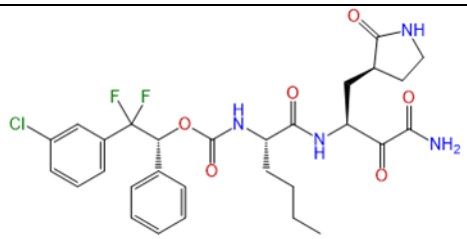
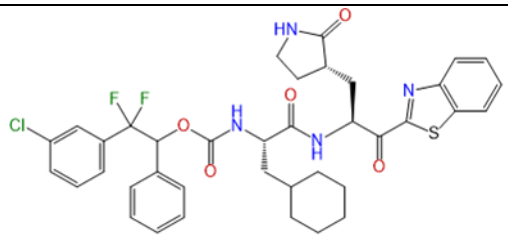
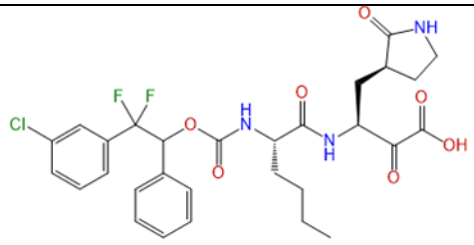
A215	
A216	
A217	
A218	
A219	
A220	

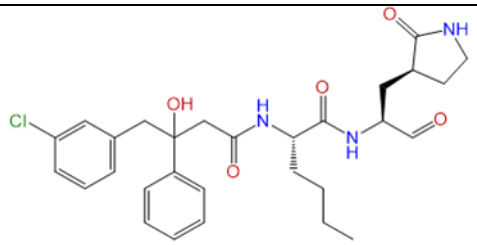
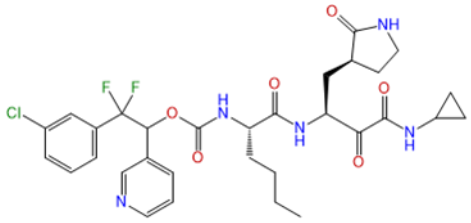
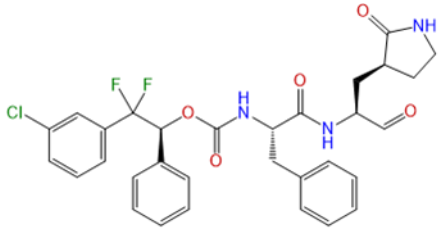
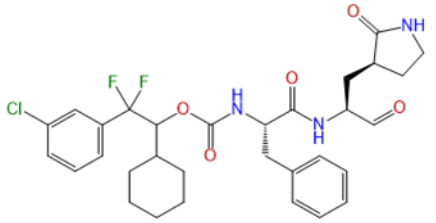
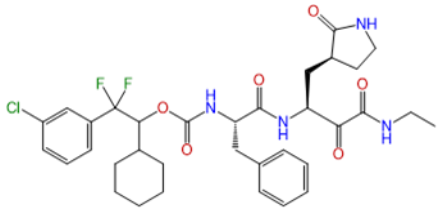
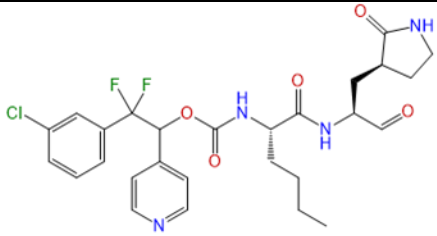
A221	
A222	
A223	
A224	
A226	
A227	

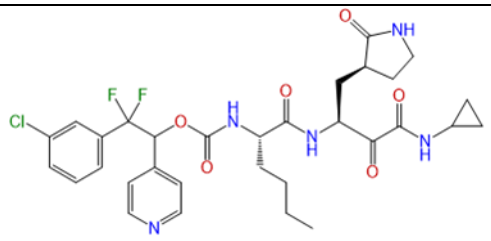
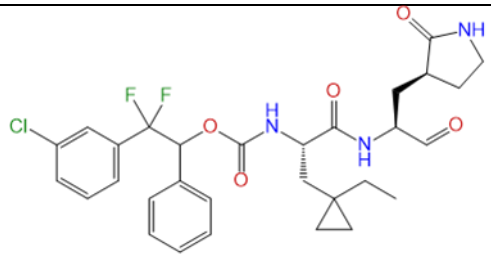
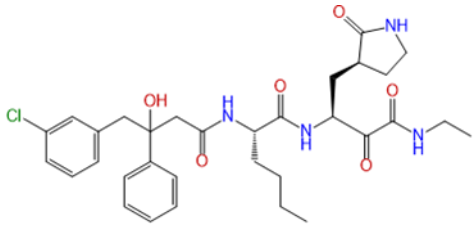
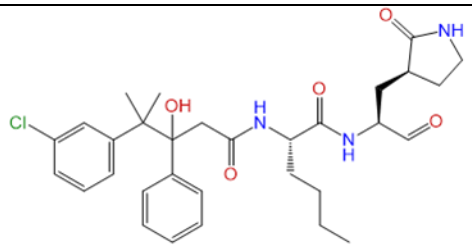
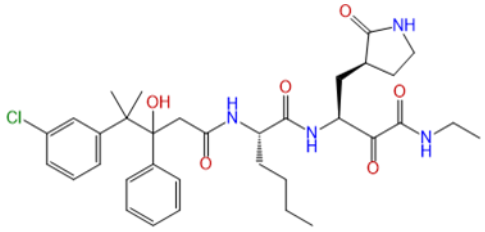
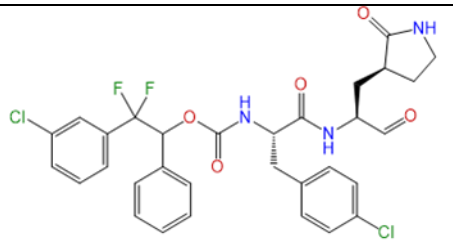
A228	
A229	
A230	
A231	
A232	
A233	

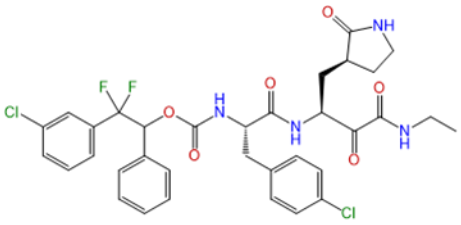
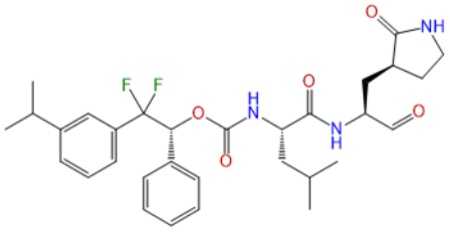
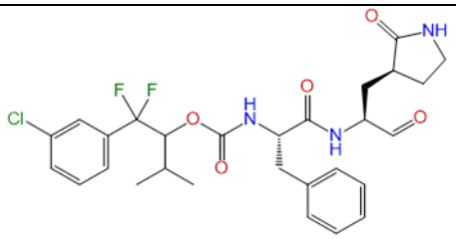
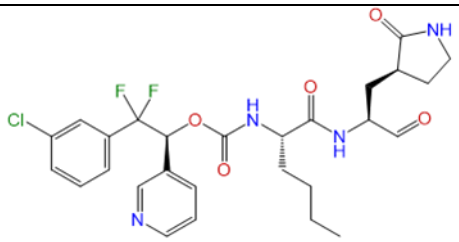
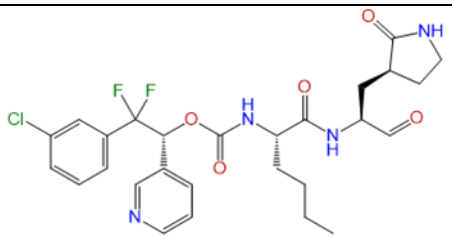
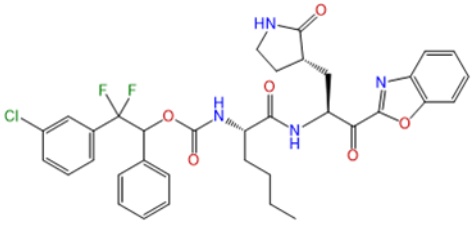
A234	
A235	
A236	
A237	
A238	
A239	

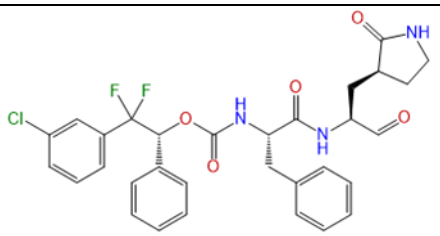
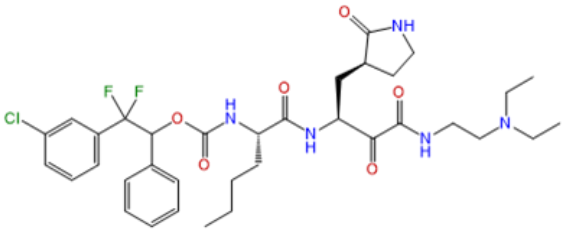
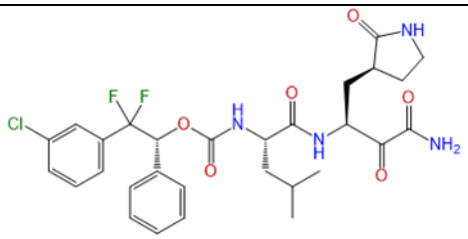
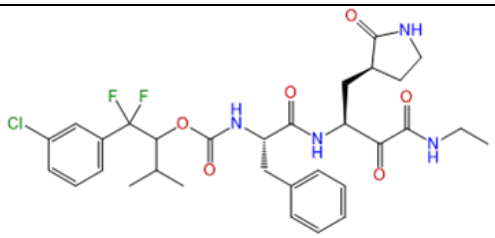
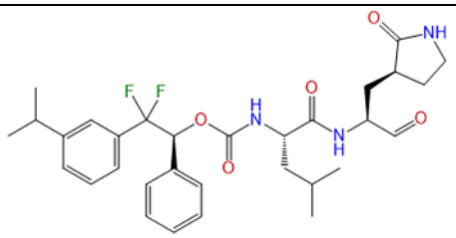
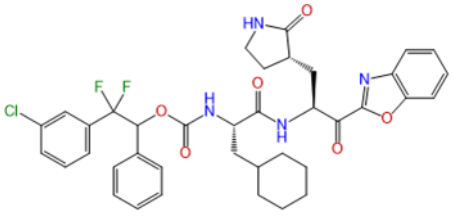
A240	
A241	
A242	
A243	
A243	
A244	

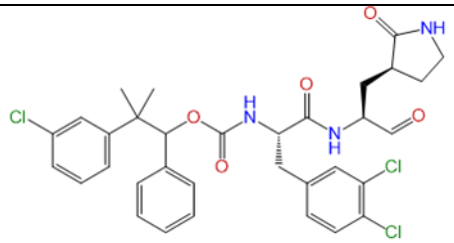
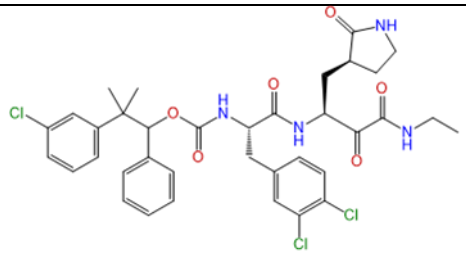
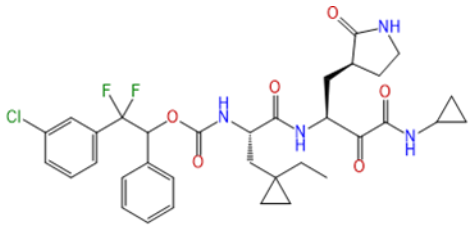
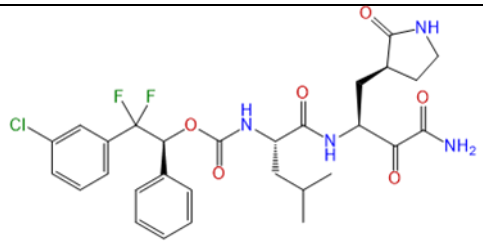
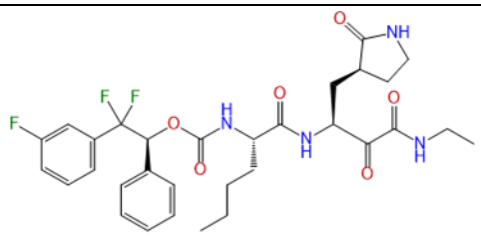
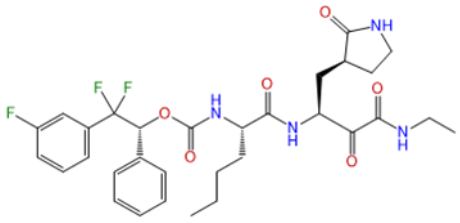
A245	
A246	
A247	
A248	
A249	
A250	

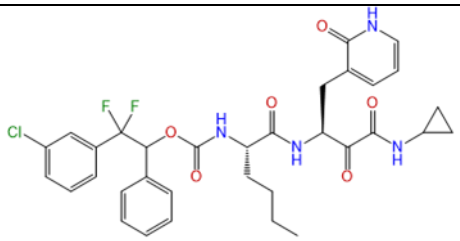
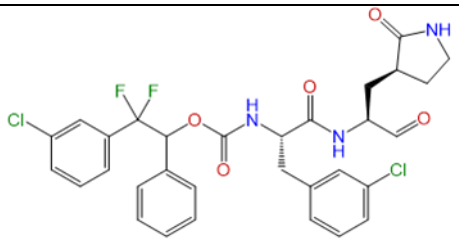
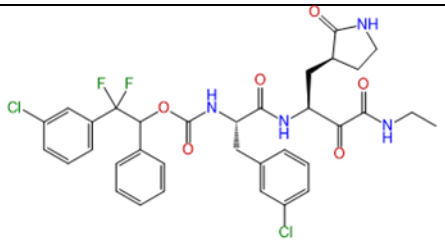
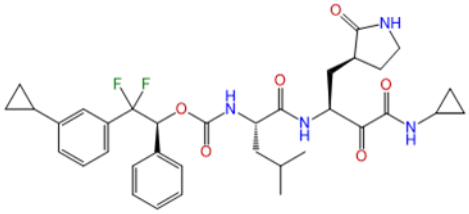
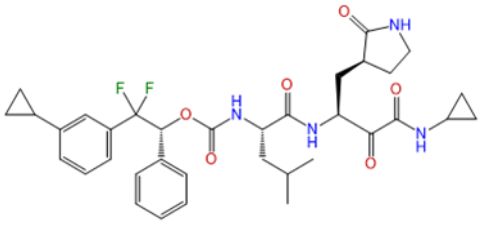
A251	
A252	
A253	
A254	
A255	
A256	

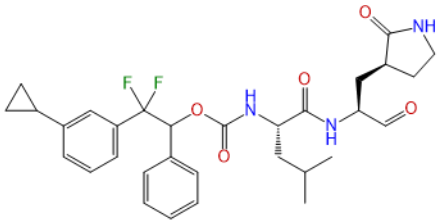
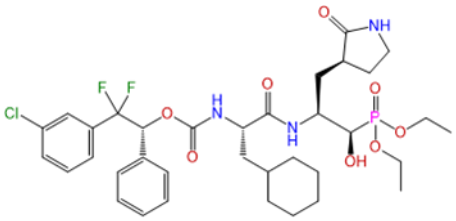
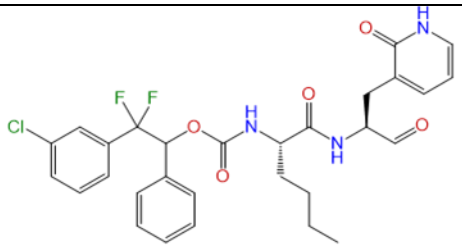
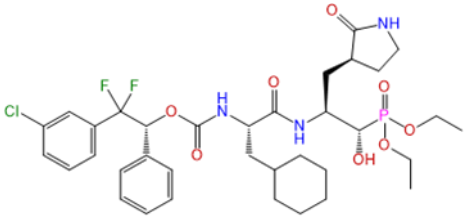
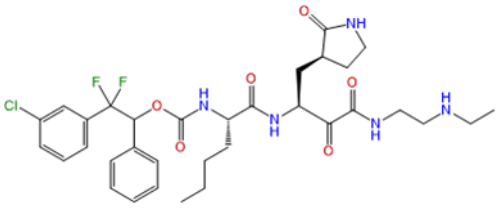
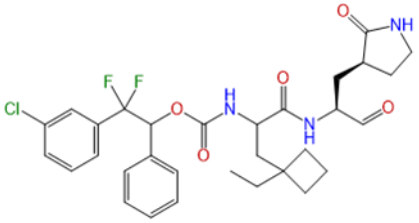
A257	
A258	
A259	
A260	
A261	
A262	

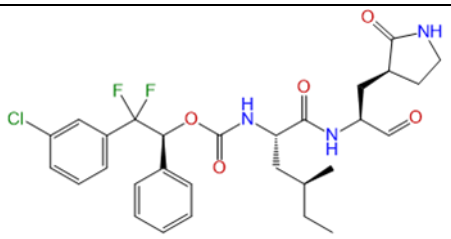
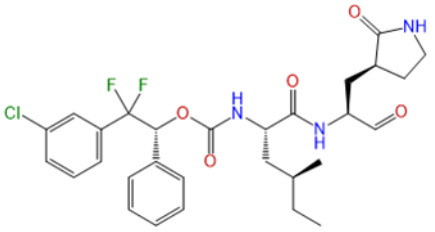
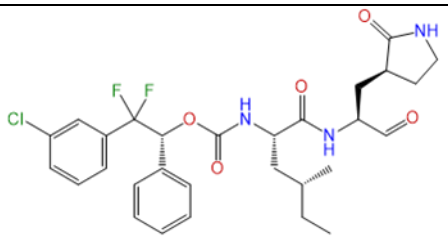
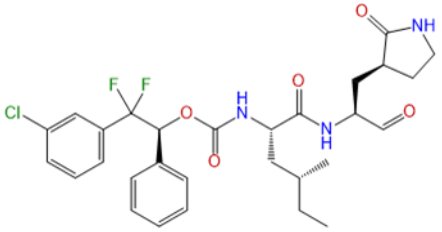
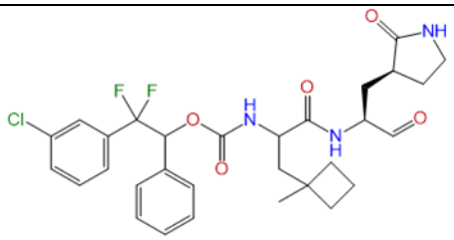
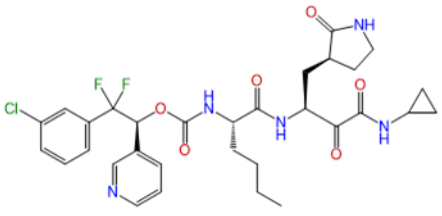
A263	
A265	
A266	
A267	
A268	
A269	

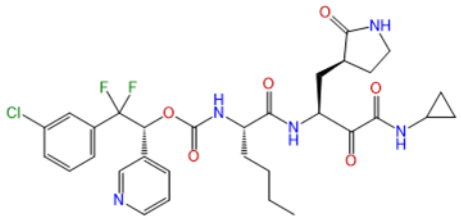
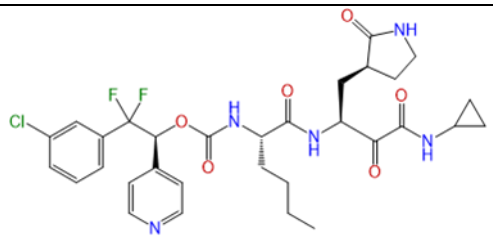
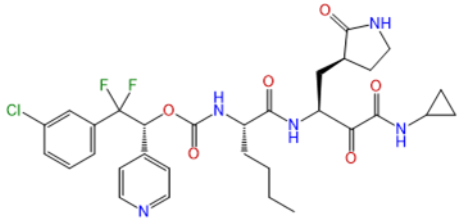
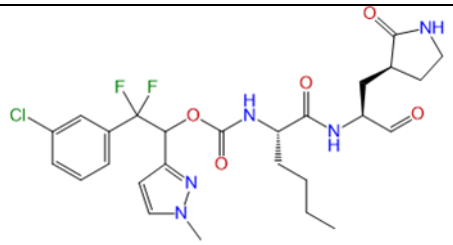
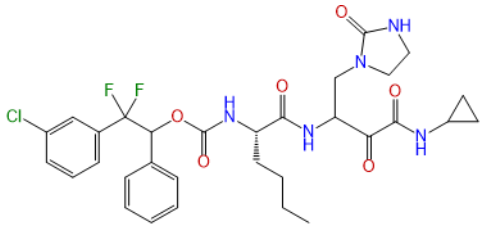
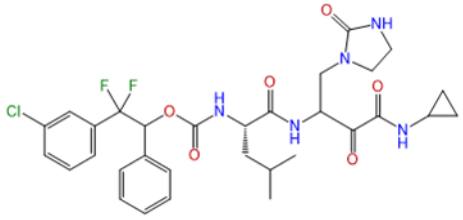
A270	
A271	
A273	
A274	
A275	
A278	

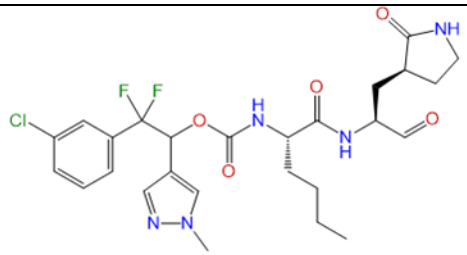
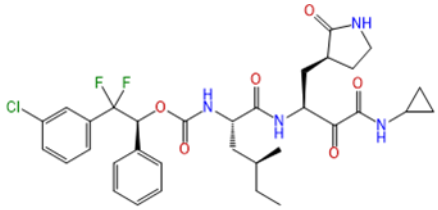
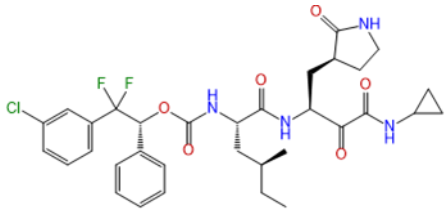
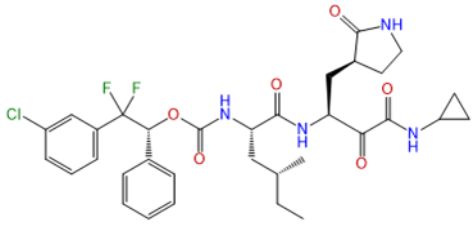
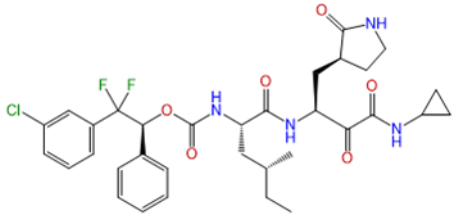
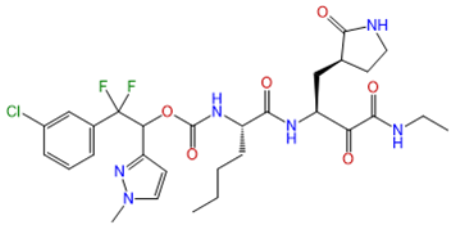
A279	
A280	
A281	
A282	
A283	
A284	

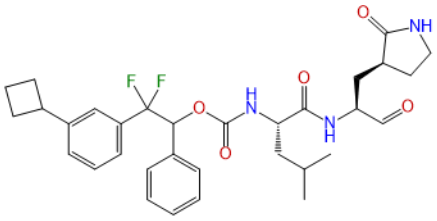
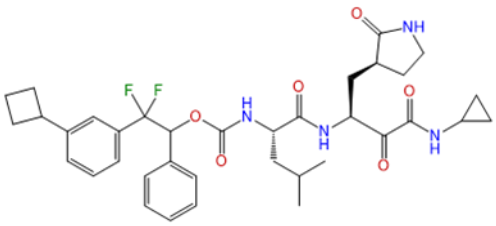
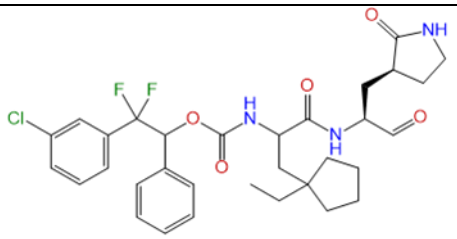
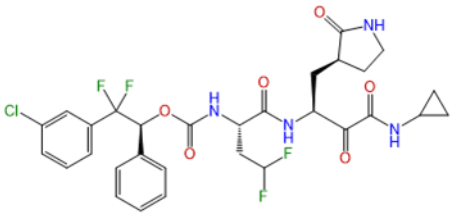
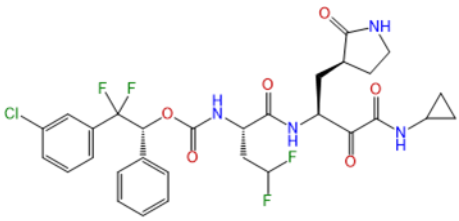
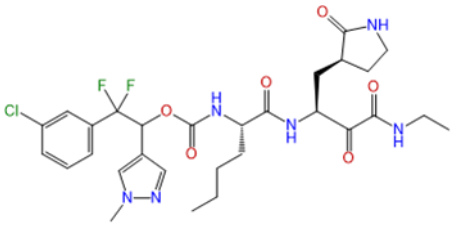
A285	
A286	
A287	
A288	
A289	

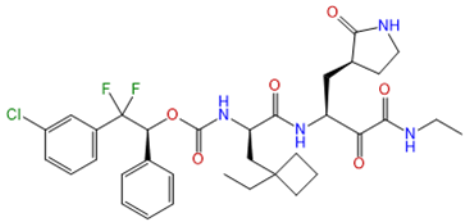
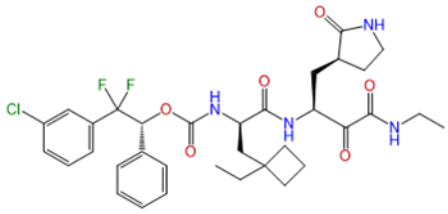
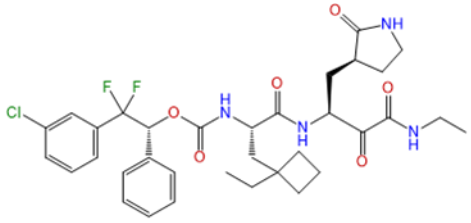
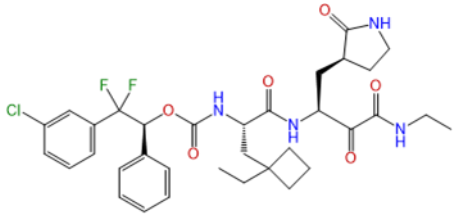
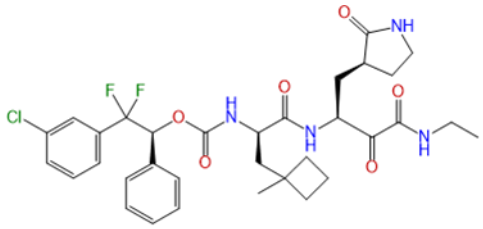
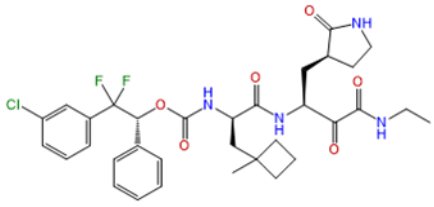
A290	
A291	
A292	
A293	
A294	
A295	

A296	
A297	
A298	
A299	
A300	
A301	

A302	
A303	
A304	
A305	
A306	
A307	

A308	
A309	
A310	
A311	
A312	
A313	

A314	
A315	
A316	
A317	
A318	
A319	

A320	
A321	
A322	
A323	
A324	
A325	

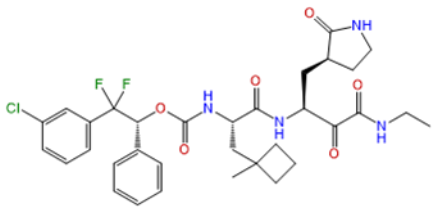
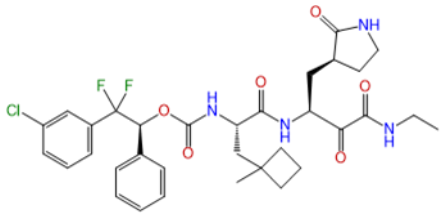
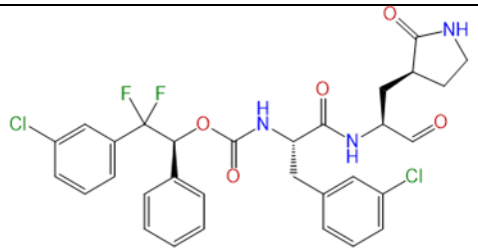
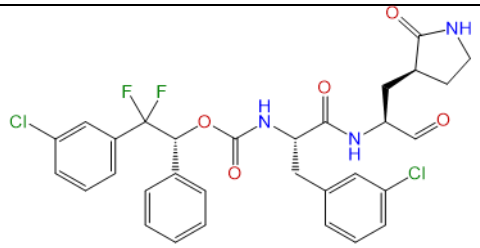
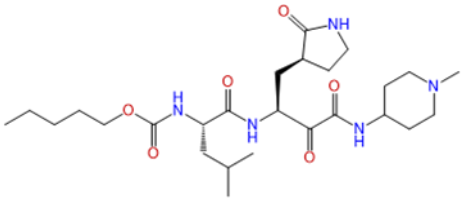
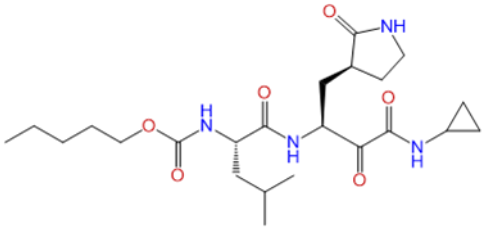
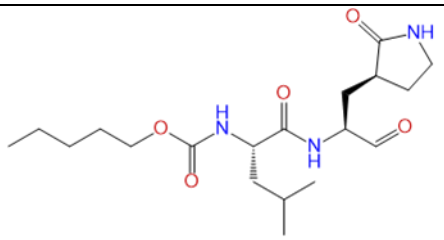
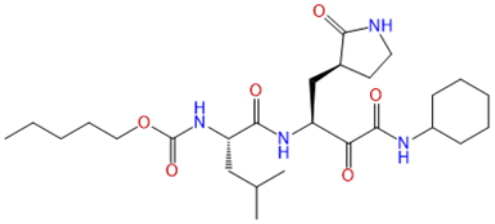
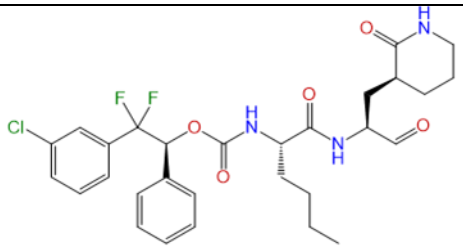
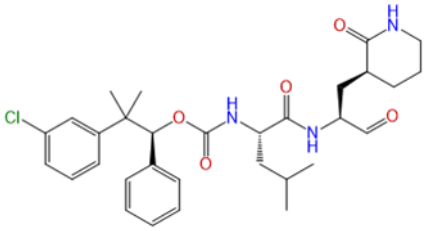
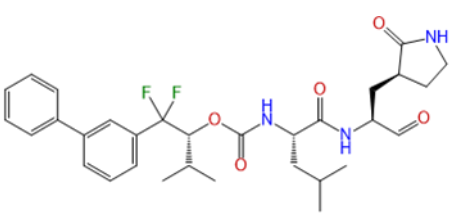
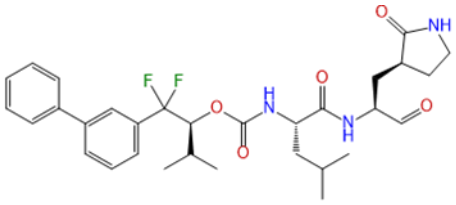
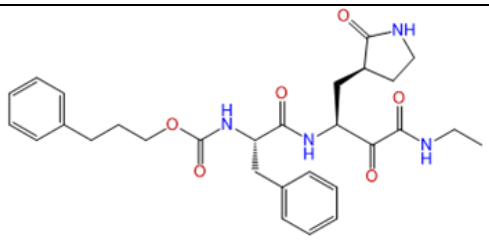
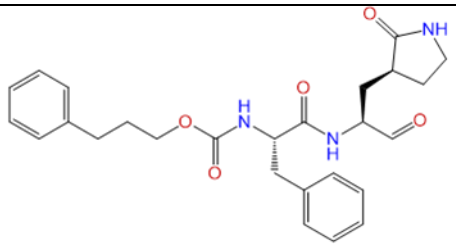
A326	
A327	
A328	
A329	

Table B

Compound no.	Structure
A8	

Compound no.	Structure
A12	
A13	
A24	
A150	
A158	
A264	

Compound no.	Structure
A272	
A276	
A277	

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[0005c] In a further aspect of the present disclosure, there is provided a pharmaceutical formulation comprising the compound or salt as disclosed herein and a pharmaceutically acceptable excipient.

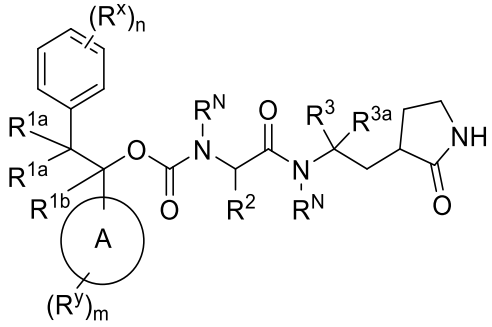
[0005d] In another aspect of the present disclosure, there is provided a compound or salt as disclosed herein, for use in treating or preventing a viral infection in a host, optionally wherein the viral infection is coronavirus infection, calicivirus infection, or picornavirus infection, preferably wherein the calicivirus infection is a norovirus infection.

[0005e] In a further aspect of the present disclosure, there is provided a use of a compound or salt as disclosed herein in the manufacture of a medicament for treating or preventing a viral infection in a host, optionally wherein the viral infection is coronavirus infection, calicivirus infection, or picornavirus infection, preferably wherein the calicivirus infection is a norovirus infection.

[0006] The present disclosure generally relates to methods of treating norovirus and coronavirus infections, to methods of inhibiting the replication of noroviruses and coronaviruses, to methods of reducing the amount of noroviruses and coronaviruses, and to compounds and compositions that can be employed for such methods.

What is claimed is:

1. A compound, or pharmaceutically acceptable salt thereof, having a structure of Formula (I):



(I),

wherein

each R^N is independently H or C_{1-6}alkyl;

each R^{1a} is independently hydrogen, halo, C_{1-6}alkyl, or C_{1-6}haloalkyl,

or both R^{1a} with the carbon to which they are attached form a spiro C_{3-6}carbocyclyl or spiro 4-8-membered heterocyclyl having 1-3 ring heteroatoms selected from N, O, and S, which is optionally substituted with $C(O)OR^N$;

R^{1b} is hydrogen, halo, hydroxyl, C_{1-6}alkyl, or C_{1-6}haloalkyl;

n is 0, 1, or 2;

each R^x is independently halo, C_{1-6}alkyl, C_{3-6}carbocyclyl, or C_{6-10}aryl, wherein the aryl is optionally substituted with 1 or 2 substituents independenly selected from OH, halo, C_{1-6}alkyl, C_{1-6}haloalkyl, and C_{1-6}alkoxy;

m is 0, 1, or 2;

each R^y is independently halo or C_{1-6}alkyl;

R^2 is C_{1-6}alkyl, C_{1-6}haloalkyl, C_{1-6}alkylene-C_{3-8}carbocyclyl, or C_{1-6}alkylene-C_{6-10}aryl, wherein the aryl is optionally substituted with 1 or 2 substituents independenly selected from OH, halo, C_{1-6}alkyl, C_{1-6}haloalkyl, and C_{1-6}alkoxy;

R^3 is CN, C_{1-6}alkylene-O(O)C-C_{1-6}alkyl substituted with SO_3H, C_{1-6}alkenylene-C(O)O-C_{1-6}alkyl, C_{1-6}alkylene-OH substituted with $PO(OCH_2CH_2)_2$, CHO, or -$[C(O)]_2$-NR^N-B, wherein B is C_{1-6}alkyl, C_{1-6}hydroxyalkyl, C_{3-8}carbocyclyl, or 4-12-membered heterocyclyl having 1-3 ring heteroatoms selected from N, O, and S, and the carbocyclyl or heterocyclyl is optionally mono-substituted with C_{1-6}alkyl;

R^{3a} is H or C_{1-6}alkyl; and

ring A is C_{6-10}cycloalkyl, C_{6-10}aryl, or 5-10 membered heteroaryl comprising one nitrogen heteroatom, with the proviso that when each R^{1a} is hydrogen or each R^{1a} is methyl, ring A is phenyl, m is 0 or 1, R^y is halo, and n is 1, then R^x is other than chloro, and

with the proviso that the compound is not:

1,2-diphenylethyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;

2-(2-(((1,2-diphenylethoxy)carbonyl)amino)-4-methylpentanamido)-1-hydroxy-3-(2-oxopyrrolidin-3-yl)propane-

1-sulfonic acid;
2-(3-chlorophenyl)-1-phenylethyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)-2-methylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-1-phenylethyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(2-(((2-(3-chlorophenyl)-1-phenylethoxy)carbonyl)amino)-4-methylpentanamido)-1-hydroxy-3-(2-oxopyrrolidin-3-yl)propane-1-sulfonic acid;
2-(2-(((2-(3-chlorophenyl)-1-phenylethoxy)carbonyl)amino)-3-cyclohexylpropanamido)-1-hydroxy-3-(2-oxopyrrolidin-3-yl)propane-1-sulfonic acid;
2-(3-chlorophenyl)-1-phenylethyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-(naphthalen-2-yl)propyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-(m-tolyl)propyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-(naphthalen-2-yl)propyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-chlorophenyl)-2-methylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-fluorophenyl)-2-methylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-(m-tolyl)propyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-fluorophenyl)-2-methylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;

2-(3-chlorophenyl)-1-(4-chlorophenyl)-2-methylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-fluorophenyl)-2-methylpropyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-chlorophenyl)-2-methylpropyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-phenylethyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)hexan-2-yl)carbamate;
2-(3-chlorophenyl)-1-phenylethyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
1-(2-chlorophenyl)-2-(3-chlorophenyl)-2-methylpropyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxohexan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxohexan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-3-cyclohexyl-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
1-(2-chlorophenyl)-2-(3-chlorophenyl)-2-methylpropyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(4-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(4-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-

methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (3-cyclohexyl-1-((4-(ethylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-(naphthalen-2-yl)propyl (3-cyclohexyl-1-((4-(diethylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-chlorophenyl)-2-methylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
ethyl (E)-4-(2-(((1,2-diphenylethoxy)carbonyl)amino)-4-methylpentanamido)-5-(2-oxopyrrolidin-3-yl)pent-2-enoate;
3-(2-(((2-(3-chlorophenyl)-2-methyl-1-(naphthalen-2-yl)propoxy)carbonyl)amino)-3-cyclohexylpropanamido)-2-oxo-4-(2-oxopyrrolidin-3-yl)butanoic acid;
2-(3-chlorophenyl)-1-(4-fluorophenyl)-2-methylpropyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)ethyl (3-cyclohexyl-1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopropan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)ethyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-chlorophenyl)-2-methylpropyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(4-fluorophenyl)-2-methylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopropyl)methyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2,2-difluoro-1-phenylethyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2,2-difluoro-1-phenylethyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-amino-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxo-3-phenylpropan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)-3-phenylpropan-2-yl)carbamate;
2-(3-chlorophenyl)-2,2-difluoro-1-phenylethyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)-2,2-difluoroethyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;

2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)heptan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)ethyl (3-cyclohexyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)propan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclobutyl)(phenyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclopentyl)(phenyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)ethyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxo-3-phenylpropan-2-yl)carbamate;
2-(3-chlorophenyl)-1-(3-fluorophenyl)-2-methylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)-2,2-difluoroethyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxoheptan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclohexyl)(phenyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclopropyl)(4-fluorophenyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(4-chlorophenyl)(1-(3-chlorophenyl)cyclopentyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclobutyl)(phenyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-ethyl-1-phenylbutyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
2-(3-fluorophenyl)-2-methyl-1-phenylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclopentyl)(phenyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(4-chlorophenyl)(1-(3-chlorophenyl)cyclopentyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-

yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-methyl-1-phenylpropyl (4-methyl-1-((4-((1-methylazetidin-3-yl)amino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-1-oxopentan-2-yl)carbamate;
2-(3-chlorophenyl)-2-ethyl-1-(4-fluorophenyl)butyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopentyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(3-chlorophenyl)(1-(3-chlorophenyl)cyclopentyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
1,2-bis(3-chlorophenyl)-2-methylpropyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclopropyl)(phenyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(1-(3-chlorophenyl)cyclopropyl)(4-fluorophenyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-fluorophenyl)cyclopropyl)(phenyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate;
(1-(3-fluorophenyl)cyclopropyl)(phenyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate;
(4-chlorophenyl)(1-(3-chlorophenyl)cyclobutyl)methyl (4-methyl-1-oxo-1-((1-oxo-3-(2-oxopyrrolidin-3-yl)propan-2-yl)amino)pentan-2-yl)carbamate; or
(4-chlorophenyl)(1-(3-chlorophenyl)cyclobutyl)methyl (1-((4-(cyclopropylamino)-3,4-dioxo-1-(2-oxopyrrolidin-3-yl)butan-2-yl)amino)-4-methyl-1-oxopentan-2-yl)carbamate.

2. The compound or salt of claim 1, wherein each R^N is H.
3. The compound or salt of claim 1 or 2, wherein at least one R^{1a} is halo, optionally wherein each R^{1a} is halo, preferably wherein halo is chloro or fluoro, more preferably wherein halo is fluoro.
4. The compound or salt of claim 1 or 2, wherein at least one R^{1a} is hydrogen, C_{1-6}alkyl, or wherein each R^{1a}, together with the carbon to which they are attached, form a spiro C_{3-6}carbocyclyl, optionally wherein C_{1-6}alkyl is methyl or ethyl, or wherein the C_{3-6}carbocyclyl is cyclopropyl, cyclobutyl, or cyclohexyl.
5. The compound or salt of any one of claims 1 to 4, wherein n is 0 or 2.
6. The compound or salt of any one of claims 1 to 4, wherein n is 1.
7. The compound or salt of claim 6, wherein R^x is in a meta position.
8. The compound or salt of claim 6 or 7, wherein R^x is halo, optionally wherein R^x is chloro or fluoro, preferably wherein R^x is chloro.
9. The compound or salt of any one of claims 1 to 8, wherein ring A is C_{6-10}aryl, optionally wherein ring A is phenyl.
10. The compound or salt of any one of claims 1 to 9, wherein m is 0.

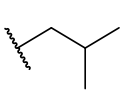
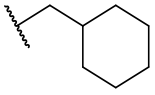
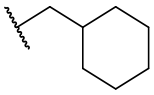
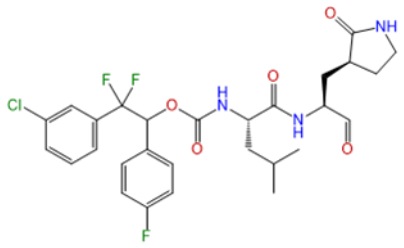
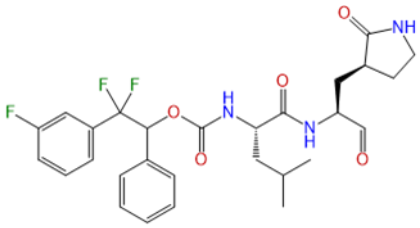
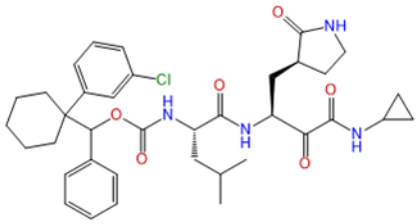
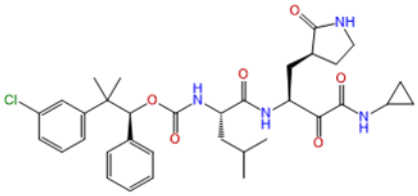
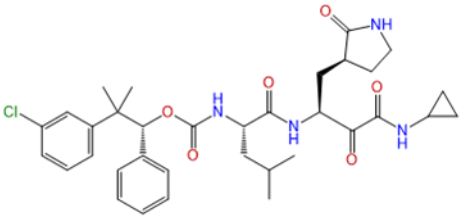
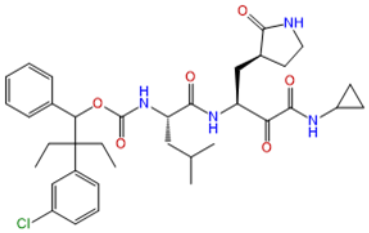
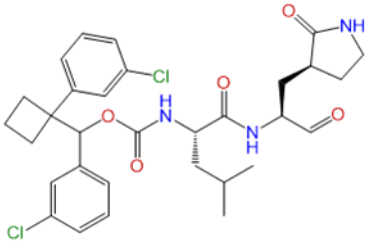
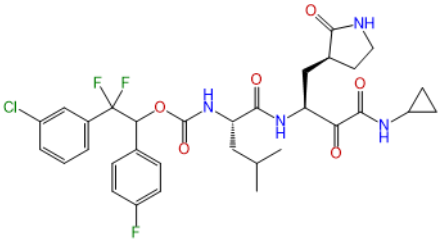
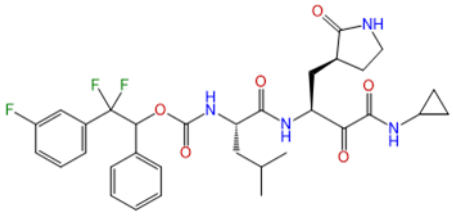
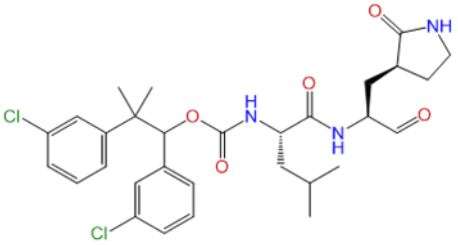
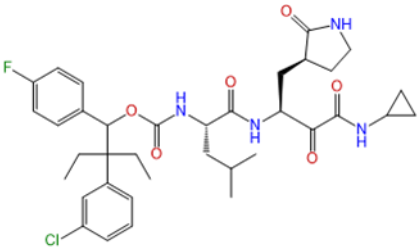
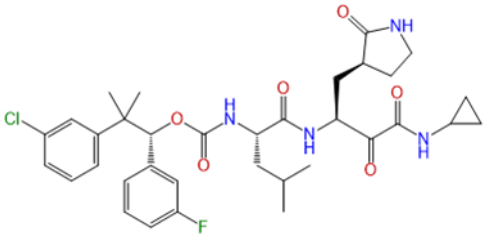
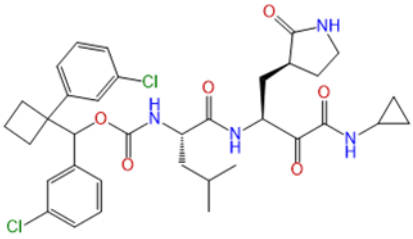
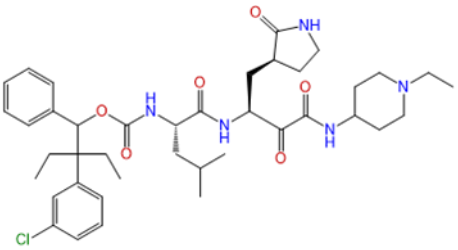
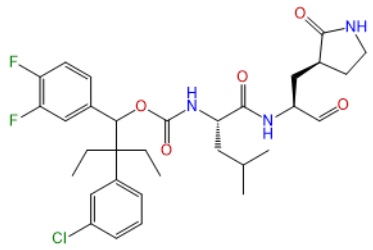
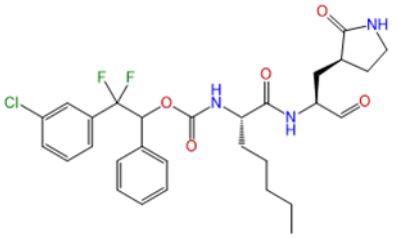
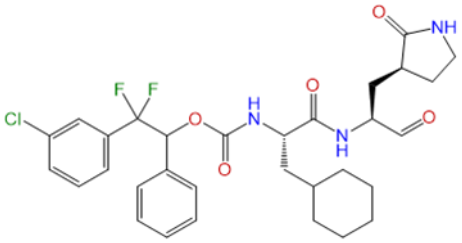
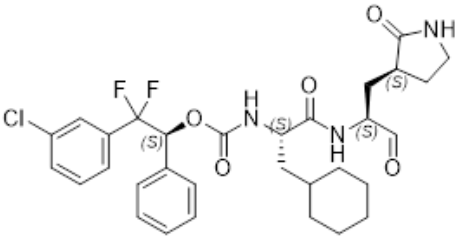
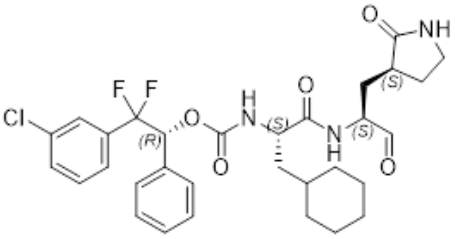
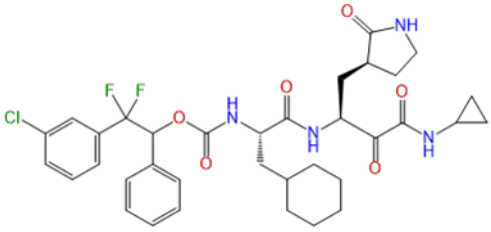
11. The compound or salt of any one of claims 1 to 9, wherein m is 1 or 2.
12. The compound or salt of claim 11, wherein R^y is in a meta position or a para position.
13. The compound or salt of claim 11 or 12, wherein R^y is halo, optionally wherein halo is chloro or fluoro.
14. The compound or salt according to any one of claims 1 to 11, wherein R^2 is C_{1-6}alkyl or C_{1-6}alkylene-C_{5-8}carbocyclyl, optionally wherein R^2 is  or , preferably wherein R^2 is C_{1-6}alkylene-C_{5-8}carbocyclyl, more preferably wherein R^2 is .
15. The compound or salt according to any one of claims 1 to 14, wherein R^3 is CHO.
16. The compound or salt according to any one of claims 1 to 14, wherein R^3 is -$[C(O)]_2$-NR^N-B, optionally wherein B is C_{3-8}carbocyclyl optionally mono-substituted with C_{1-6}alkyl or 4-12-membered heterocyclyl having 1-3 ring heteroatoms selected from N, O, and S optionally mono-substituted with C_{1-6}alkyl, preferably wherein B is C_3carbocyclyl optionally mono-substituted with C_{1-6}alkyl or piperidinyl optionally mono-substituted with C_{1-6}alkyl.
17. The compound or salt according to claim 1, wherien ring A comprises phenyl, each R^{1a} is F, R^{1b} is H, each R^N is H, n is 1, R^x is halo, R^2 is C_{1-6}haloalkyl, C_{1-6}alkylene-C_{3-8}carbocyclyl, or C_{1-6}alkylene-C_{6-10}aryl, wherein the aryl is optionally substituted with 1 or 2 substituents independenly selected from OH, halo, C_{1-6}alkyl, C_{1-6}haloalkyl, and C_{1-6}alkoxy; R^3 is CN, C_{1-6}alkylene-O(O)C-C_{1-6}alkyl substituted with SO_3H, C_{1-6}alkenylene-C(O)O-C_{1-6}alkyl, C_{1-6}alkylene-OH substituted with $PO(OCH_2CH_2)_2$, CHO, or -$[C(O)]_2$-NR^N-B.
18. A compound as recited in Table A or Table B, or a pharmaceutically acceptable salt thereof:

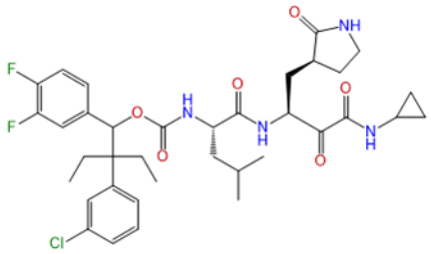
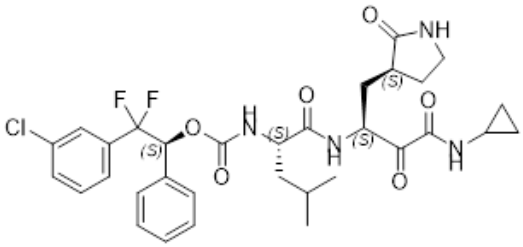
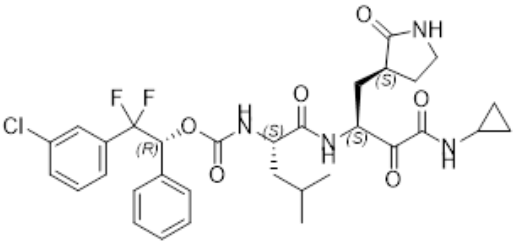
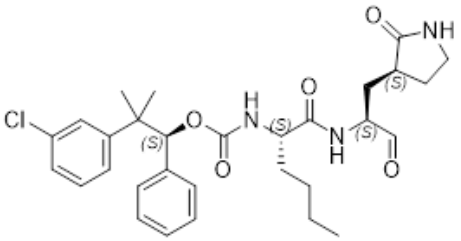
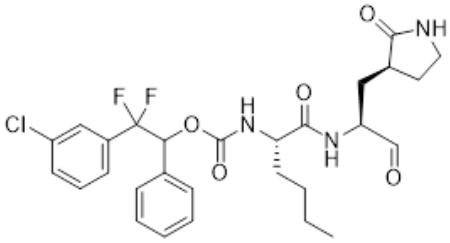
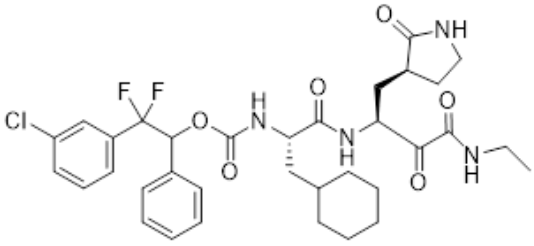
TABLE A

Compound no.	Structure
A1	
A2	

Compound no.	Structure
A3	
A4	
A5	
A6	
A7	
A9	

Compound no.	Structure
A10	
A11	
A14	
A15	
A16	
A17	

Compound no.	Structure
A18	
A19	
A20	
A20-1	
A20-2	
A21	

Compound no.	Structure
A22	
A25-1	
A25-2	
A26P	
A27	
A29	

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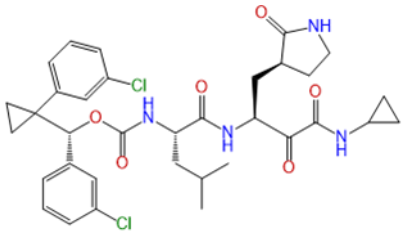
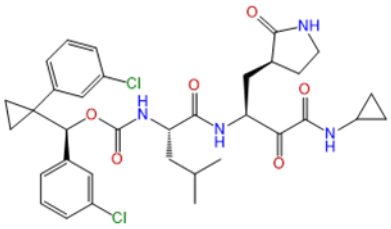
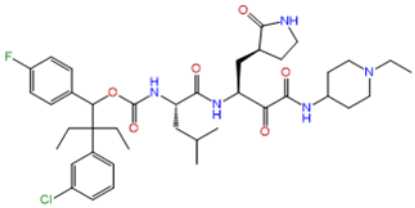
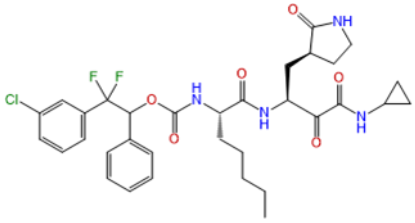
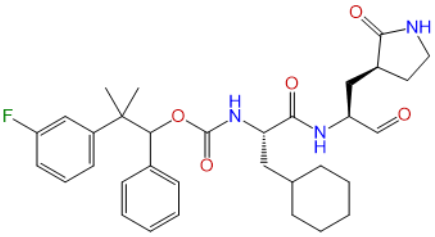
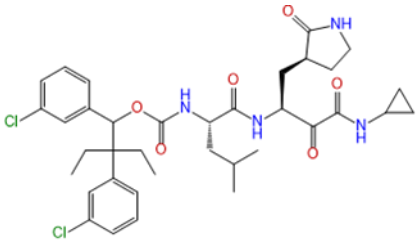
A30	
A31	
A32	
A33	
A34	
A35	

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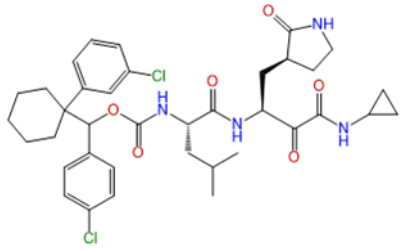
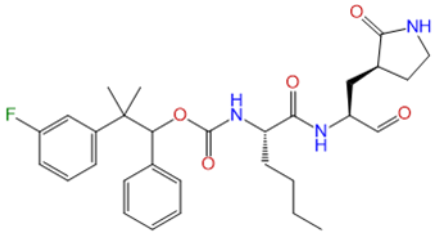
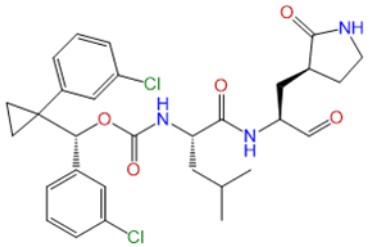
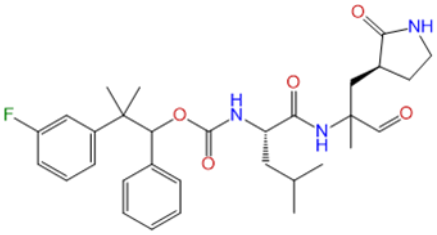
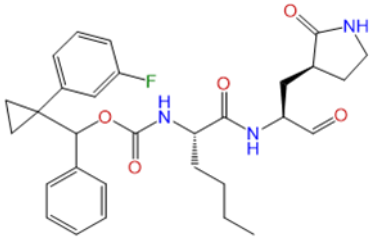
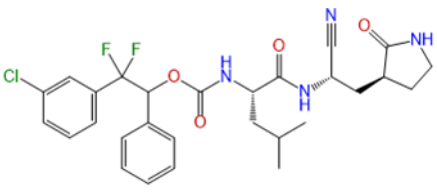
A36	
A37	
A38	
A39	
A40	
A41	

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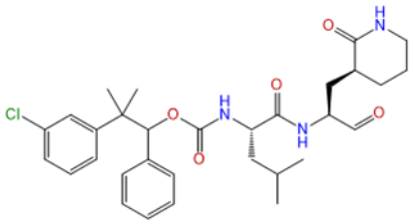
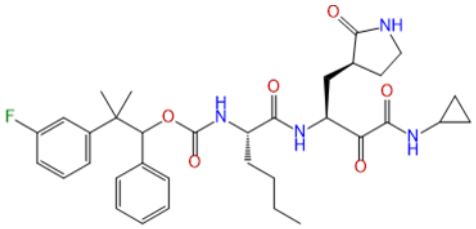
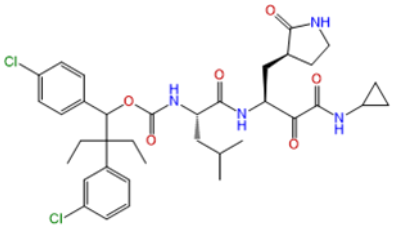
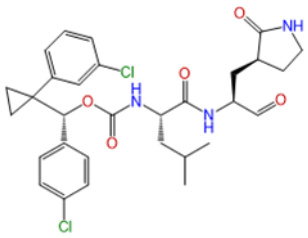
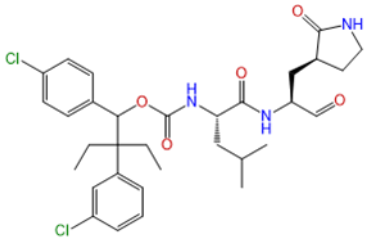
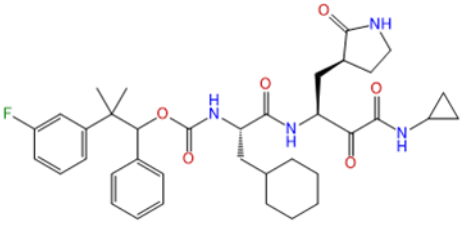
A42	
A43	
A44	
A45	
A46	
A47	

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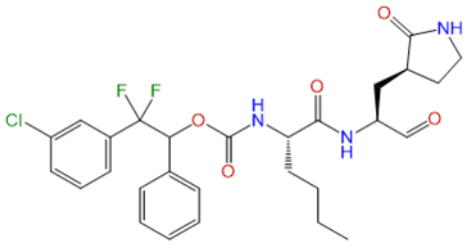
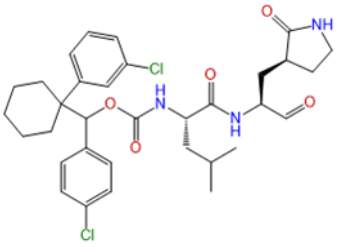
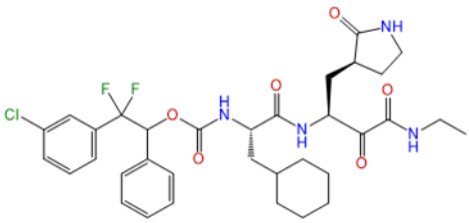
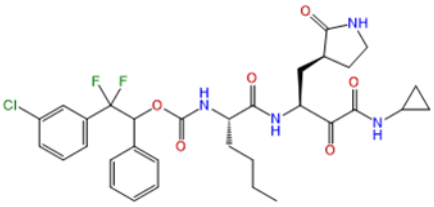
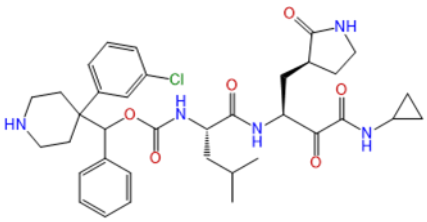
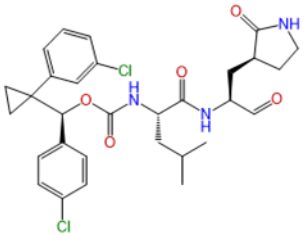
A48	
A49	
A50	
A51	
A52	
A53	

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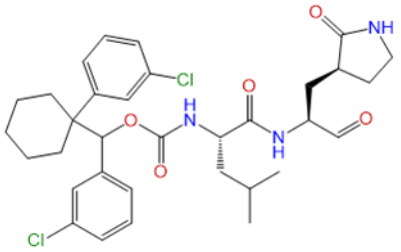
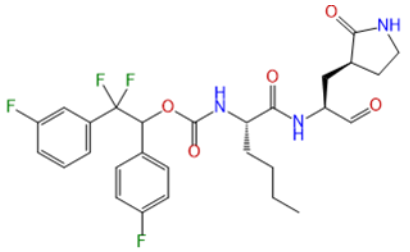
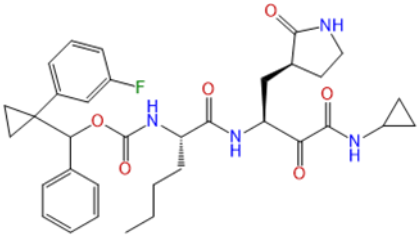
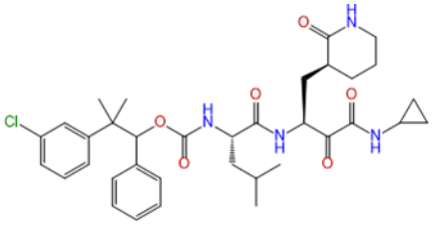
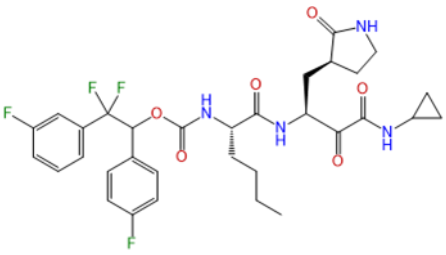
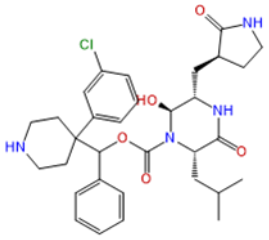
A54	
A55	
A56	
A57	
A58	
A59	

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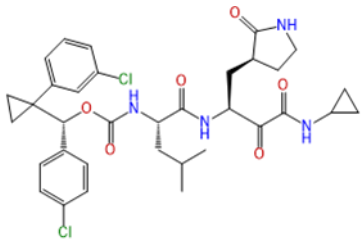
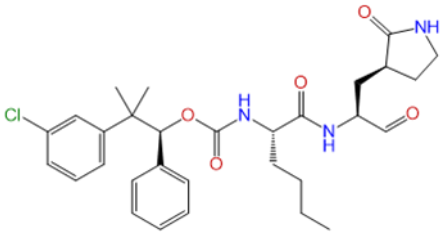
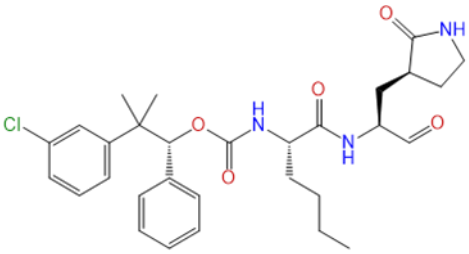
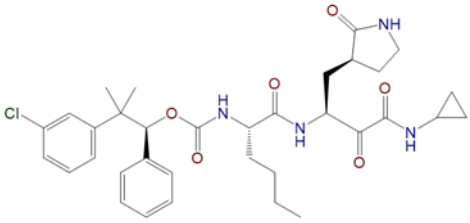
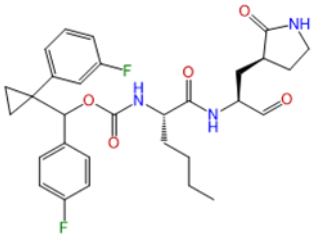
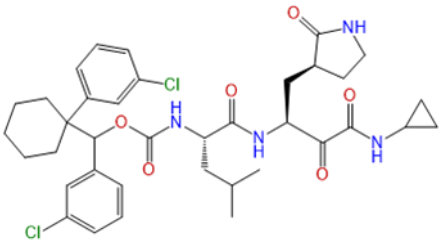
A60	
A61	
A62	
A63	
A64	
A65	

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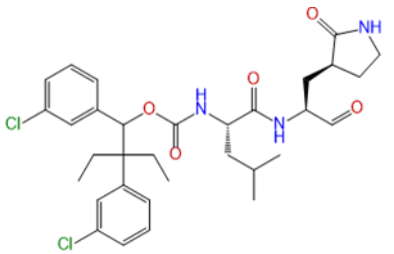
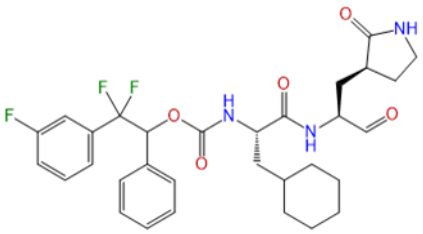
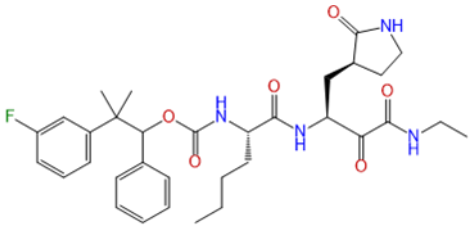
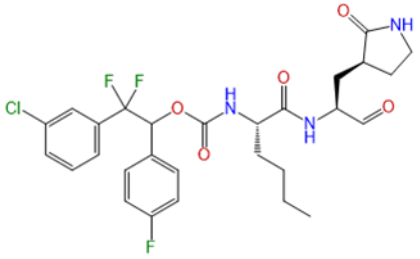
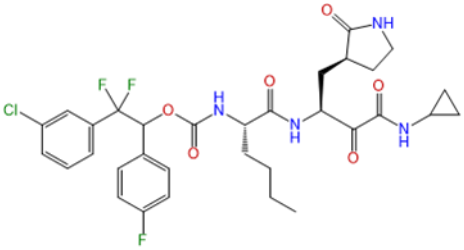
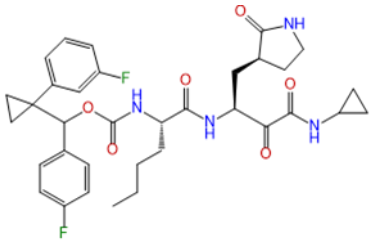
A66	
A67	
A68	
A69	
A70	
A71	

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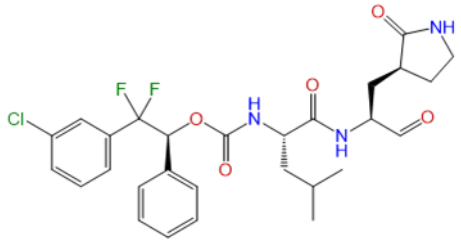
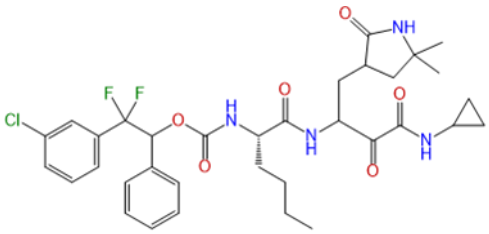
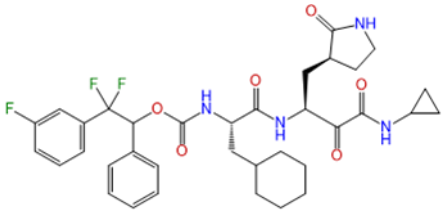
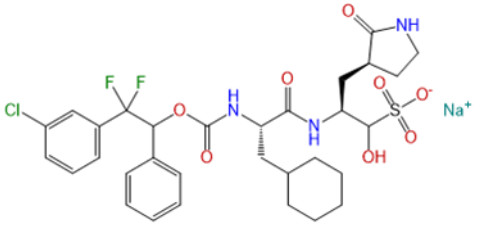
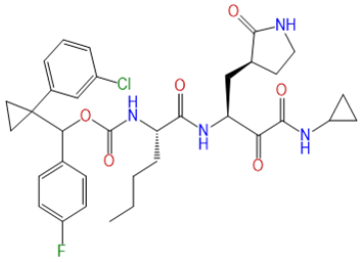
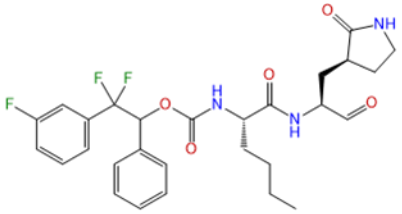
A72	
A73	
A74	
A75	
A76	
A77	

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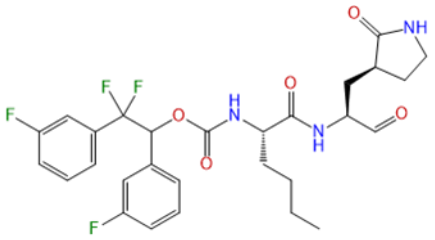
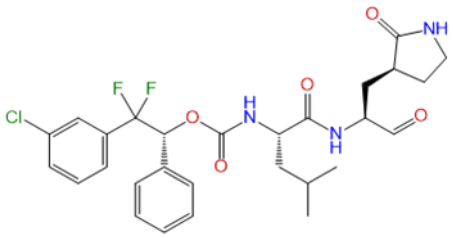
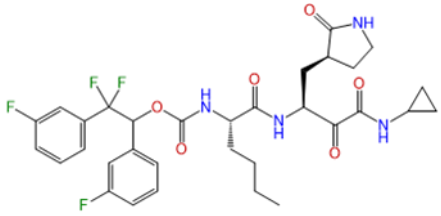
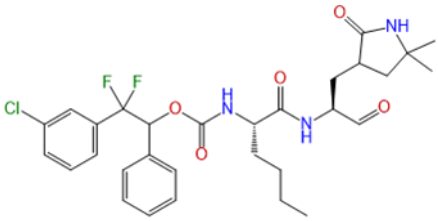
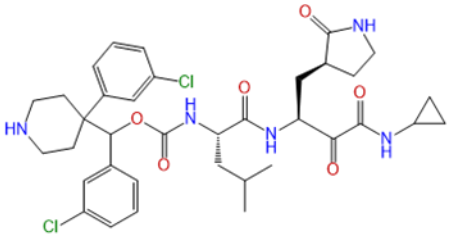
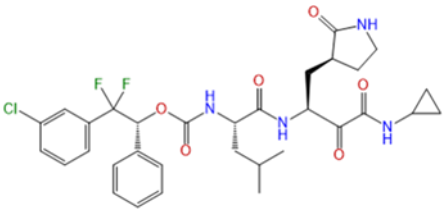
A78	
A79	
A80	
A81	
A83	
A84	

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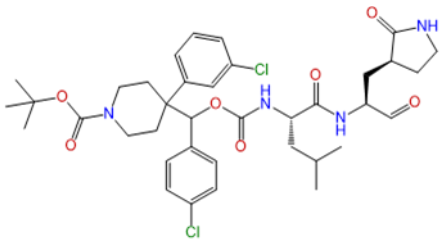
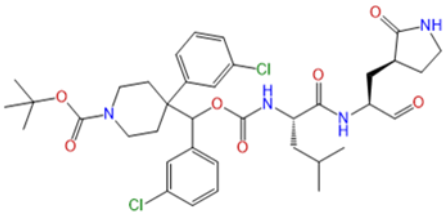
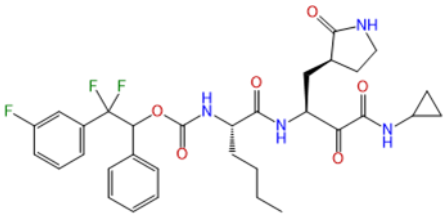
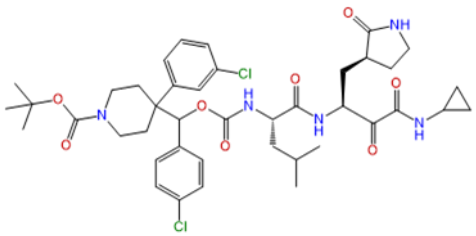
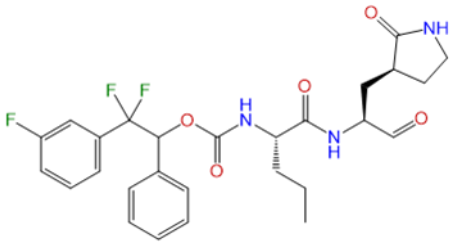
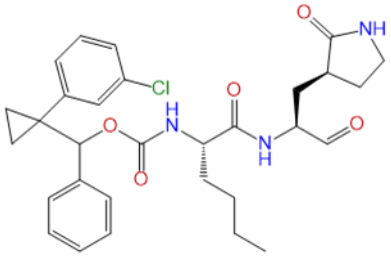
A85	
A86	
A87	
A88	
A89	
A90	

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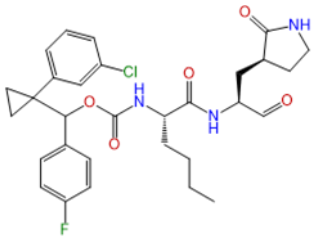
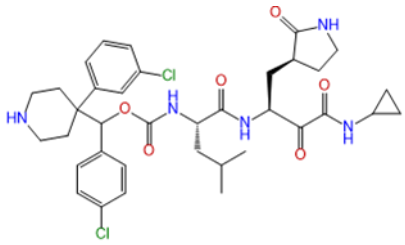
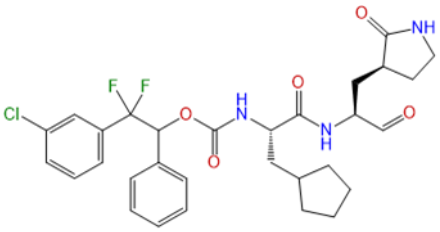
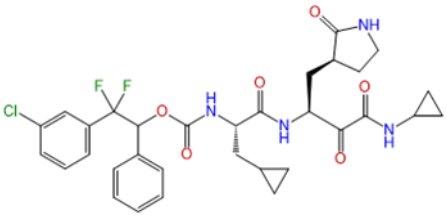
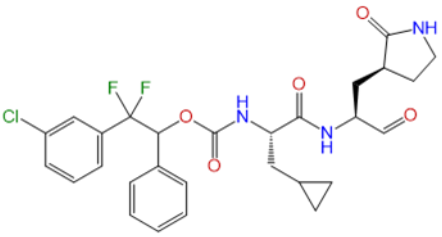
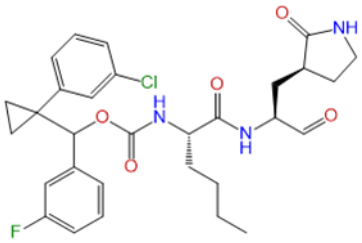
A91	
A92	
A93	
A94	
A95	
A96	

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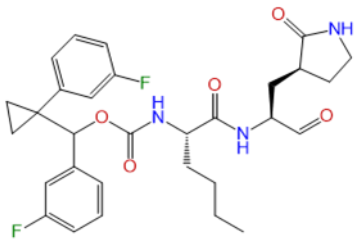
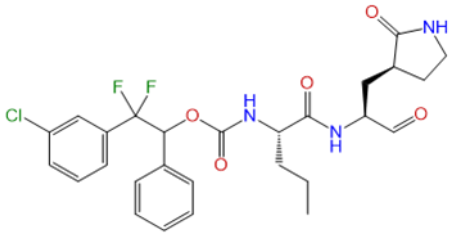
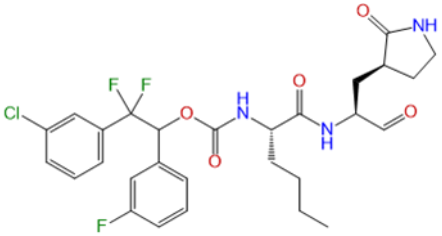
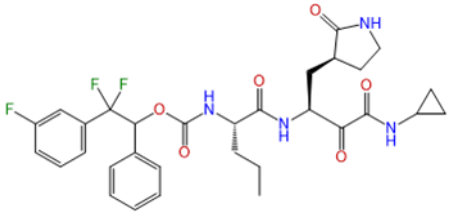
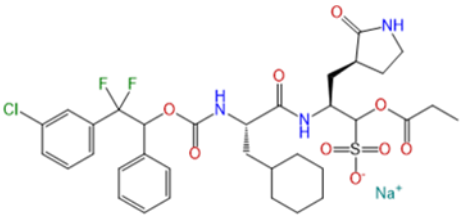
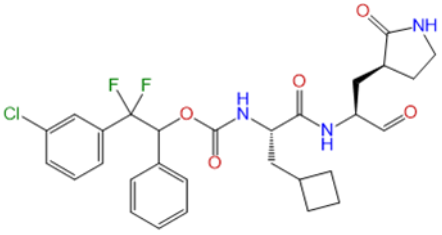
A97	
A98	
A99	
A100	
A101	
A102	

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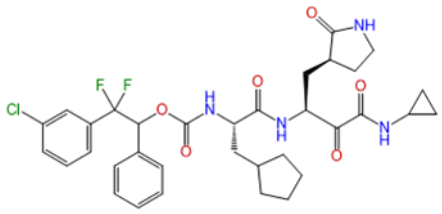
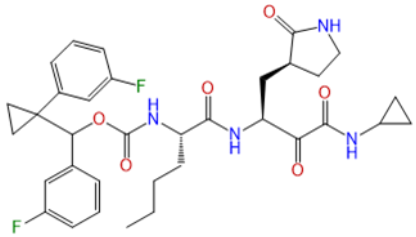
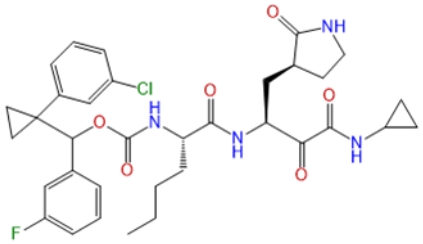
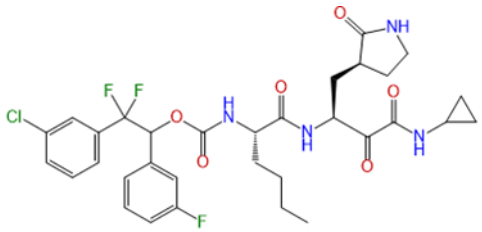
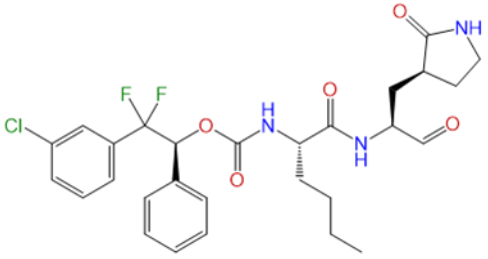
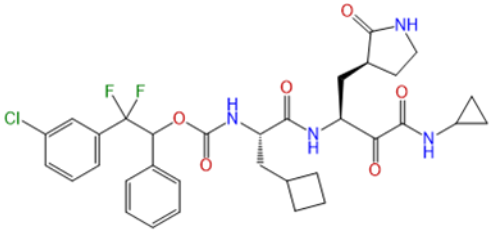
A103	
A104	
A105	
A106	
A107	
A108	

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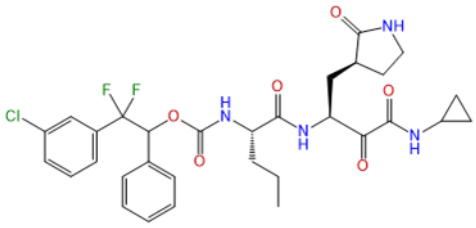
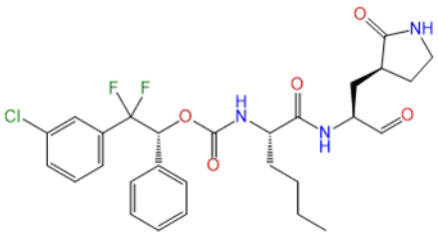
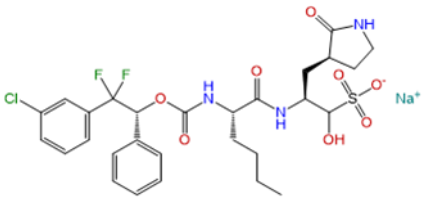
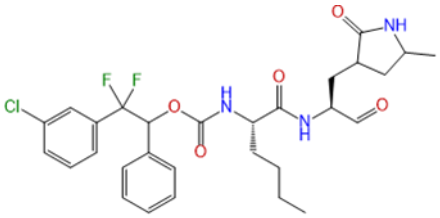
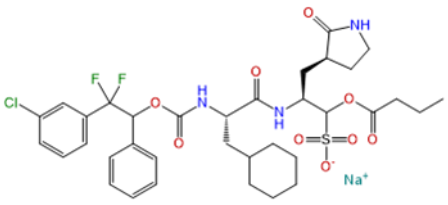
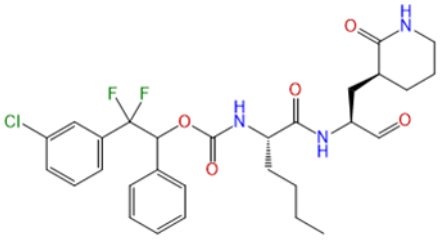
A109	
A110	
A111	
A112	
A113	
A114	

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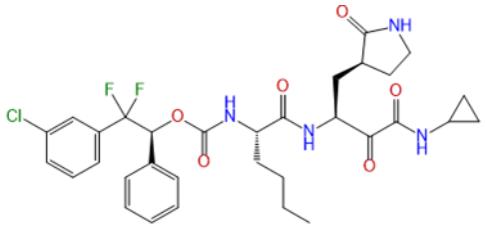
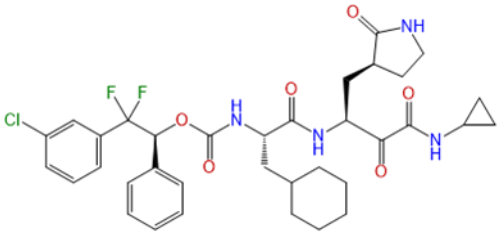
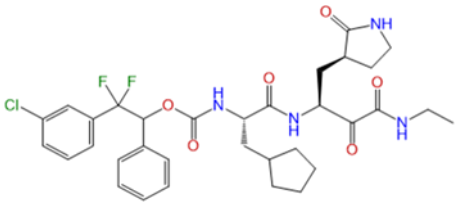
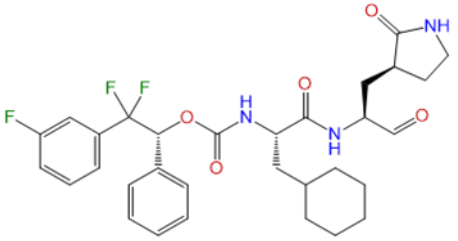
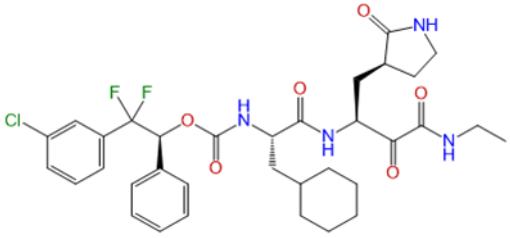
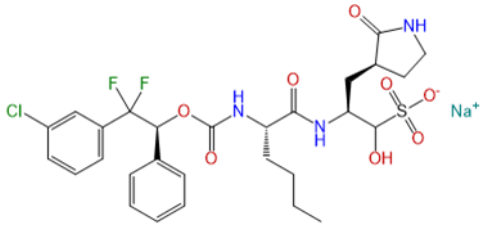
A115	
A116	
A117	
A119	
A120	
A121	

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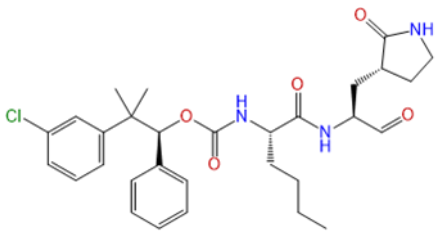
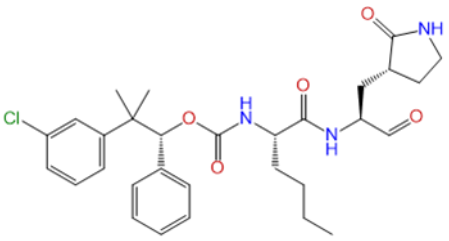
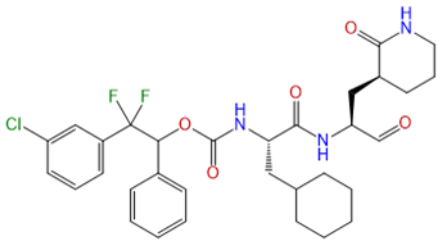
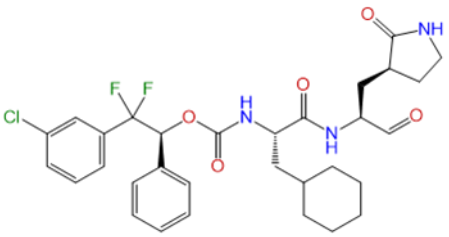
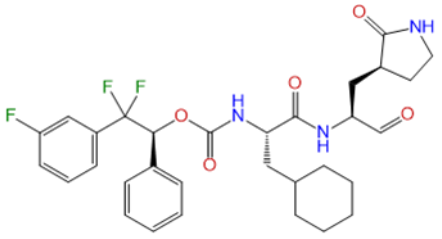
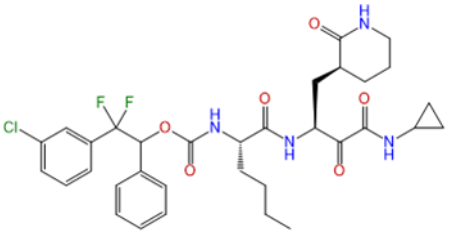
A122	
A123	
A124	
A125	
A126	
A127	

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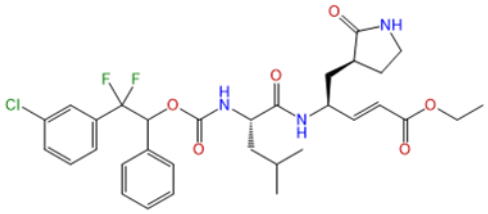
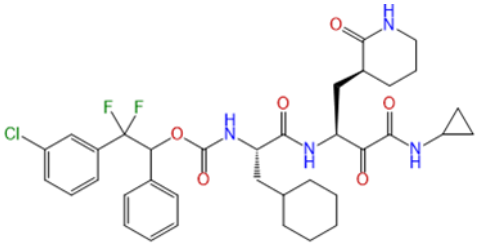
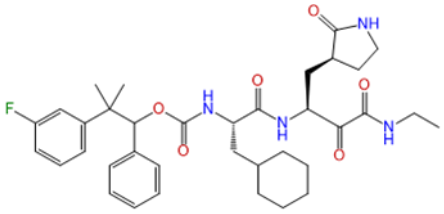
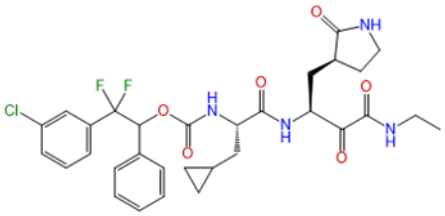
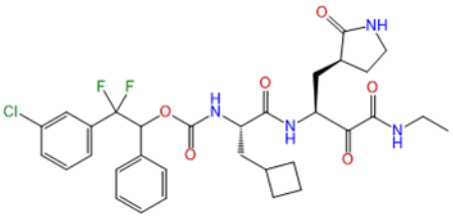
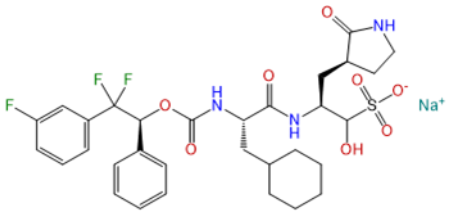
A128	
A129	
A130	
A131	
A132	
A133	

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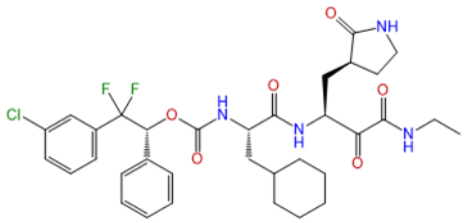
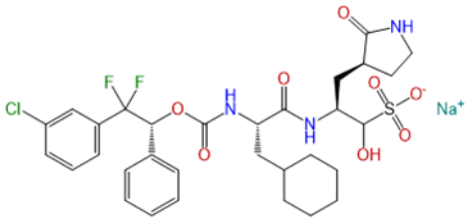
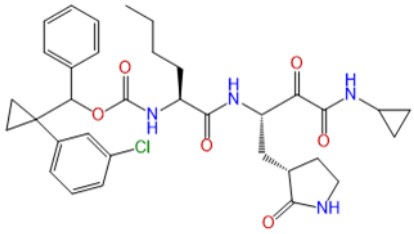
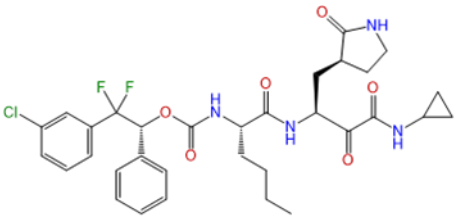
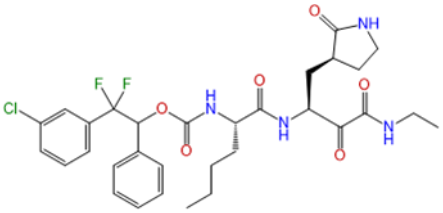
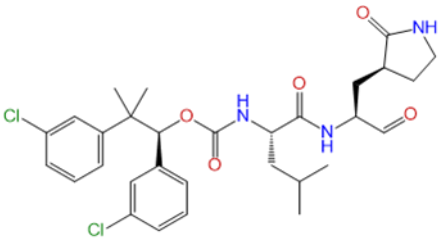
A134	
A135	
A136	
A137	
A138	
A139	

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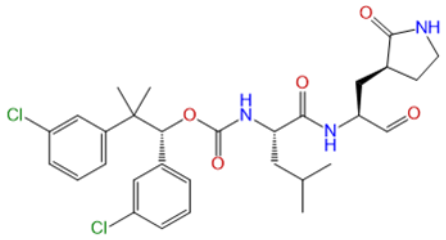
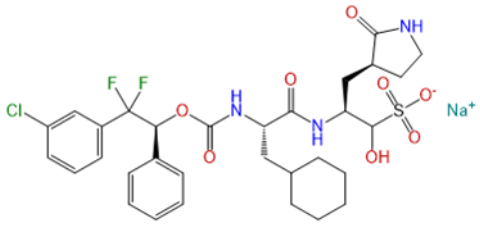
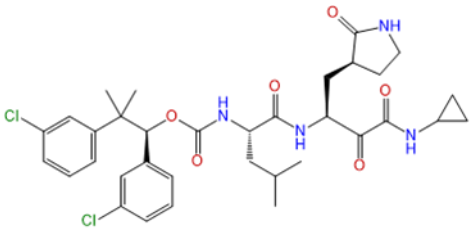
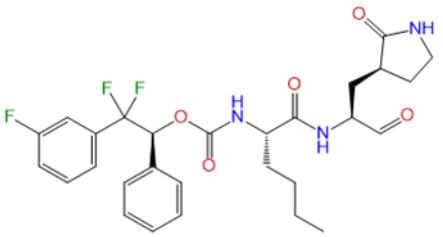
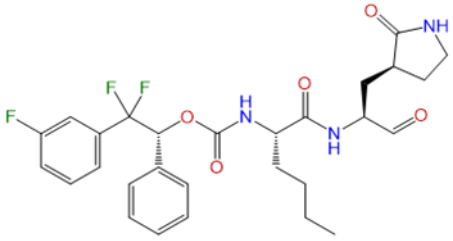
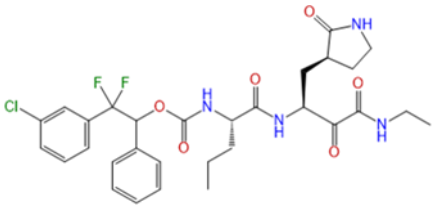
A140	
A141	
A142	
A143	
A144	
A145	

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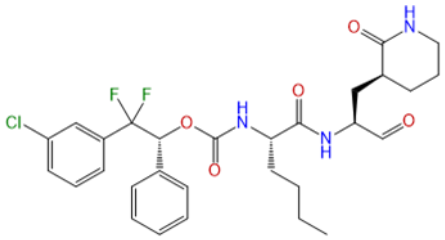
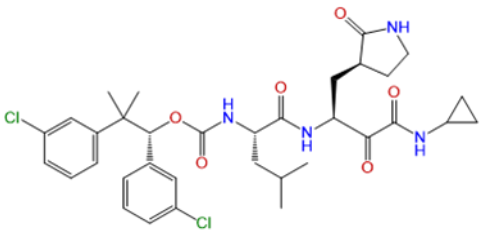
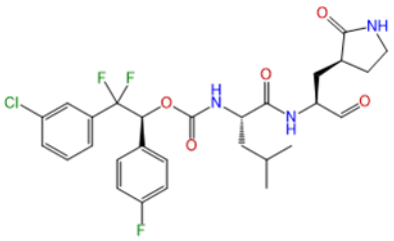
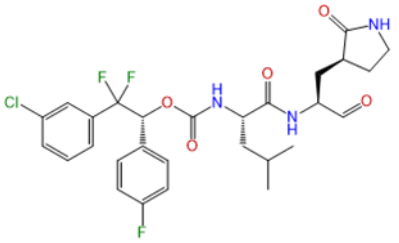
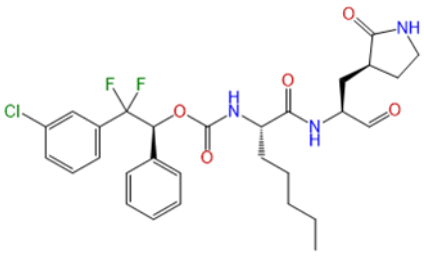
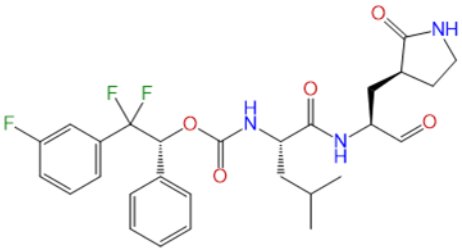
A146	
A147	
A148	
A149	
A151	
A152	

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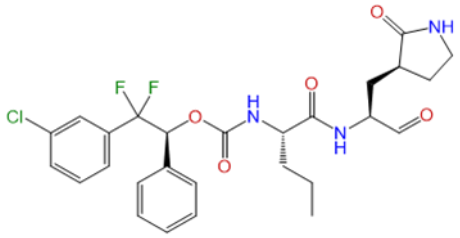
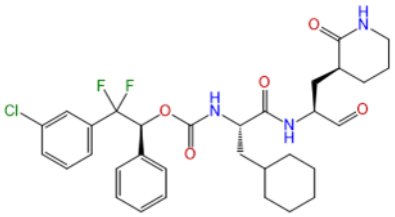
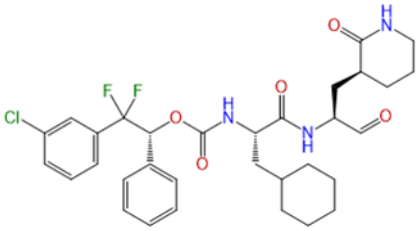
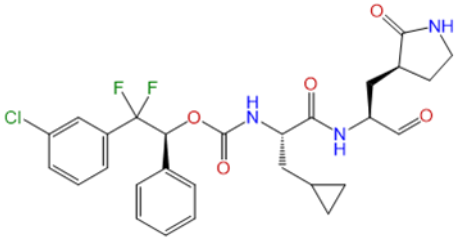
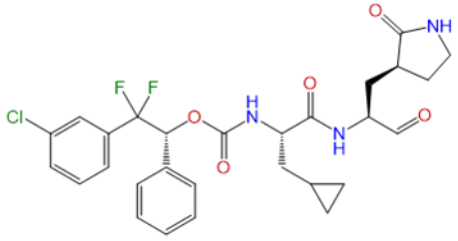
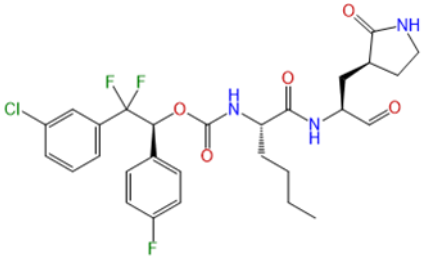
A153	
A154	
A155	
A156	
A157	
A159	

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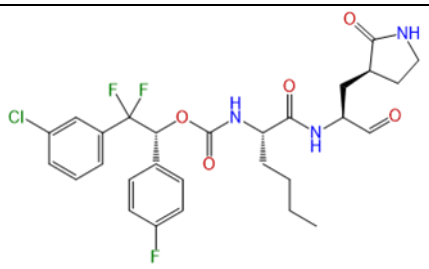
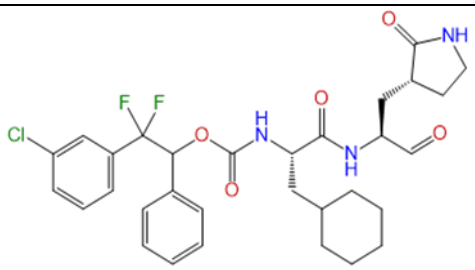
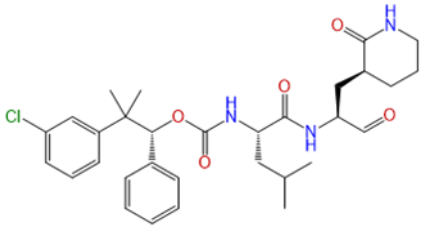
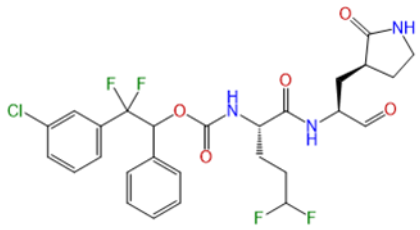
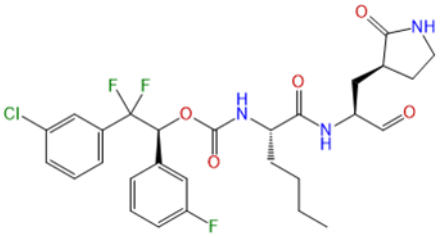
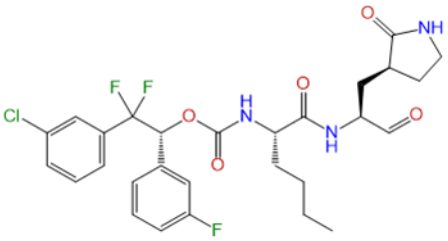
A160	
A161	
A162	
A163	
A164	
A165	

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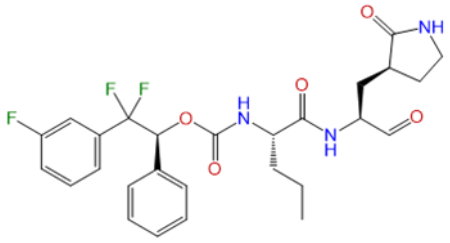
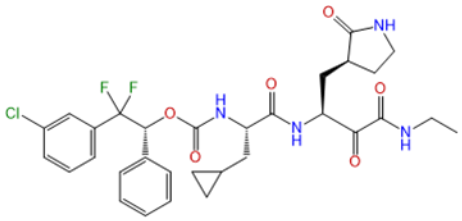
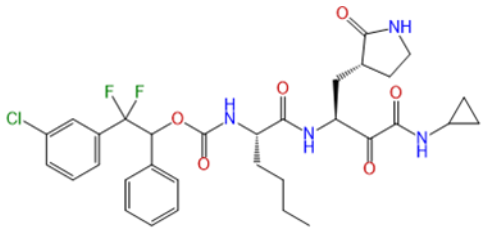
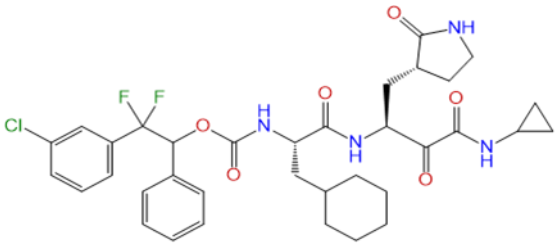
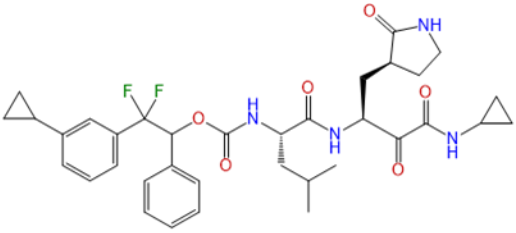
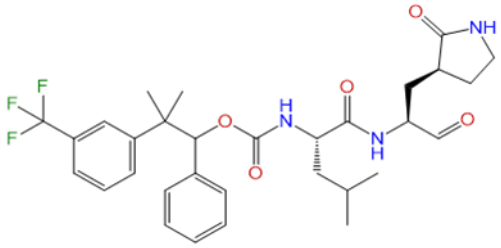
A166	
A167	
A168	
A169	
A170	
A171	

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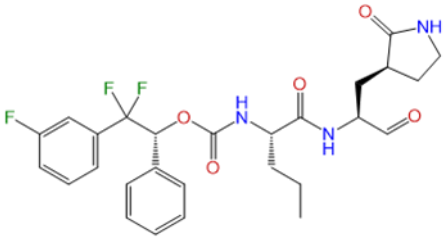
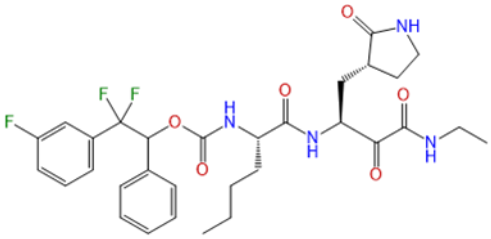
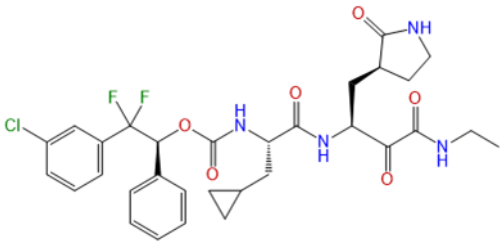
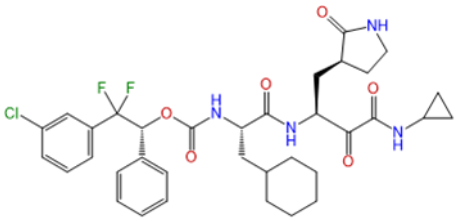
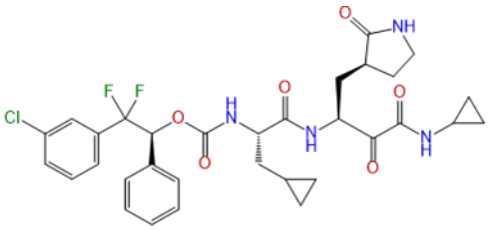
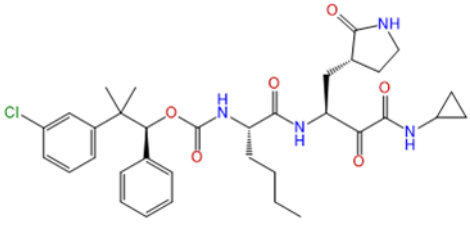
A172	
A173	
A174	
A175	
A176	
A177	

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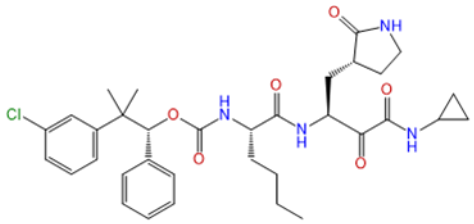
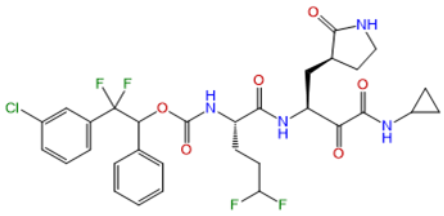
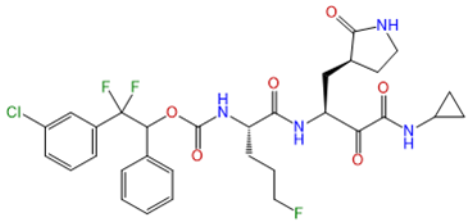
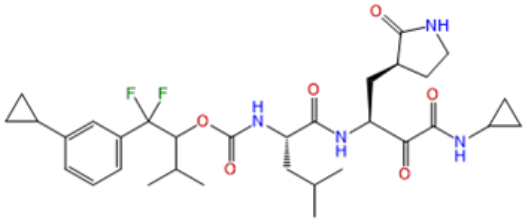
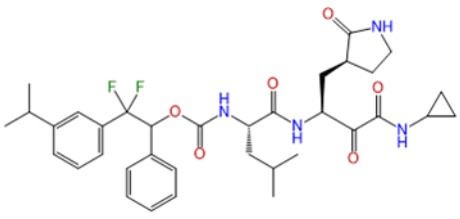
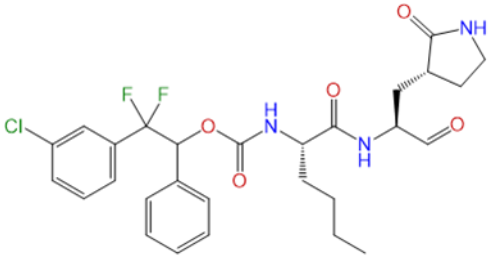
A178	
A179	
A180	
A181	
A182	
A183	

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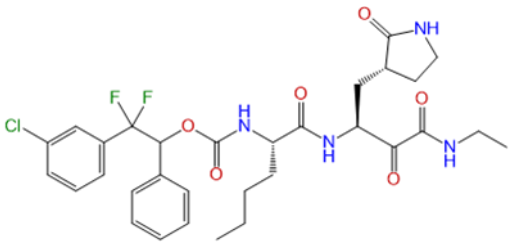
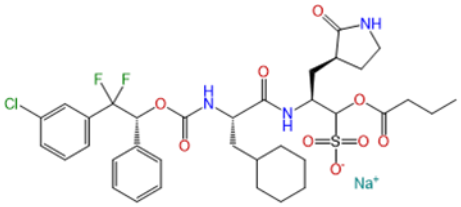
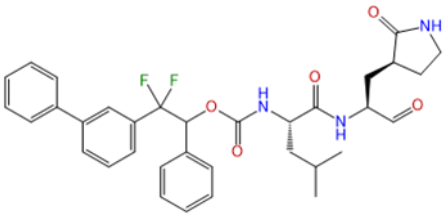
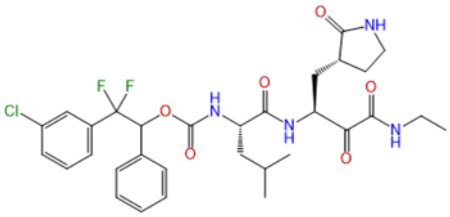
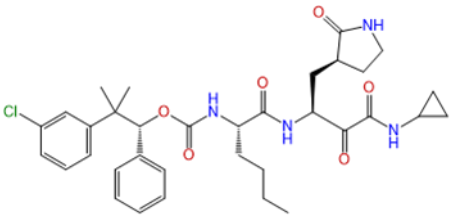
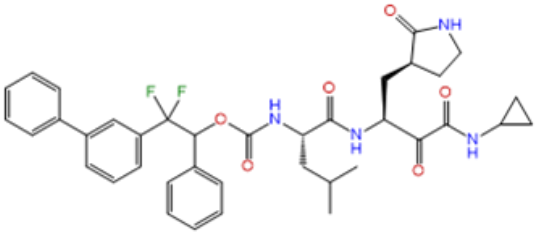
A185	
A186	
A187	
A188	
A189	
A191	

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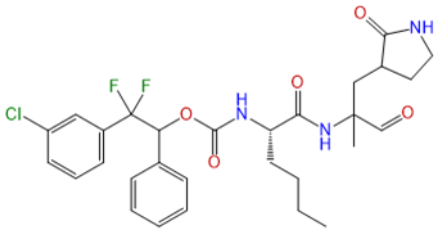
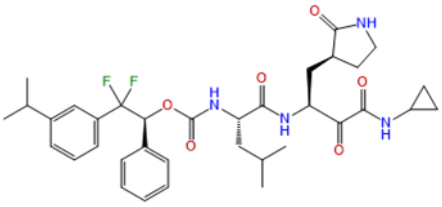
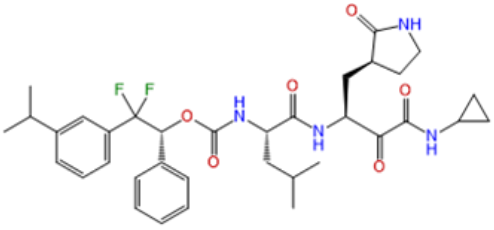
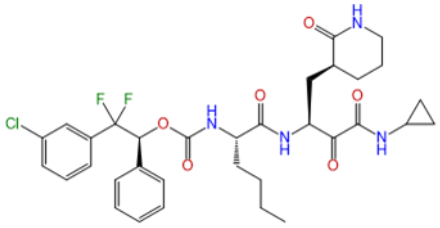
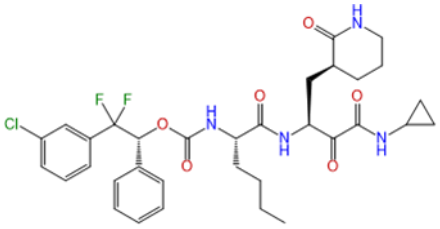
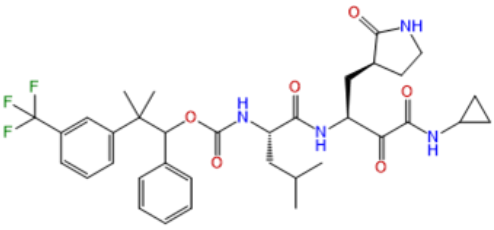
A192	
A193	
A194	
A195	
A196	
A197	

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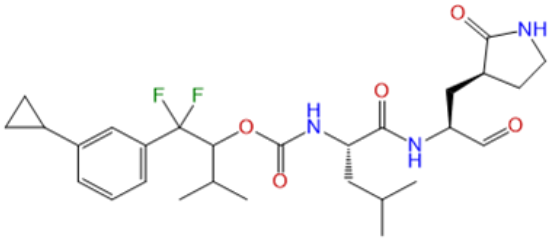
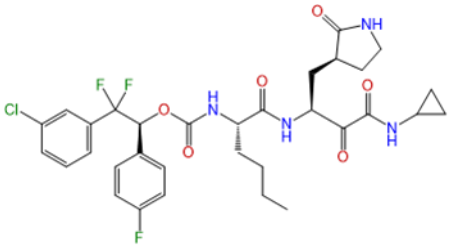
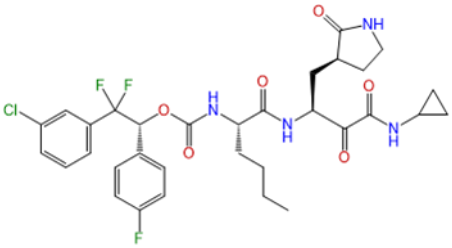
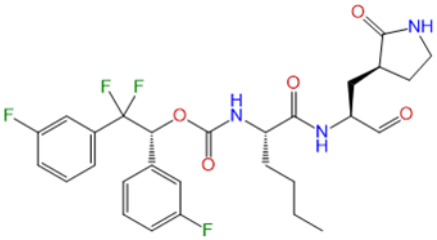
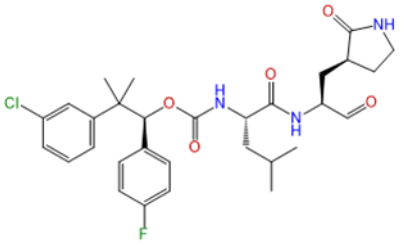
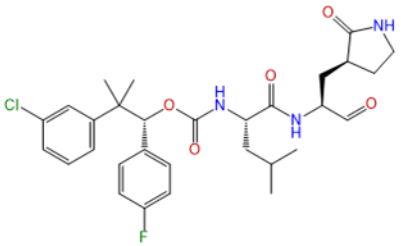
A198	
A199	
A200	
A201	
A202	
A203	

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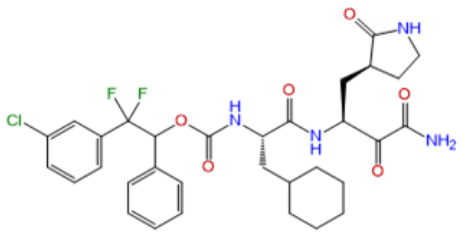
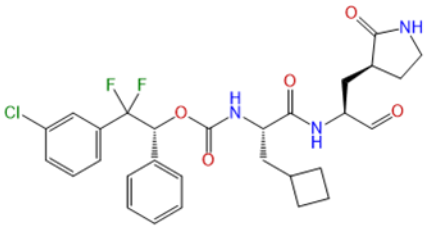
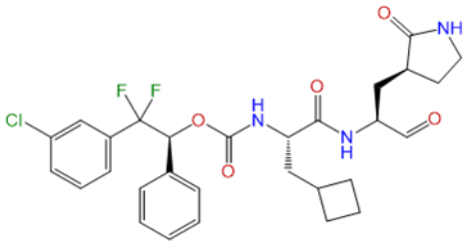
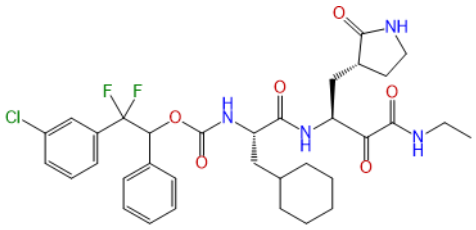
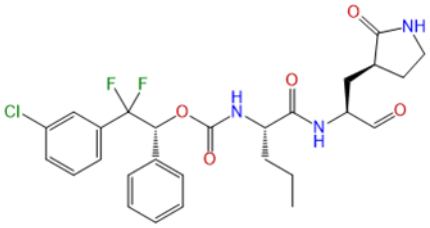
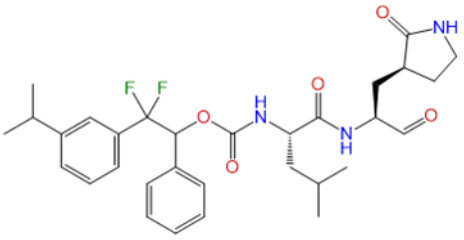
A204	
A205	
A206	
A207	
A208	
A209	

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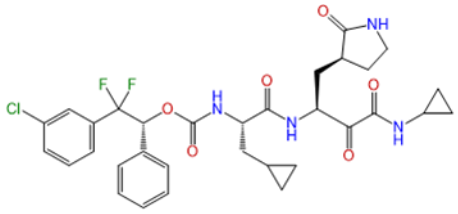
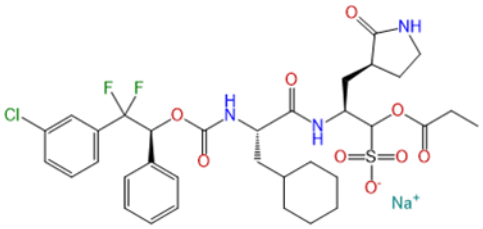
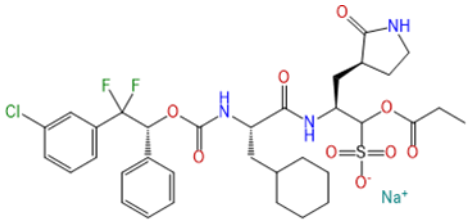
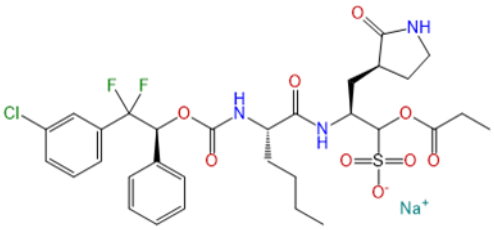
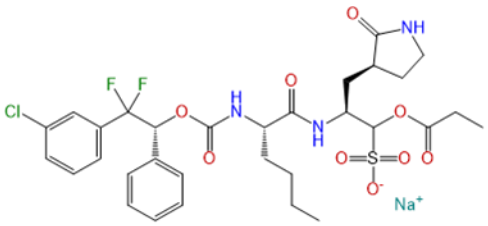
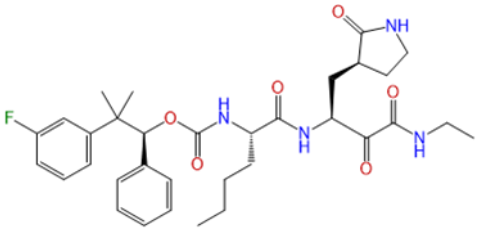
A210	
A211	
A212	
A213	
A214	
A215	

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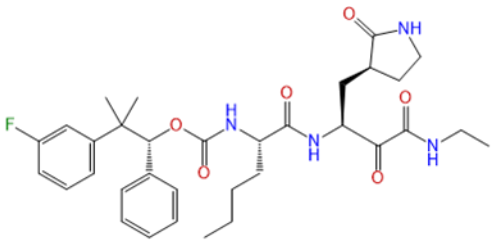
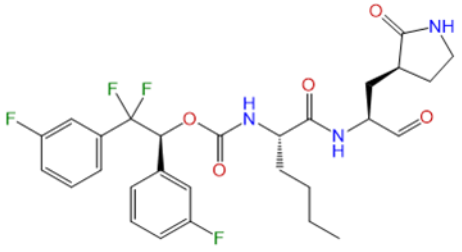
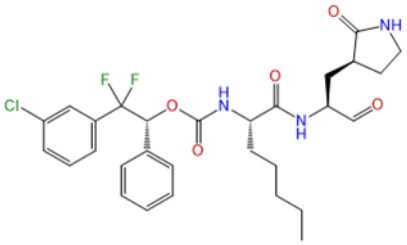
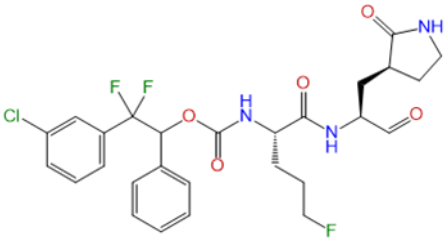
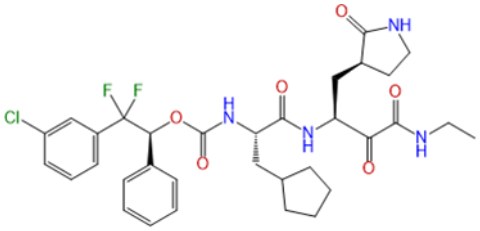
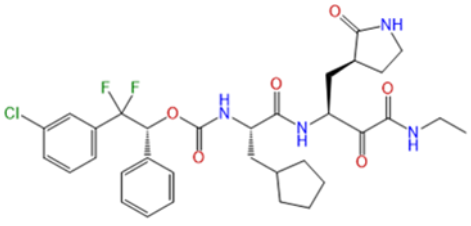
A216	
A217	
A218	
A219	
A220	
A221	

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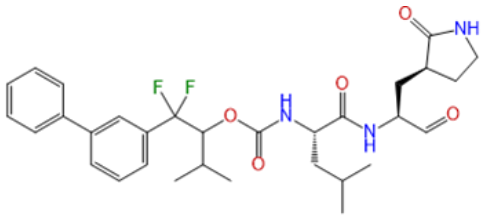
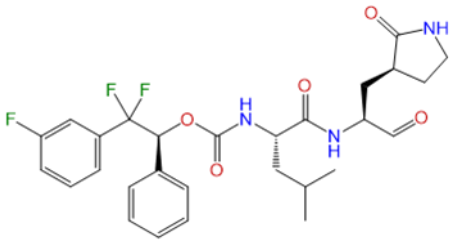
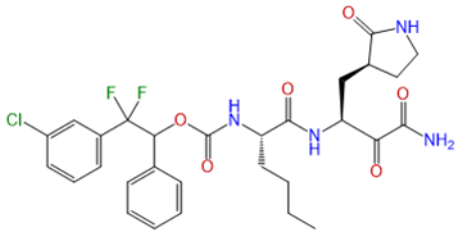
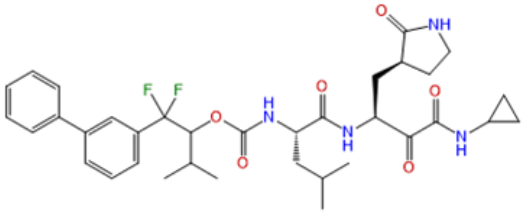
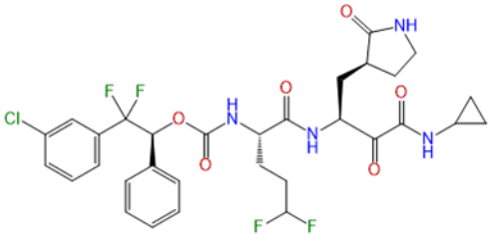
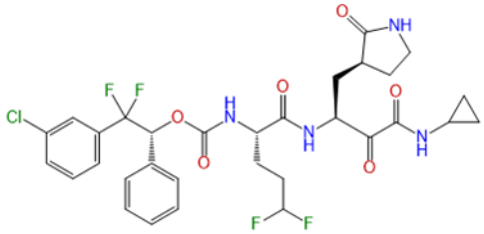
A222	
A223	
A224	
A226	
A227	
A228	

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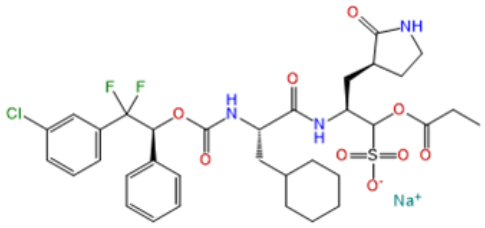
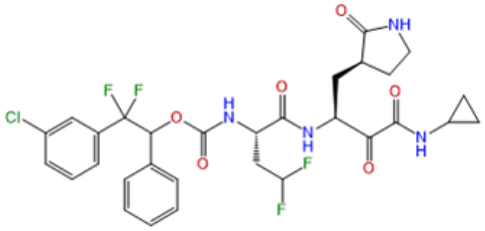
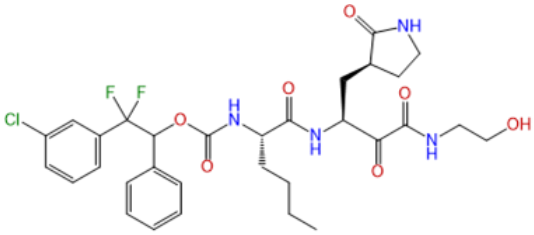
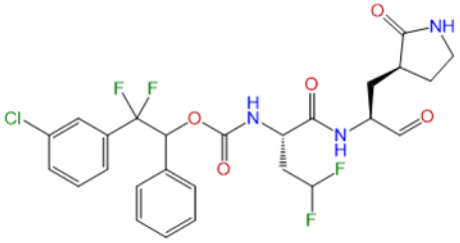
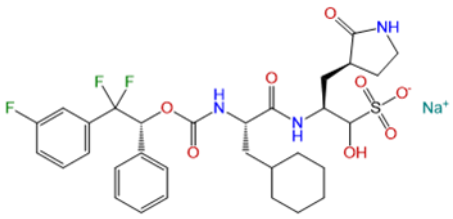
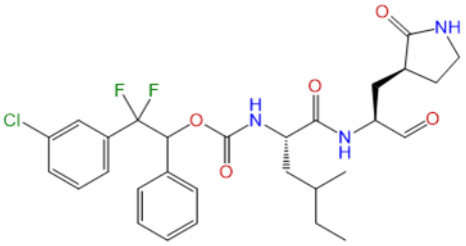
A229	
A230	
A231	
A232	
A233	
A234	

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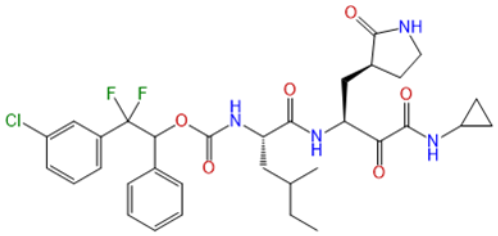
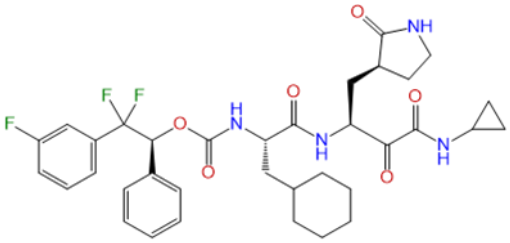
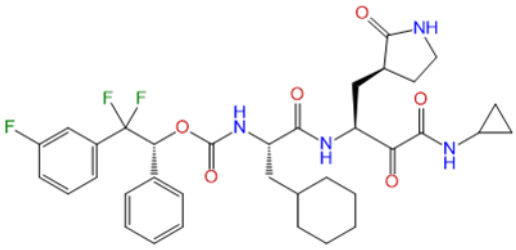
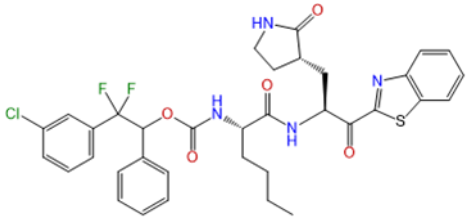
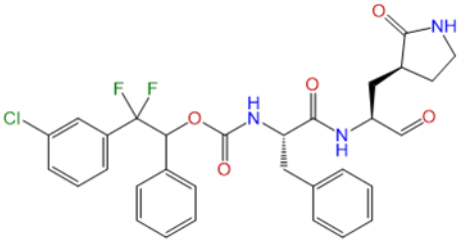
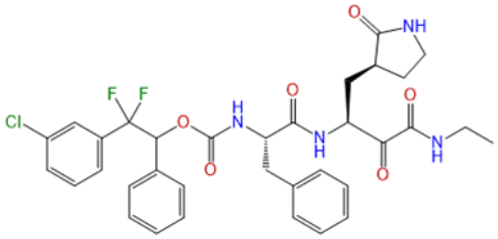
A235	
A236	
A237	
A238	
A239	
A240	

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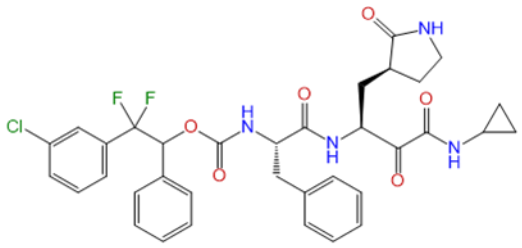
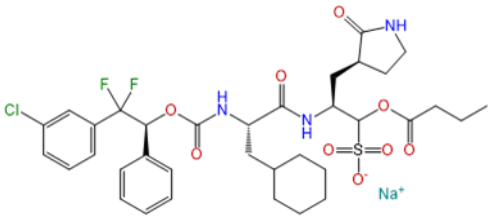
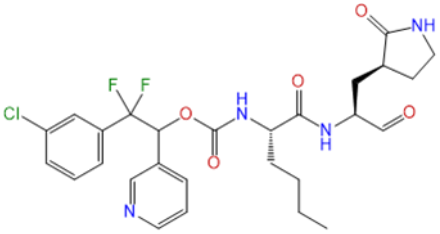
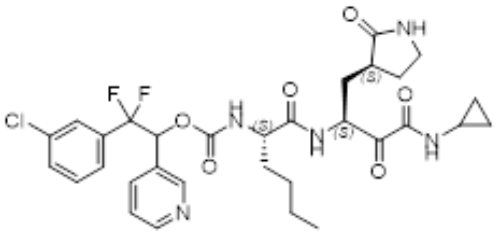
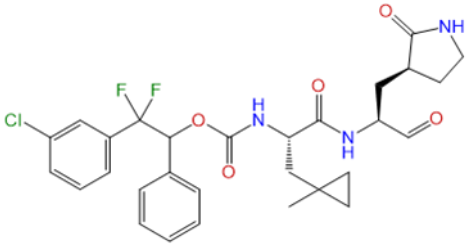
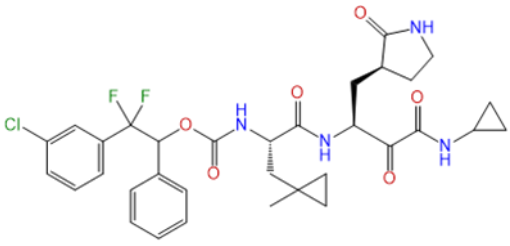
A241	
A242	
A243	
A243	
A244	
A245	

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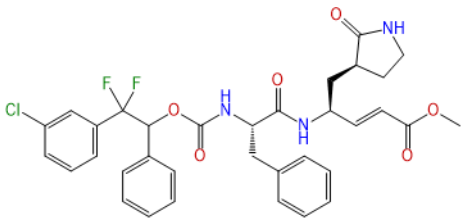
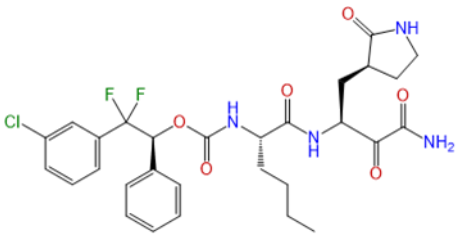
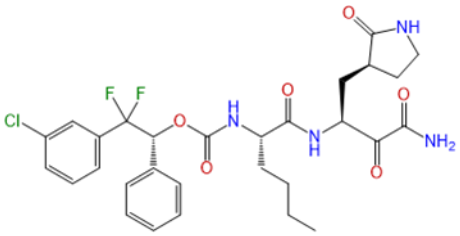
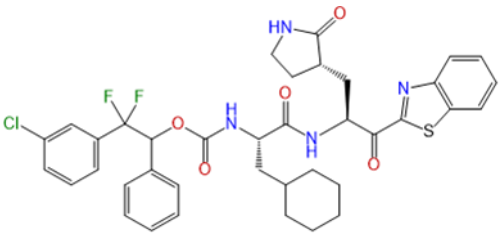
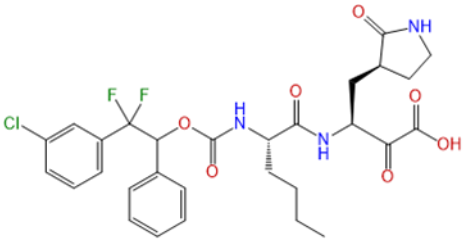
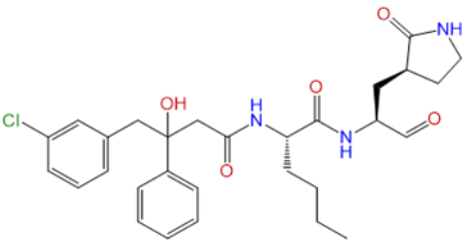
A246	
A247	
A248	
A249	
A250	
A251	

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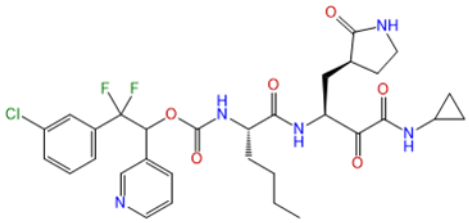
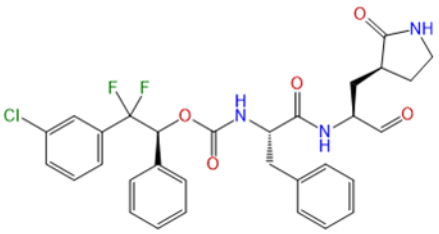
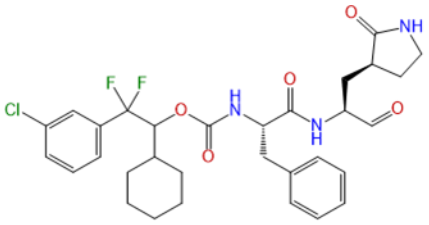
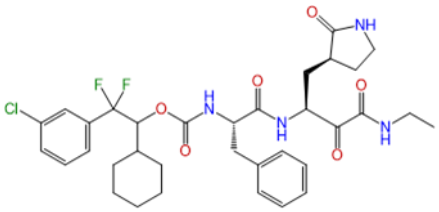
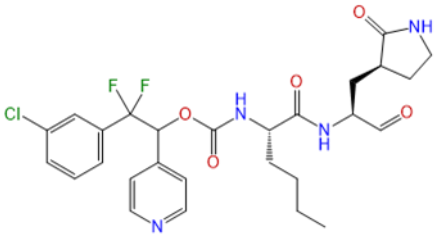
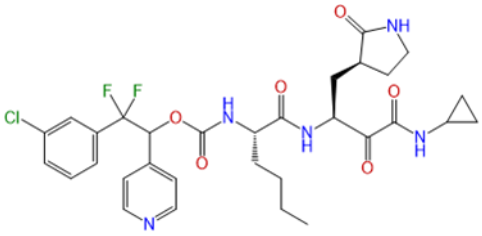
A252	
A253	
A254	
A255	
A256	
A257	

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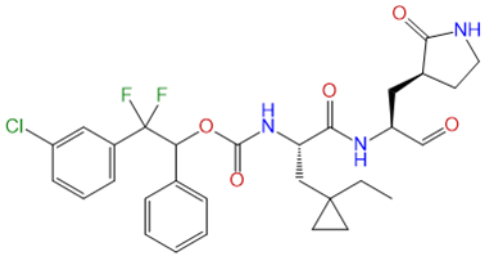
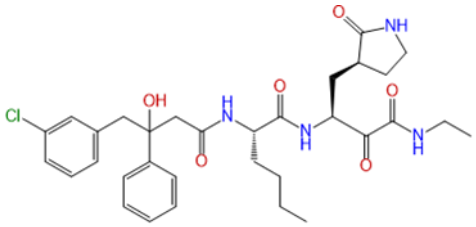
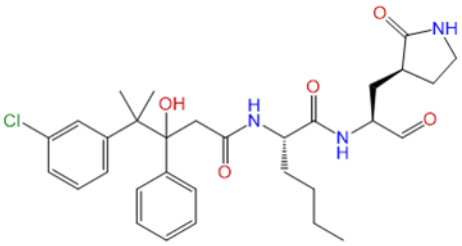
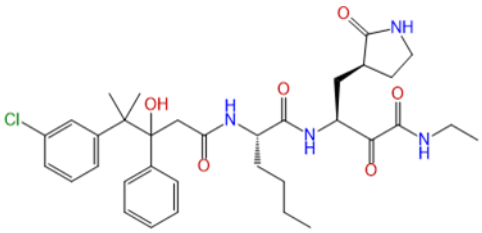
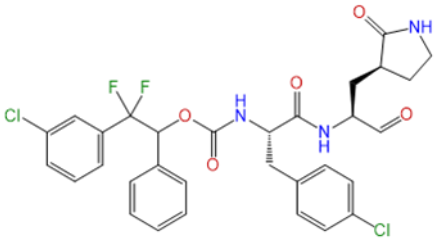
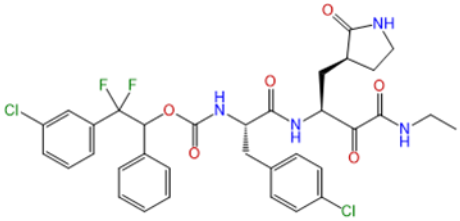
A258	
A259	
A260	
A261	
A262	
A263	

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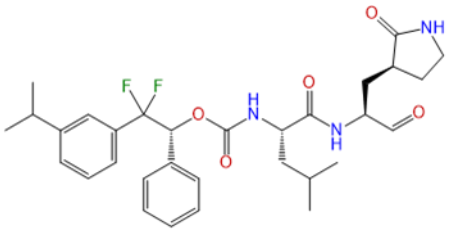
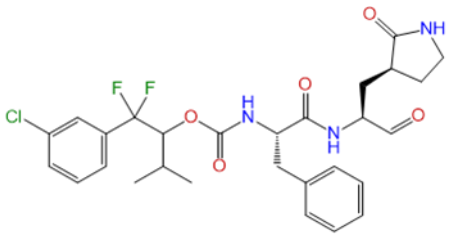
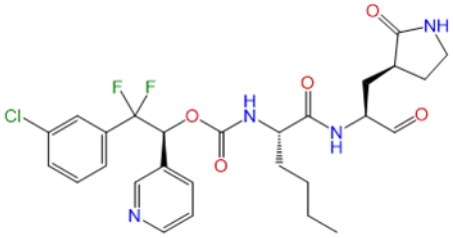
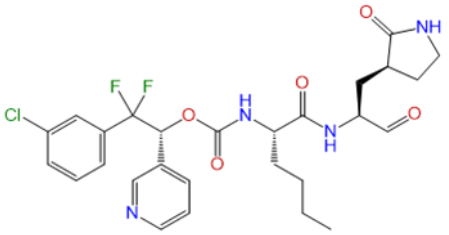
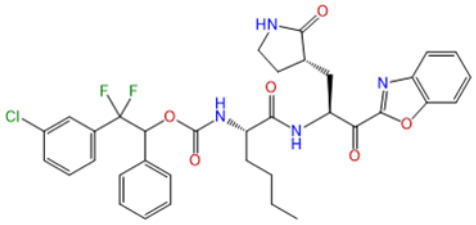
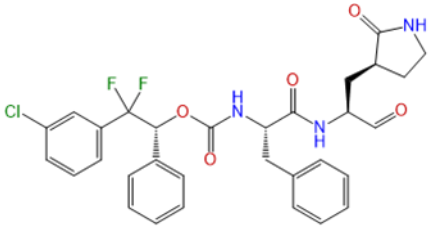
A265	
A266	
A267	
A268	
A269	
A270	

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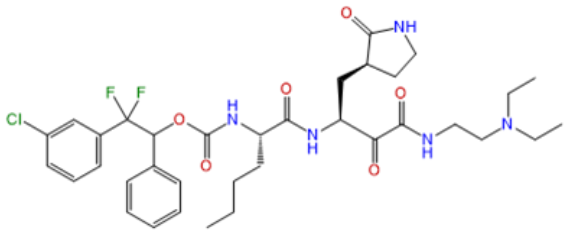
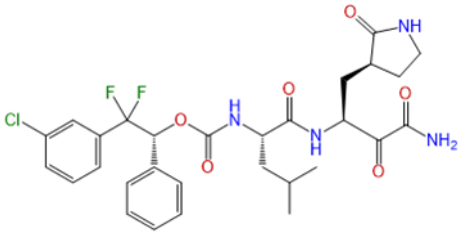
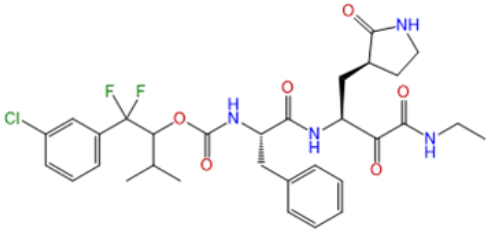
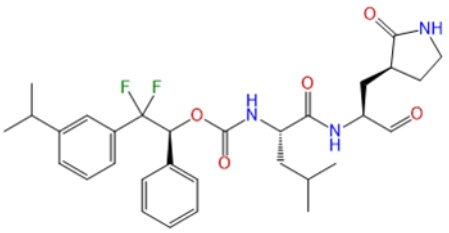
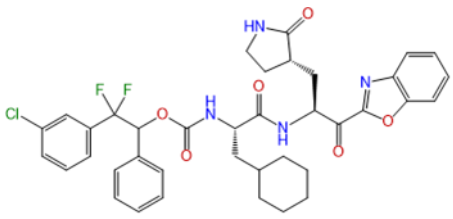
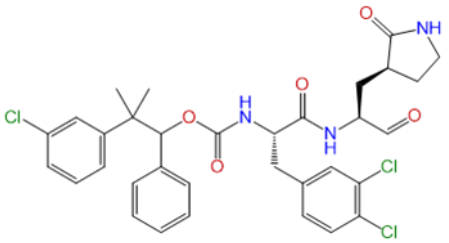
A271	
A273	
A274	
A275	
A278	
A279	

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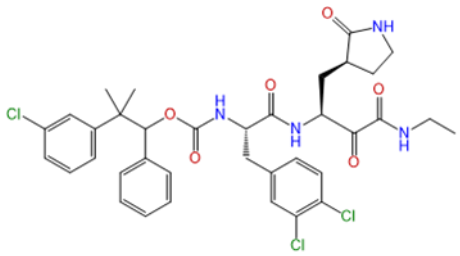
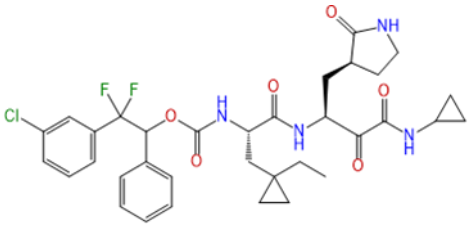
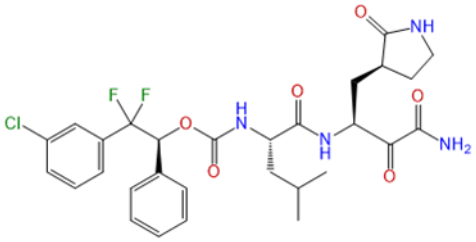
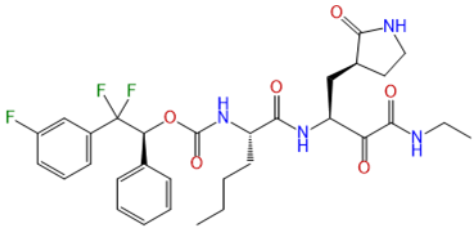
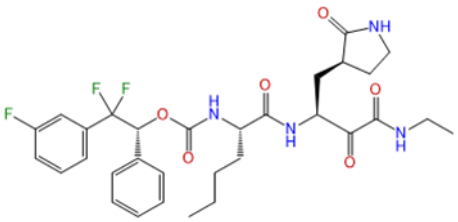
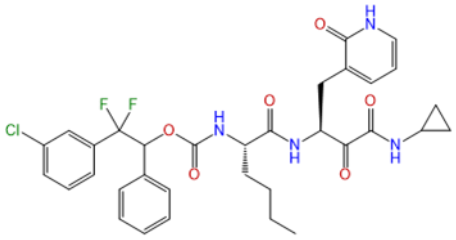
A280	
A281	
A282	
A283	
A284	
A285	

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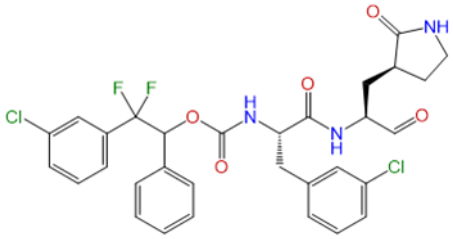
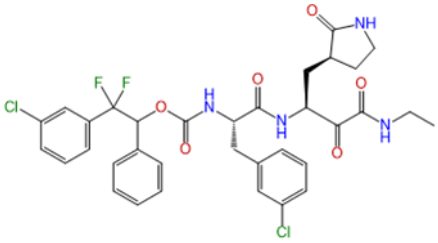
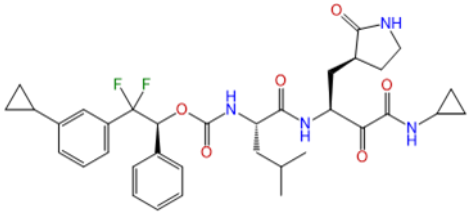
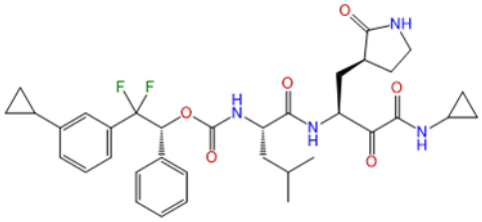
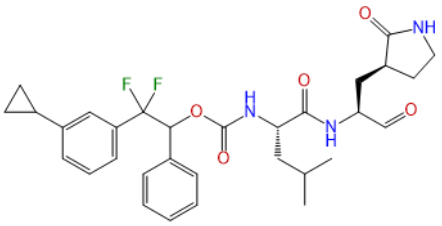
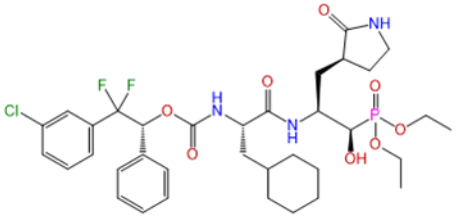
A286	
A287	
A288	
A289	
A290	
A291	

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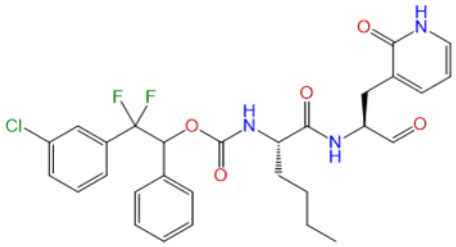
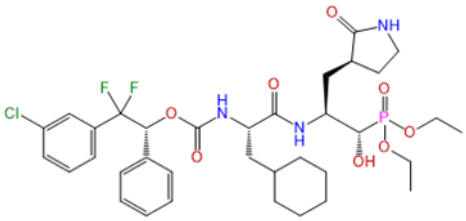
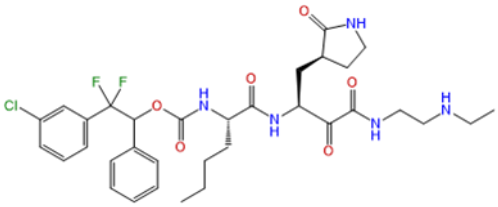
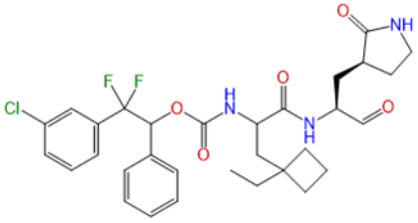
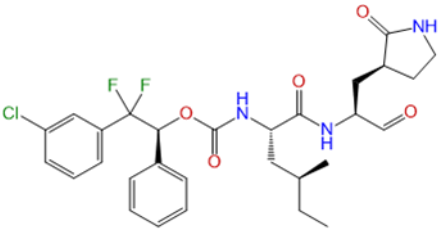
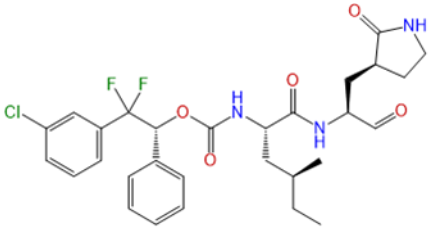
A292	
A293	
A294	
A295	
A296	
A297	

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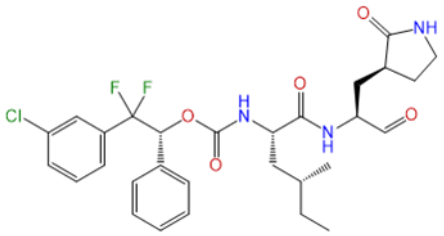
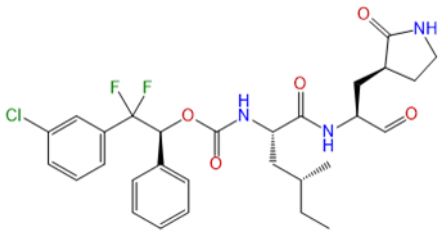
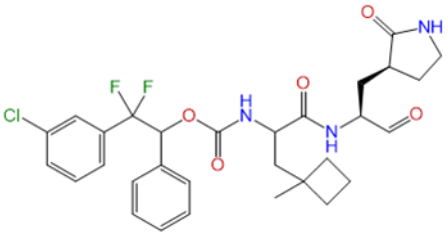
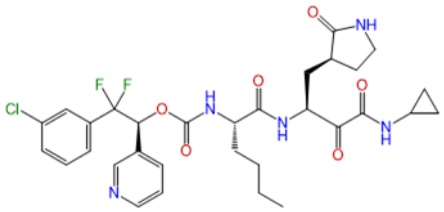
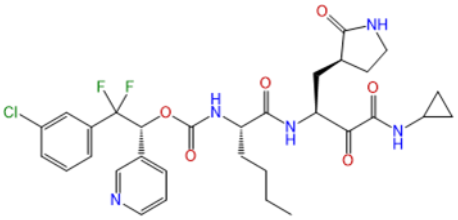
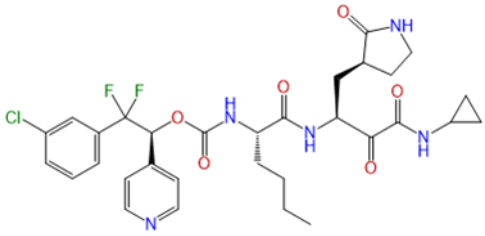
A298	
A299	
A300	
A301	
A302	
A303	

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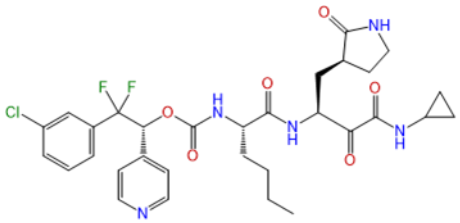
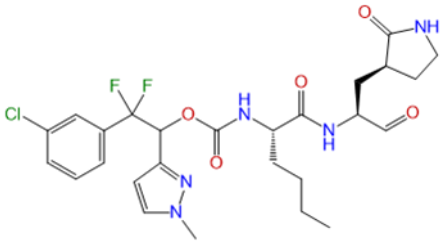
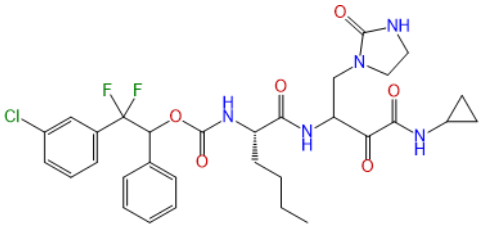
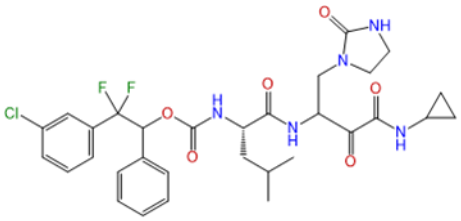
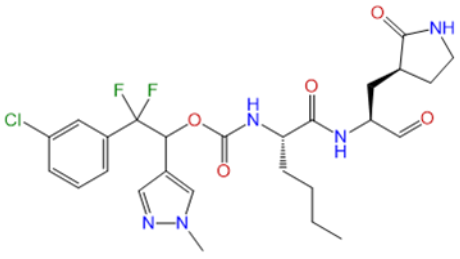
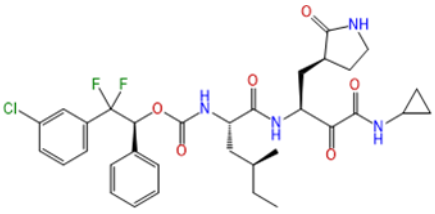
A304	
A305	
A306	
A307	
A308	
A309	

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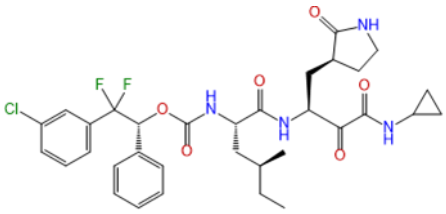
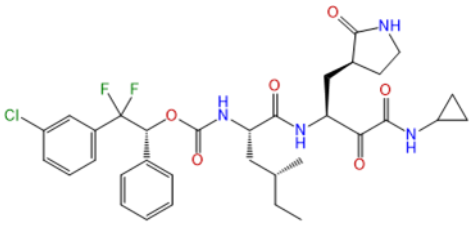
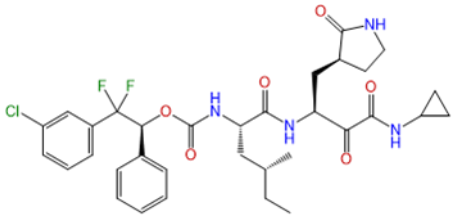
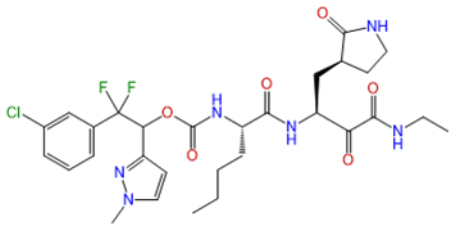
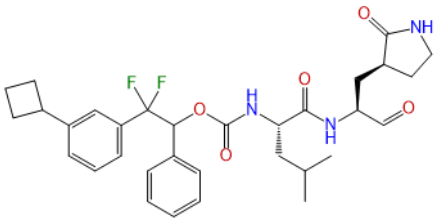
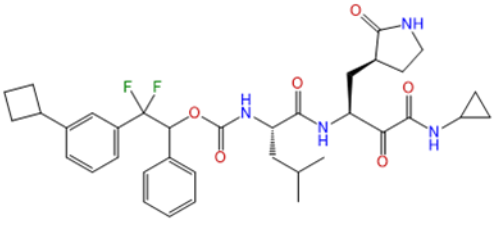
A310	
A311	
A312	
A313	
A314	
A315	

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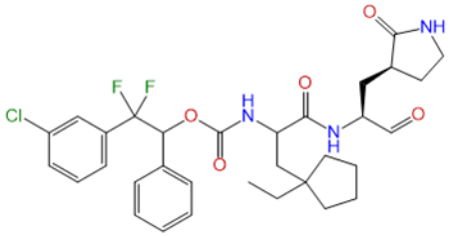
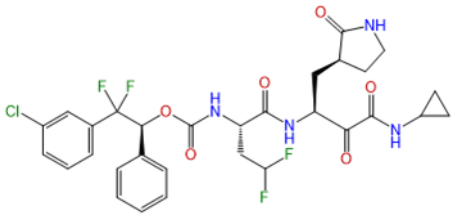
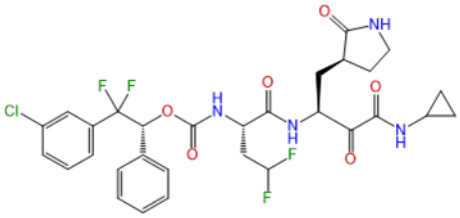
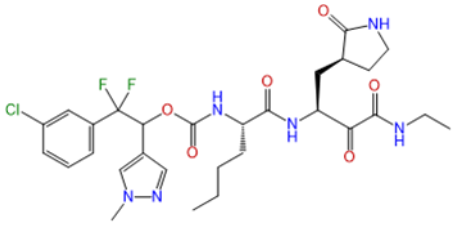
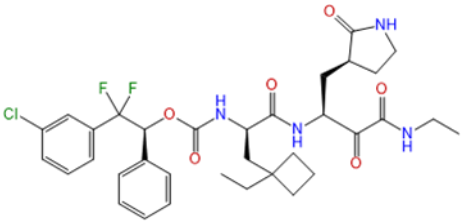
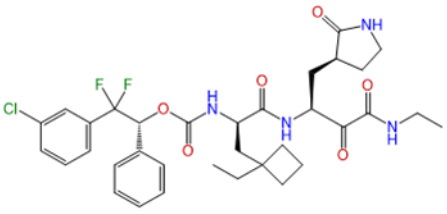
A316	
A317	
A318	
A319	
A320	
A321	

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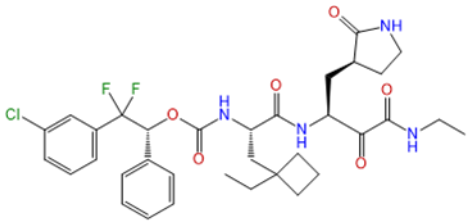
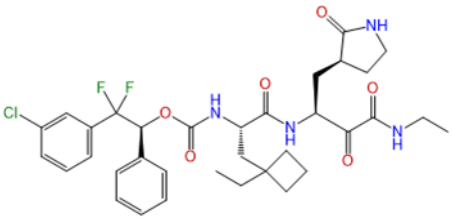
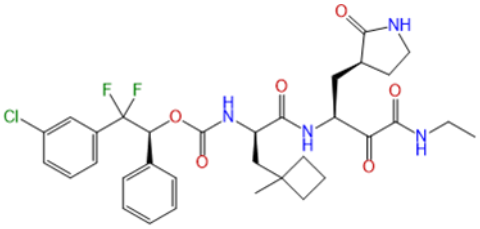
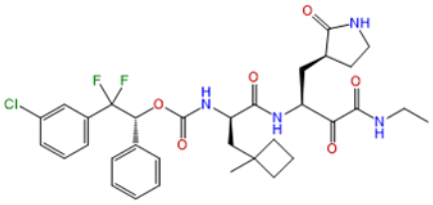
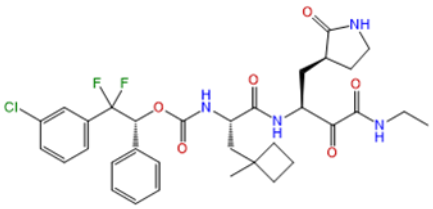
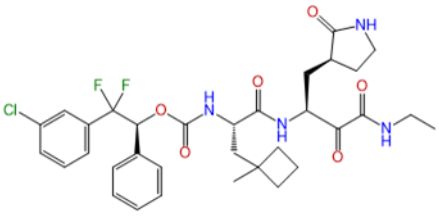
A322	
A323	
A324	
A325	
A326	
A327	

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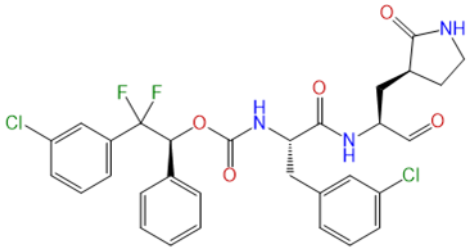
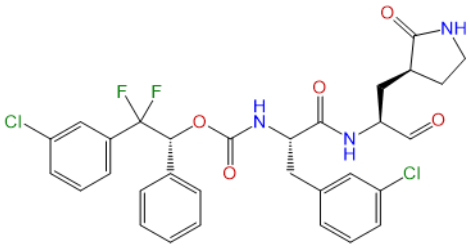
A328	
A329	

TABLE B

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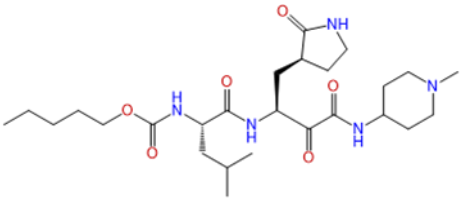
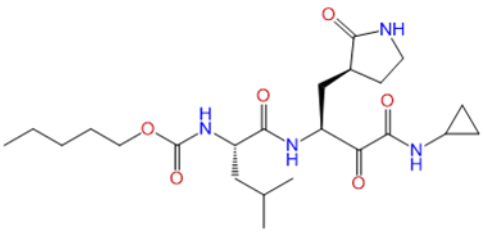
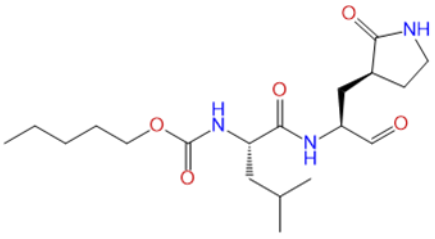
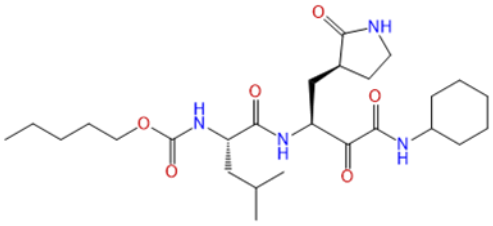
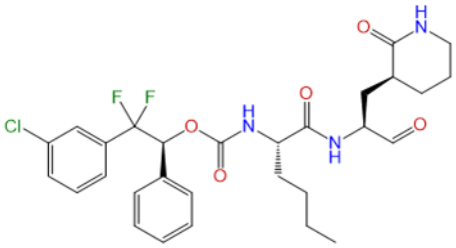
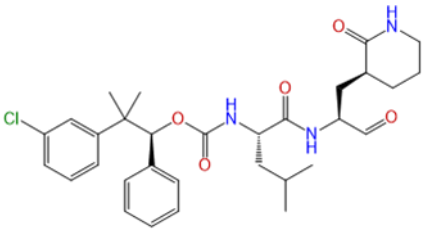
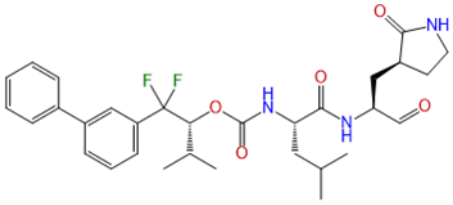
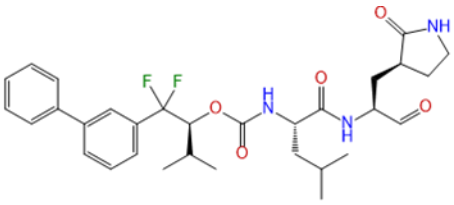
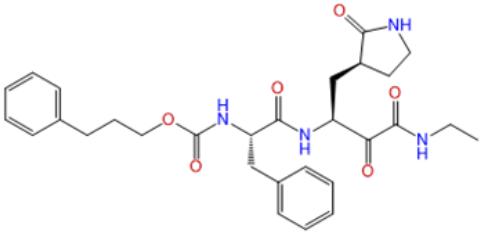
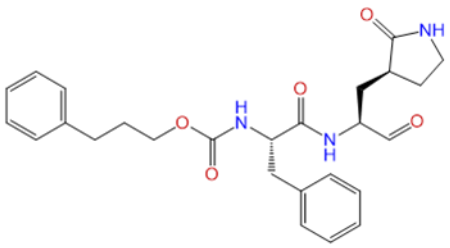
A8	
A12	
A13	

Compound no.	Structure
A24	
A150	
A158	
A264	
A272	
A276	

Compound no.	Structure
A277	

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19. A pharmaceutical formulation comprising the compound or salt according to any one of claims 1 to 18 and a pharmaceutically acceptable excipient.

20. A compound or salt of any one of claims 1 to 18, for use in treating or preventing a viral infection in a host, optionally wherein the viral infection is coronavirus infection, calicivirus infection, or picornavirus infection, preferably wherein the calicivirus infection is a norovirus infection.

21. Use of a compound or salt of any one of claims 1 to 18 in the manufacture of a medicament for treating or preventing a viral infection in a host, optionally wherein the viral infection is coronavirus infection, calicivirus infection, or picornavirus infection, preferably wherein the calicivirus infection is a norovirus infection.