BAB V

KESIMPULAN DAN SARAN

A. Kesimpulan

Pertama, nilai afinitas dari 26 senyawa turunan 3-aminopiridin-2(1H)-on tidak berkorelasi dengan aktivitas *in vitro*.

Kedua, pola interaksi 26 senyawa turunan 3-aminopiridin-2(1H)-on terhadap enzim RT HIV-1 dengan melibatkan asam amino yang berbeda-beda berada pada empat daerah yang berbeda, yaitu:

a. Daerah penghambatan pertama menempati daerah yang sama seperti daerah penghambatan ligan asli dan ditempati oleh 17 senyawa turunan 3-aminopiridin-2(1H)-on.
b. Daerah penghambatan kedua ditempati oleh tiga senyawa turunan 3-aminopiridin-2(1H)-on dengan jarak sekitar 12,51Å dengan daerah penghambatan pertama.
c. Daerah penghambatan ketiga ditempati oleh tiga senyawa turunan 3-aminopiridin-2(1H)-on dengan jarak sekitar 10,34Å dengan daerah penghambatan pertama
d. Daerah penghambatan keempat ditempati oleh tiga senyawa turunan 3-aminopiridin-2(1H)-on dengan jarak sekitar 49,14Å dari daerah penghambatan.

B. Saran

Pertama, perlu dilakukan penelitian *docking* molekuler senyawa turunan 3-aminopiridin-2(1H)-on terhadap enzim RT HIV-1 dengan *binding site* dan metode yang berbeda.

Kedua, pemilihan pose dilakukan lebih mendetail pada setiap posenya dengan memperhatikan reprodusibilitas yang paling baik.

Ketiga, menggunakan sistem operasi linux.

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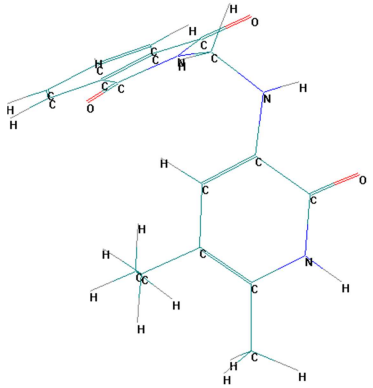
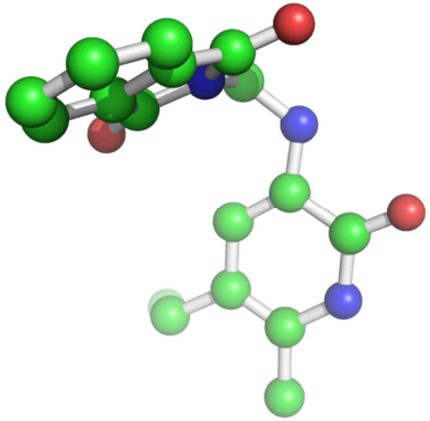
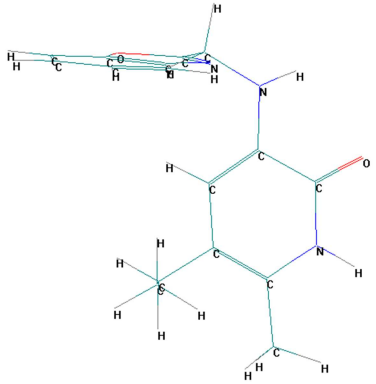
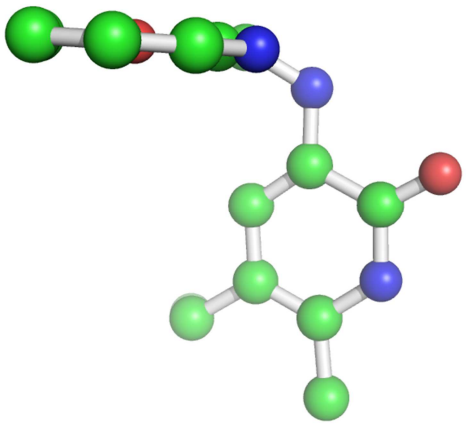
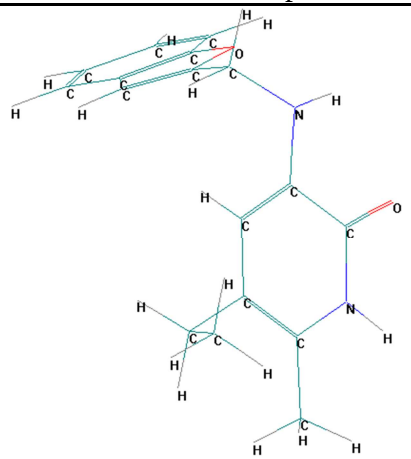
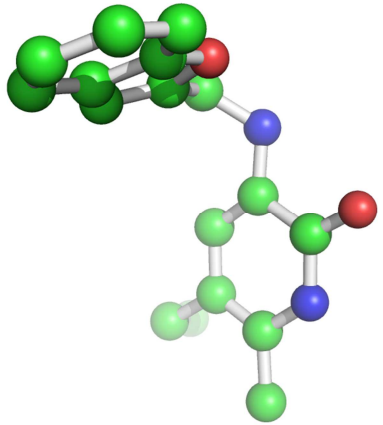
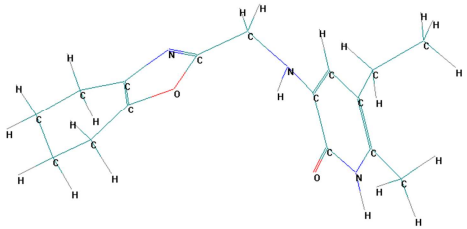
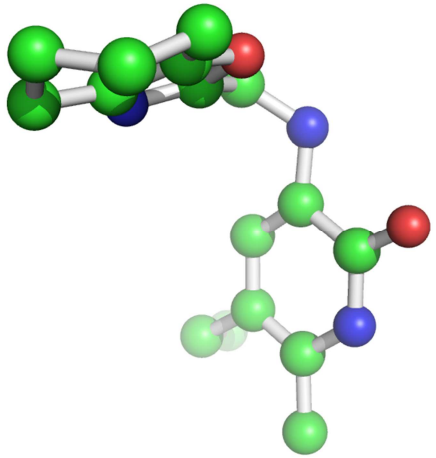
L A M P I R A N

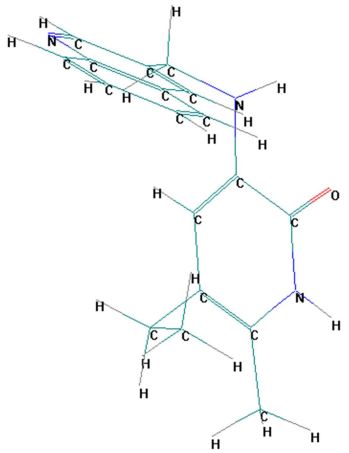
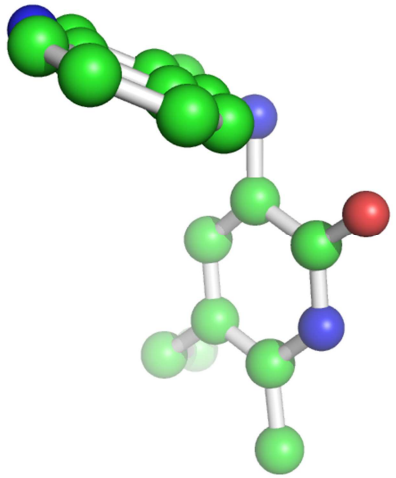
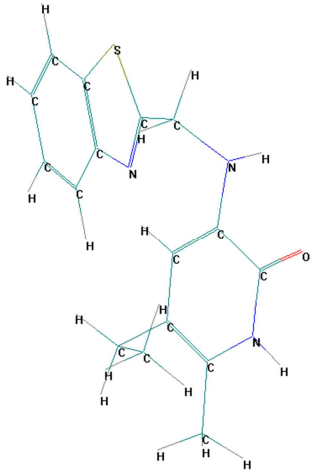
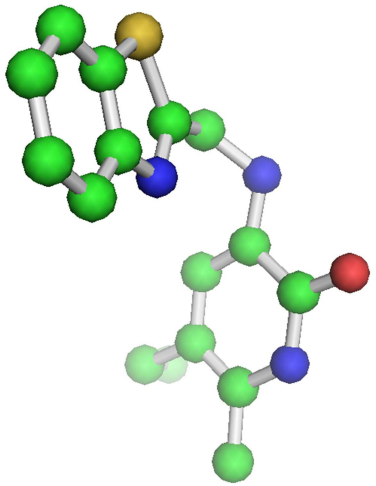
Lampiran 1. Nama 26 senyawa turunan 3-aminopiridin-2(1)-on

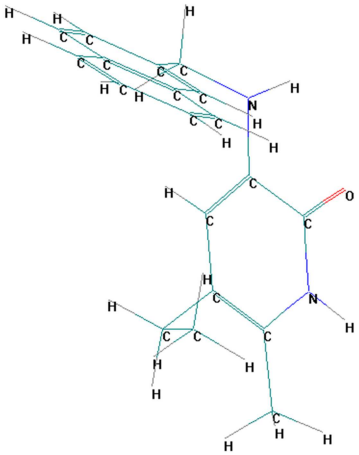
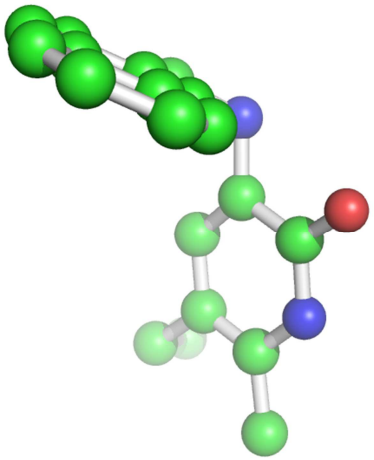
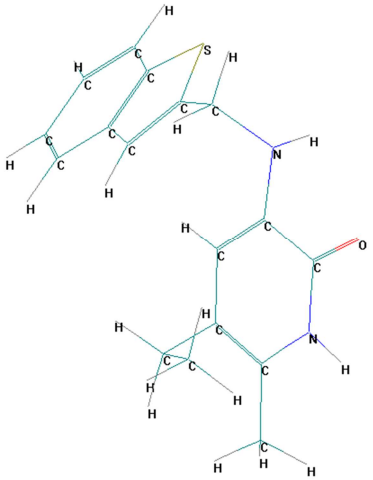
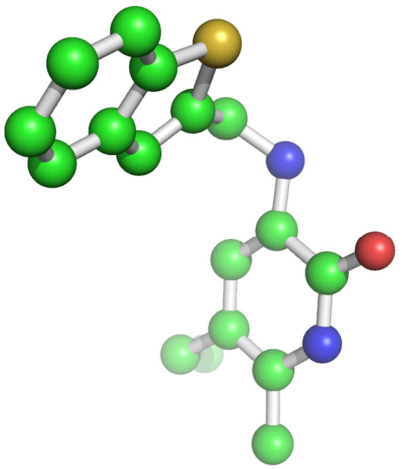
No	Nama Senyawa
1	3-(aminomethyl)phtahlimide-5-ethyl-6-methylpyridin-2(1H)-one
2	3-{[(benzoxazole-2'-yl)methyl]amino}5-ethyl-6-methylpyridin2(1H)-one
3	3-{[(benzofuran-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
4	3-[(4',5',6',7'-tetrahydrobenzoxazole-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
5	3-{[quinoline-3'yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
6	3-{[(1',3'-benzothiazole-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
7	3-{[(2'naphtyl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
8	3-{[(benzothiophene-2'-yl)methyl] amino}-5-ethyl-6-methylpyridin-2(1H)-one
9	3-{[quinoline-2'yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
10	3-{[(1'-benzopyran-4'-one-3'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
11	3-{[(3',4'-diazobenzofuran-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
12	3-naphthalene-5- ethyl-6-methylpyridin-2(1H)-one
13	3-{[(5'-phenyl-oxazole-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
14	3-{[(4'-quinozolone-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
15	3-{[(1',3'-naftoxazol-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
16	3-{[(indol-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
17	3-benzylamino-5-ethyl-6-methylpyridin-2(1H)-one
18	3-{[(quinazolin-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
19	3-[(1',2',3',4'-tetrahydronaphtalene)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
20	3-{[(1',4'-naftoxazole-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
21	3-{[(pyridine-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
22	3-{[(indol-3'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
23	3-{[(furan-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
24	3-{[(5'-azabenzofuran-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
25	3-{[(6'-azabenzofuran-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one
26	3-{[(pyridine-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one

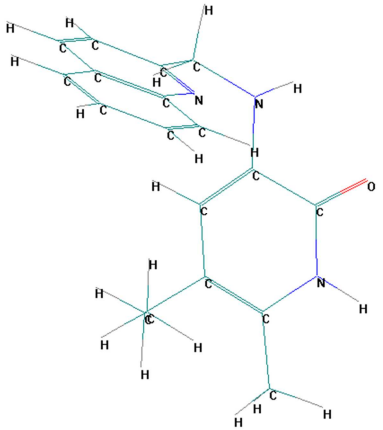
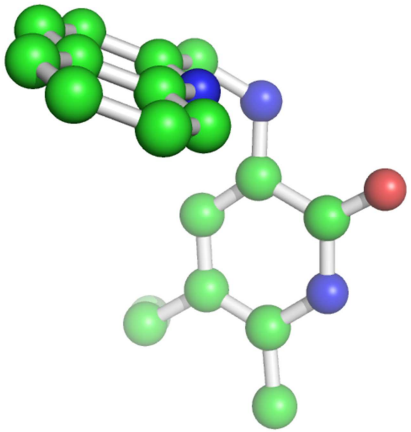
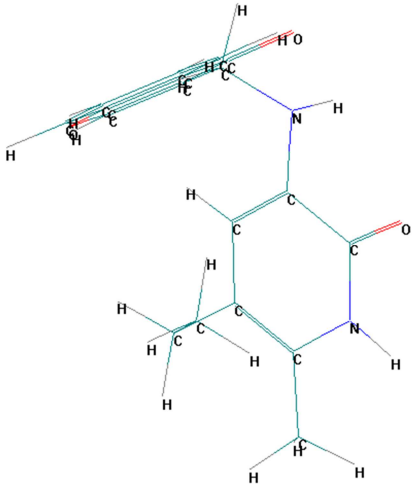
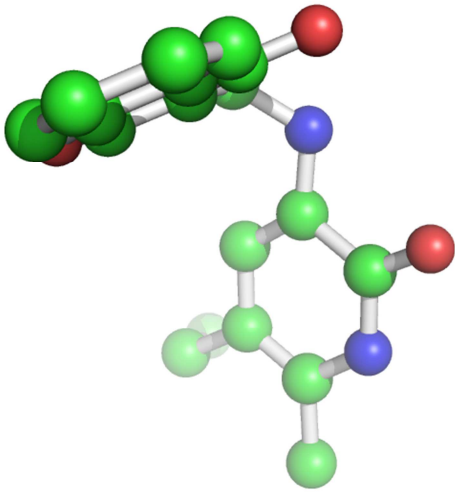
Lampiran 2. Struktur hasil optimasi menggunakan program HyperChem

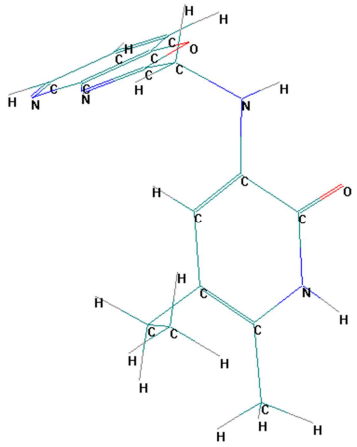
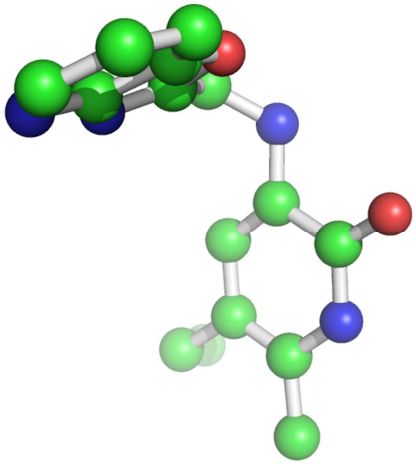
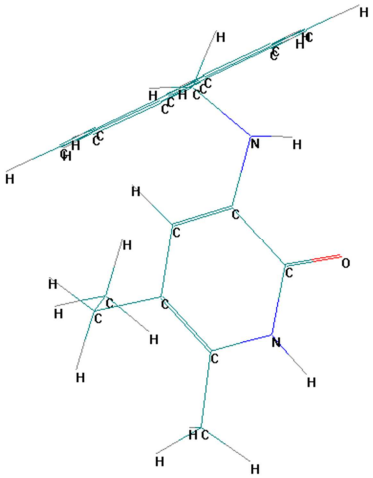
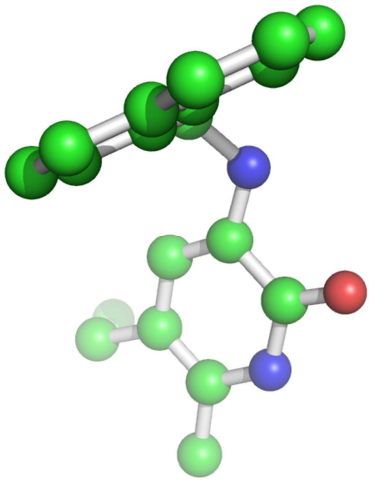
No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
1	3-(aminomethyl)phtahlimide-5-ethyl-6-methylpyridin-2(1H)-one			-92053.843
2	3-{[(benzoxazole-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-81699.794

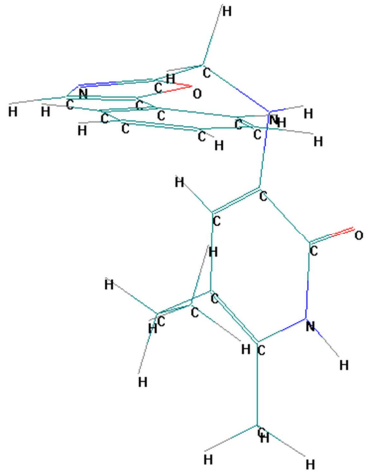
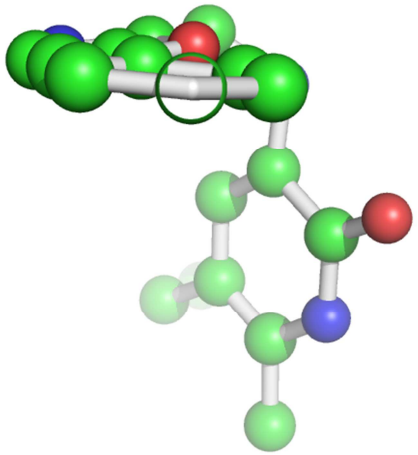
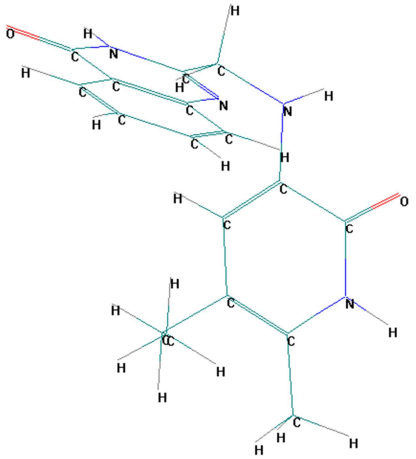
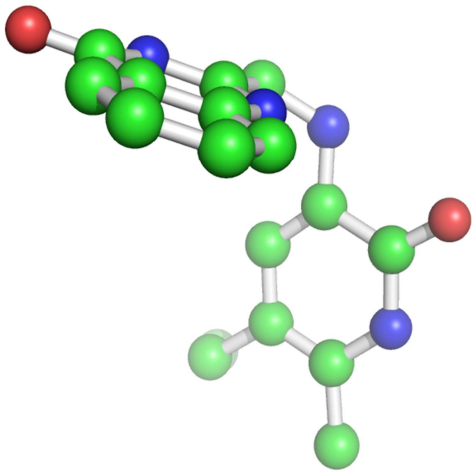
No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
3	3-{[(benzofuran-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-80201.187
4	3-[(4',5',6',7'-tetrahydrobenzoxazole-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-82997.401

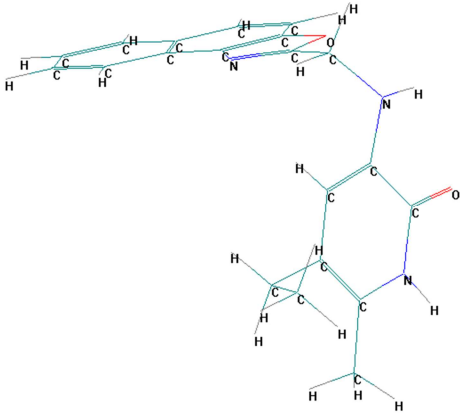
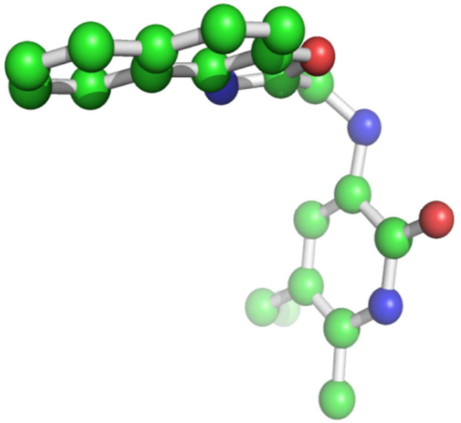
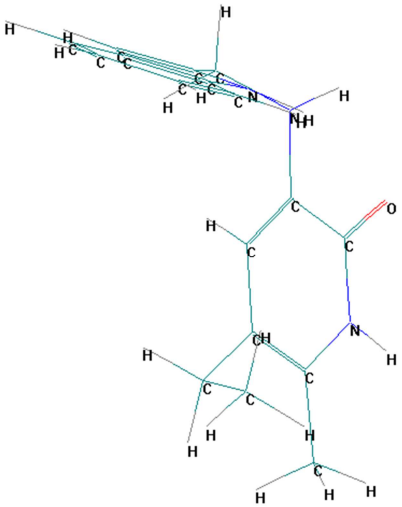
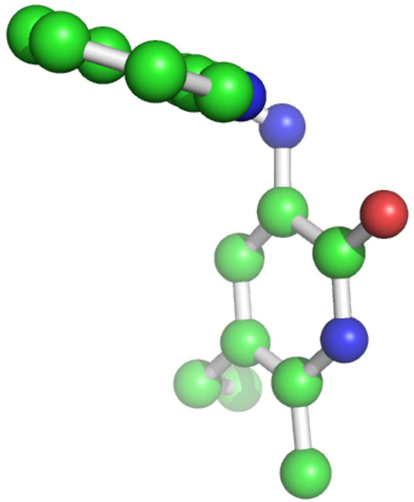
No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
5	3-{[quinoline-3'yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-80875.359
6	3-{[(1',3'-benzothiazole-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-78816.119

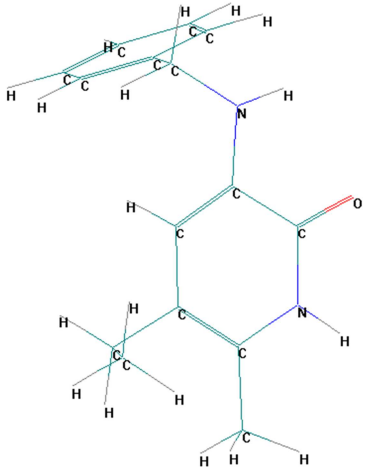
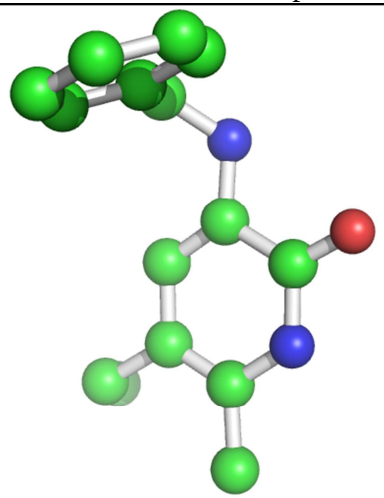
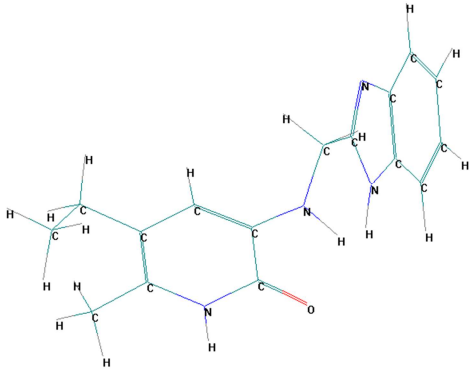
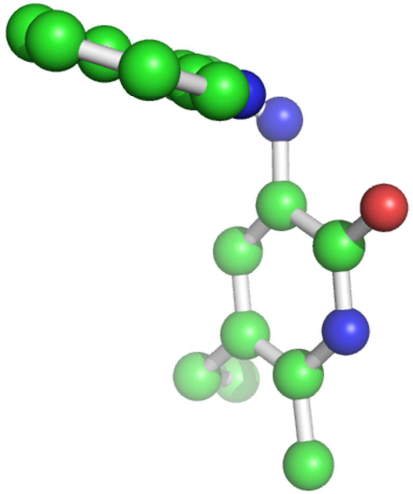
No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
7	3-{[(2'naphtyl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-79377.598
8	3-{[(benzothiophene-2'-yl)methyl] amino}-5-ethyl-6-methylpyridin-2(1H)-one			-77318.849

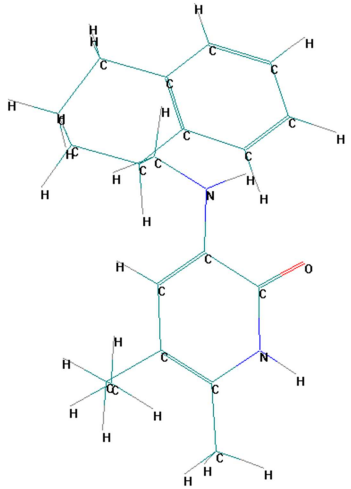
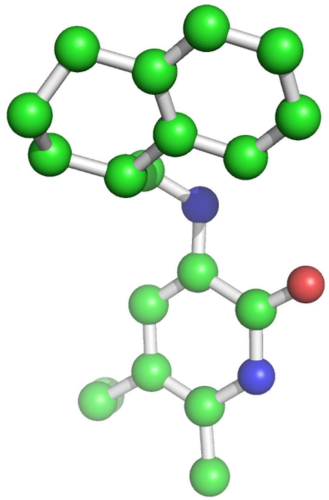
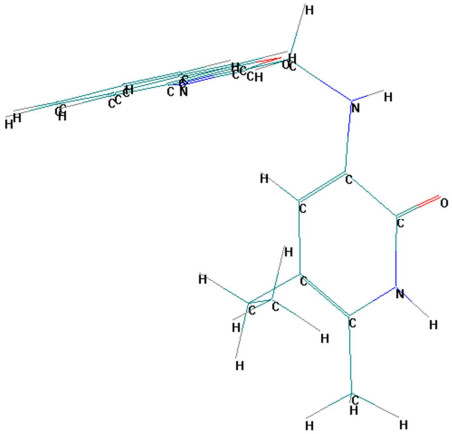
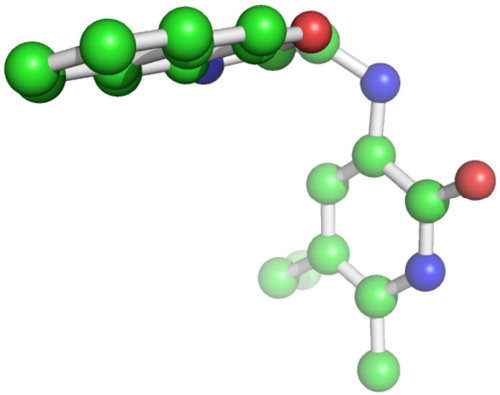
No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
9	3-{[quinoline-2'yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-80873.708
10	3-{[(1'-benzopyran-4'-one-3'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-90550.798

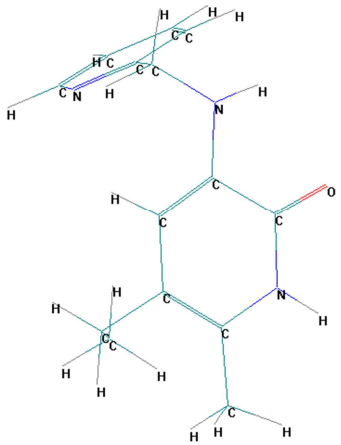
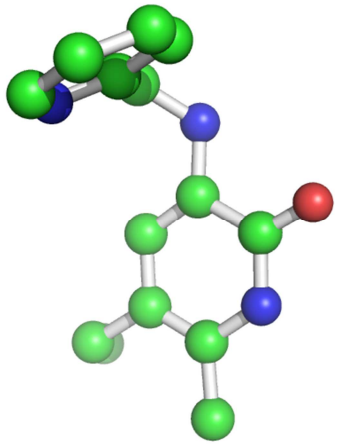
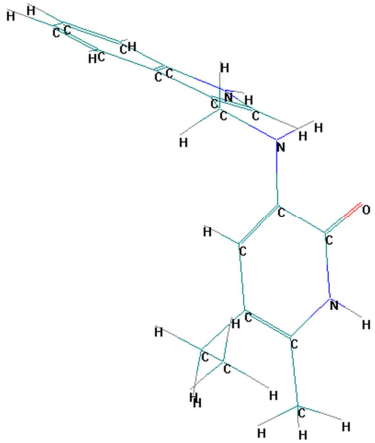
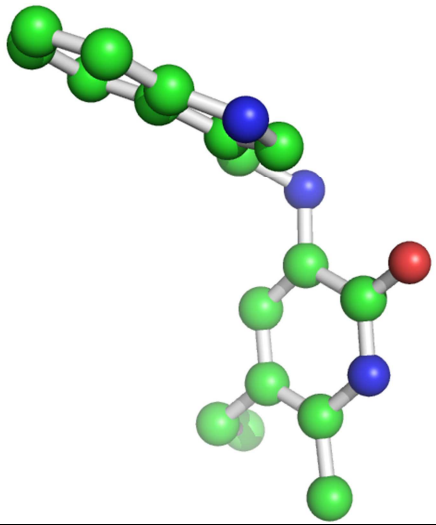
No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
11	3-{[(3',4'-diazobenzofuran-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-83192.940
12	3-naphthalene-5- ethyl-6-methylpyridin-2(1H)-one			-79375.318

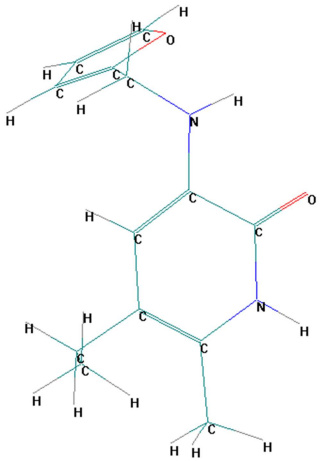
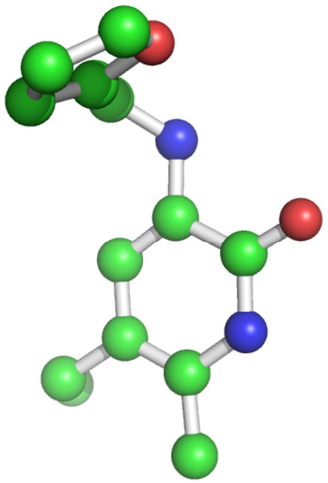
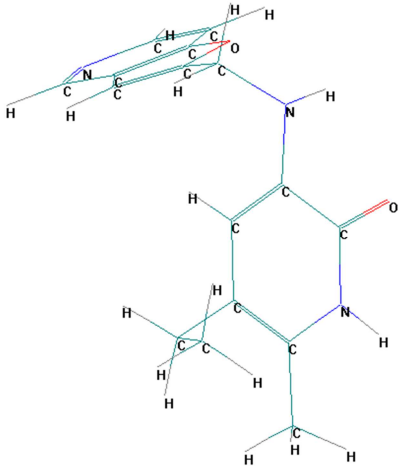
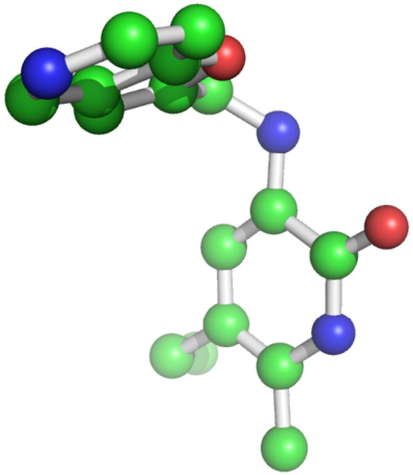
No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
13	3-{[(5'-phenyl-oxazole-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-88236.541
14	3-{[(4'-quinozolone-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-89771.061

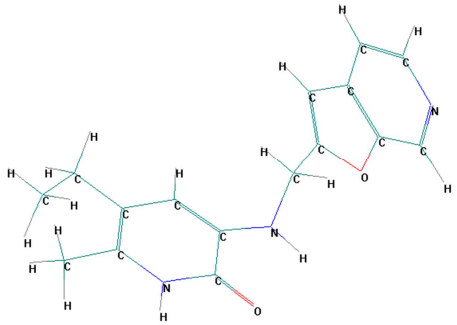
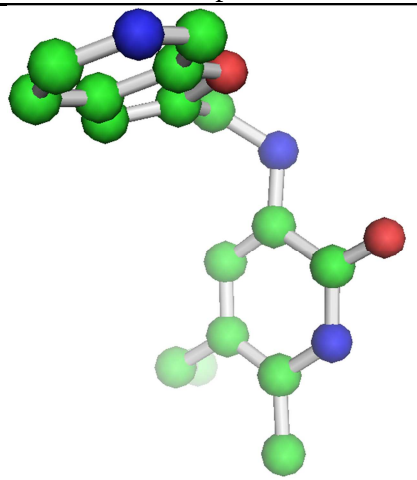
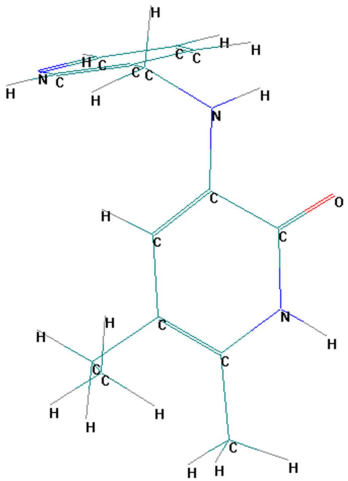
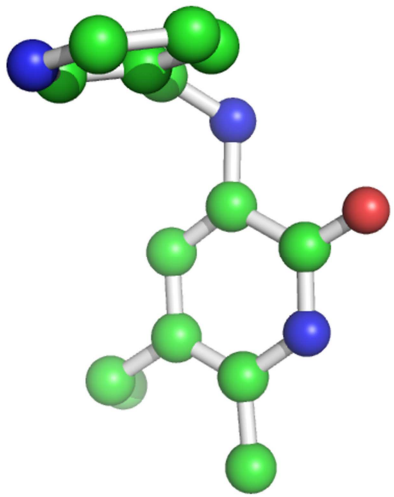
No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
15	3-{[(1',3'-naftoxazol-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-94139.974
16	3-{[(indol-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-77918.154

No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
17	3-benzylamino-5-ethyl-6-methylpyridin-2(1H)-one			-66937.733
18	3-{[(quinazolin-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-79415.161

No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
19	3-[(1',2',3',4'-tetrahydronaphtalene)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-80672.689
20	3-{[(1',4'-naftoxazole-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-94138.225

No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
21	3-{[(pyridine-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-68435.573
22	3-{[(indol-3'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-77916.125

No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
23	3-{[(furan-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-67761.234
24	3-{[(5'-azabenzofuran-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-81699.309

No	Nama Senyawa	Gambar struktur optimasi 2D	Gambar struktur optimasi 3D	ΔG (kkal/mol)
25	3-{[(6'-azabenzofuran-2'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-77875.923
26	3-{[(pyridine-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one			-68436.844

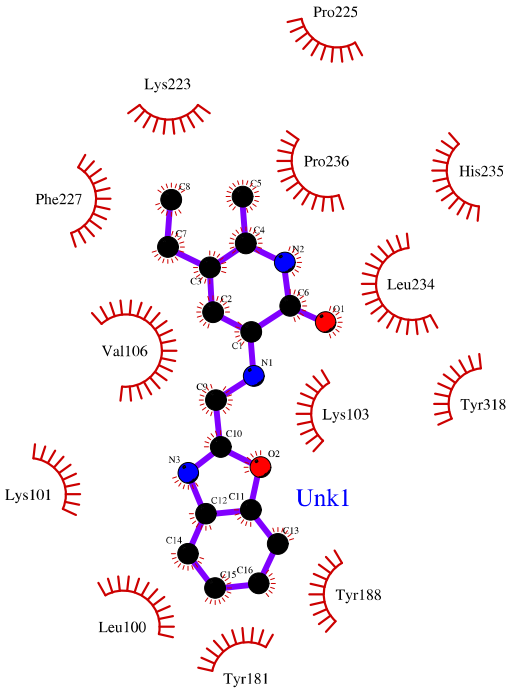
Lampiran 3. Pola interaksi 26 senyawa turunan 3-aminopiridin-2(1H)-on dengan asam amino sesuai jenis interaksinya pada enzim HIV-1

No.	Turunan	Interaksi Hidrofobik	Interaksi Hidrogen
1.	Turunan 1	Asn265, Gln 269, Trp269, Met230, Tyr232, Ile94, His94, Ile382, dan Lys350.	Glu378
2.	Turunan 2	Pro225, Pro236, His235, Leu234, Tyr318, Lys103, Tyr188, Tyr181, Leu100, Lys101, Val106, Phe227, dan Lys223.	
3.	Turunan 3	Lys22, Lys20, Asn57, Val21, Gln23, Pro140, Gly141, Pro52, Arg143, Tyr56, dan Pro55.	Thr131
4.	Turunan 4	Pro225, Ser105, Pro236, Val106, Lys223, Phe227, His235, Tyr188, Leu234, Leu100, Tyr181, Tyr318, Lys103, dan Lys104.	
5.	Turunan 5	Lys22, Val21, Lys20, Pro55, Tyr56, Arg143, Pro 52, Pro140, dan Asn57.	Gly141, Gln23, Thr131.
6.	Turunan 6	Pro236, Val106, Tyr318, Lys101, Tyr181, Tyr188, Leu234, Trp229, Pro95, Leu100, His235, dan Lys103.	
7.	Turunan 7	Pro236, Leu100, Tyr181, Val179, Glu190, Tyr188, Tyr318, Leu234, Pro225, His235, Phe227, Ser105, Lys104, dan Val106.	Lys103
8.	Turunan 8	Pro225, His235, Ser105, Pro236, Lys104, Leu100, Val179, Gly190, Tyr181, Tyr188, Tyr318, Phe227, Val106, dan Leu234.	Lys103
9.	Turunan 9	Leu100, Tyr181, Trp229, Tyr188, Val108, Leu234, Phe227, Val106, Tyr318, dan Lys103	Lys101
10.	Turunan 10	Asn265, Gln 269, Ser268, Glu378, Val381, Tyr232, , His96, dan Ile382	Lys350, Ile94
11.	Turunan 11	Pro236, His235, Ser105, Lys223, Phe227, Val106, Leu100, Lys101, Tyr181, Tyr318, Tyr188, dan Leu234.	Lys103, Lys104
12.	Turunan 12	Pro236, Lys103, Val106, Leu234, Phe227, Tyr181, Tyr188, Leu100, Lys101, dan Tyr318	
13.	Turunan 13	Pro236, Pro225, Val106, His235, Phe227, Tyr188, Leu234, Pro95, Trp229, Leu100, Tyr181, Lys103, dan Tyr318.	Lys101
14.	Turunan 14	Lys311, Arg307, Leu310, Gln242, Thr240, Pro243, Glu233, Pro313, dan Leu246.	Tyr271, Ile244, Val241.
15.	Turunan 15	Lys311, Arg307, Leu310, Gln242, Thr240, Pro243, Glu233, dan Pro313.	Tyr271, Ile244, Val241.

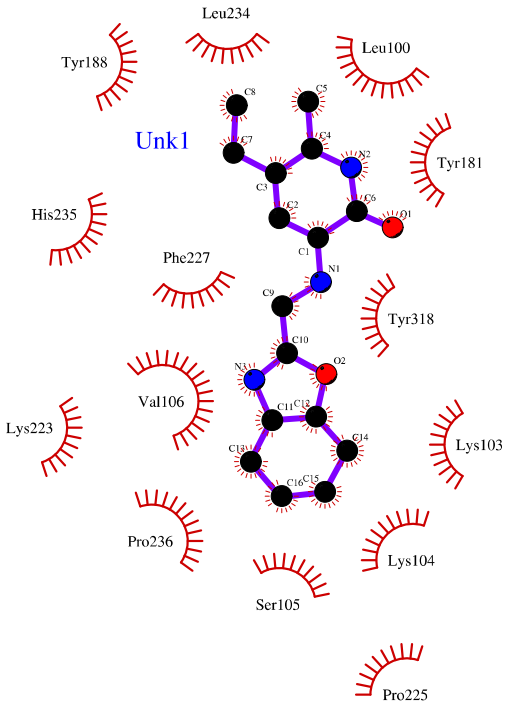
16. Turunan 16	Pro236, Tyr318, His235, Pro225,Lys223, Phe227, Ser105, Val106, Leu234, Tyr188, Tyr181, Lys101, Val179, dan Lys104.	Lys103
17. Turunan 17	Tyr318, His235, Phe227, Leu234, Trp229, Tyr188, Leu100, Tyr181, Lys103, dan Val106.	Lys101
18. Turunan 18	Pro236, Lys103, Leu100, Pro95, Trp229, Tyr188, Tyr181, Leu234, Val106, Lys101, His235, dan Tyr318.	
19. Turunan 19	Asn265, Ser268, Glu378, Lys353, Tyr339, Gly352, His96, Ile94, Trp266, dan Ile382.	Lys350
20. Turunan 20	Pro236, Ser105, Lys104, Val106, Leu234, Lys103, Tyr318, Val179, Leu100, Tyr181, His235, Phe227, Lys223, dan Pro225.	Lys101
21. Turunan 21	Pro236, Val106, Phe227, Leu234, Tyr318, Tyr188, Leu100, Tyr181, Val179, His235, dan Lys104.	Lys103
22. Turunan 22	Pro236, Lys103, Tyr188, Tyr181, Leu100, Pro95, Trp229, Leu234, Val106, His235 Phe227, dan Tyr318.	Lys101
23. Turunan 23	Val106, Phe227, Lys103, Leu100, Trp229, Leu234, Tyr181, Tyr188, dan Tyr 318.	Lys101
24. Turunan 24	Val241, Lys311, Arg307, Pro243, Leu246, dan Leu310.	Tyr271, Ile244
25. Turunan 25	Pro236, His235, Phe227, Leu234, Lys104, Tyr318, Val106, Leu100, Val189, Val179, Glu190, Tyr181, dan Pro225.	Lys103, Tyr188
26. Turunan 26	Lys22, Gln23, Asn57, Val21, Lys20, Tyr56, Pro55, Pro140, Gly141, dan Arg143.	Thr131

Lampiran 4. Pola interaksi 17 senyawa turunan senyawa 3-aminopiridin-2(1H)-on menempati daerah penghambatan yang sama dengan ligan pada daerah (a) enzim RT HIV-1.

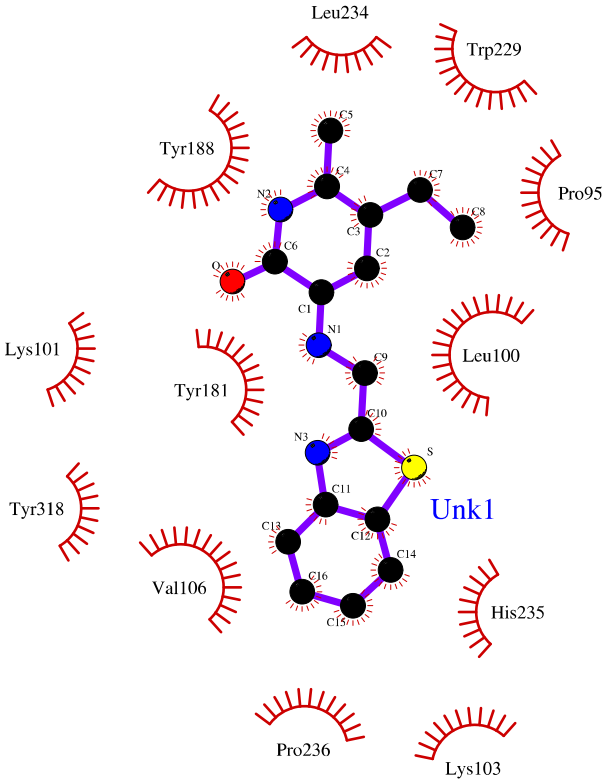
2. 3-{[(benzoxazole-2'-yl)methyl]amino}5-ethyl-6-methylpyridin2(1H)-one



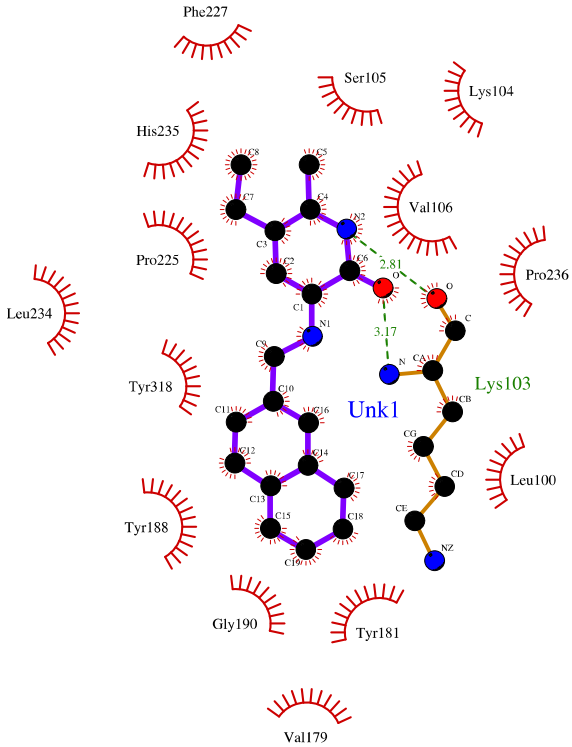
4. 3-[(4',5',6',7'-tetrahydrobenzoxazole-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



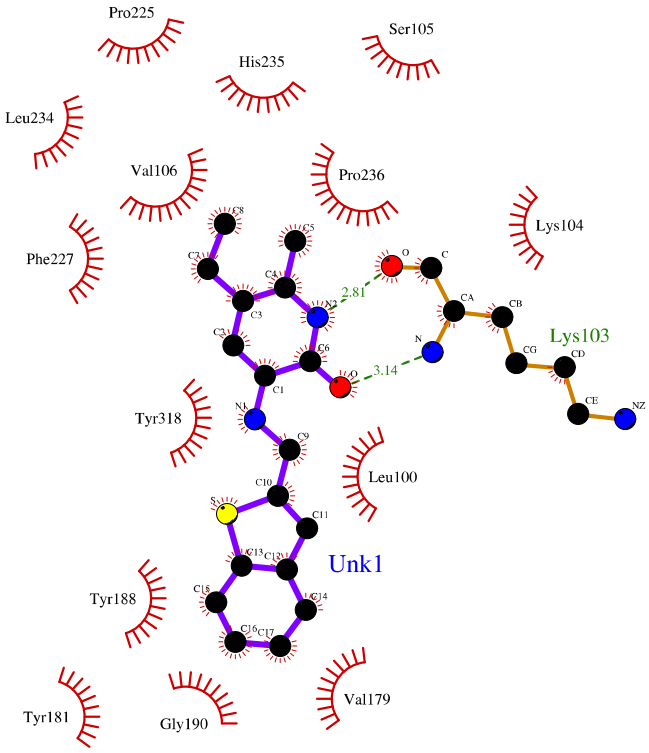
6. 3-{[(1’,3’-benzothiazole-2’-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



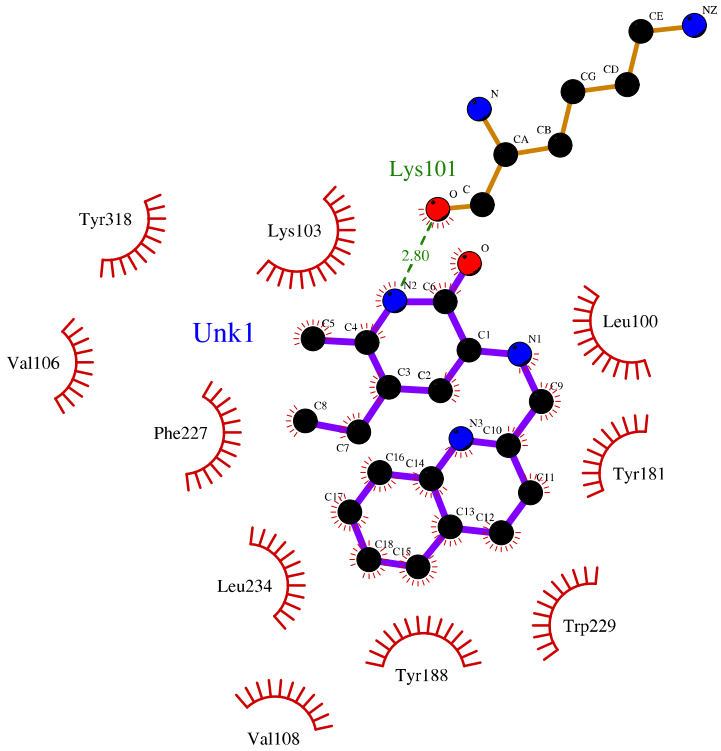
7. 3-{[(2’naphtyl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



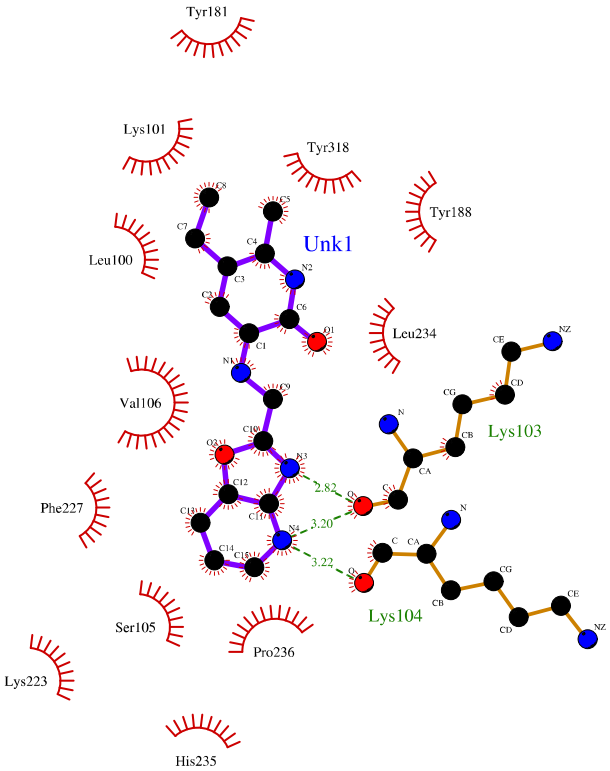
8. 3-{[(benzothiophene-2’-yl)methyl] amino}-5-ethyl-6-methylpyridin-2(1H)-one



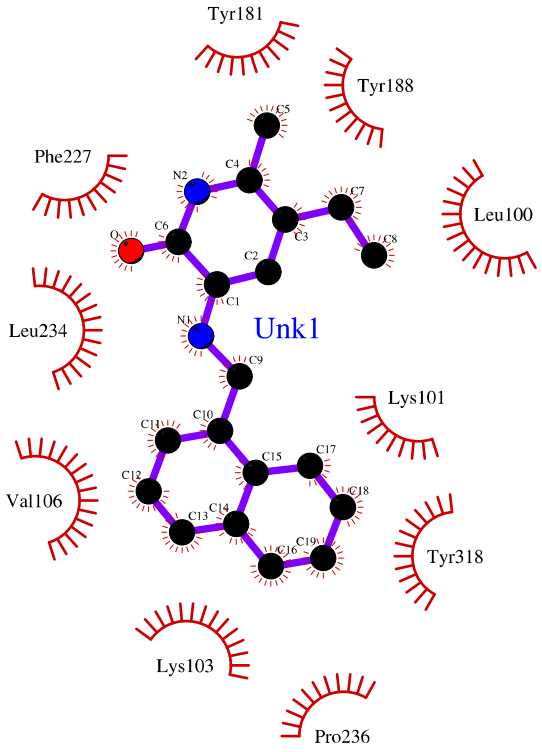
9. 3-{[quinoline-2’yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-on



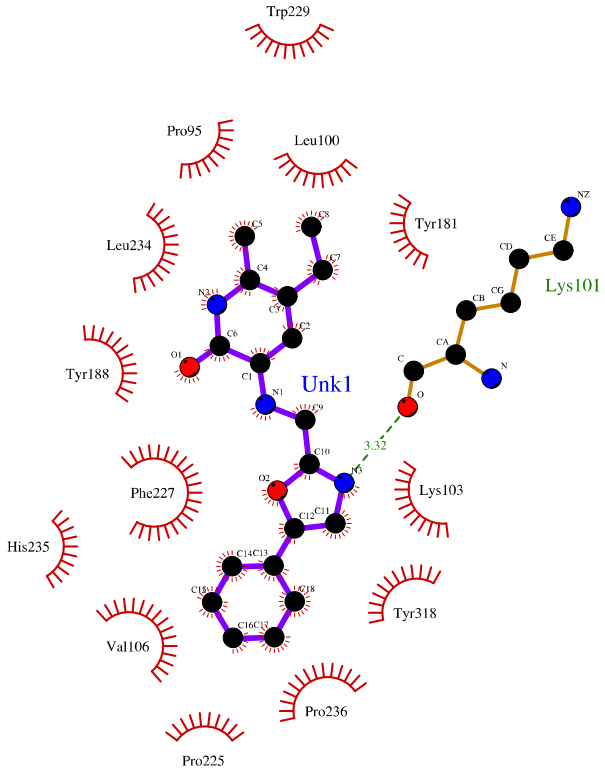
11. 3-{[(3’,4’-diazobenzofuran-2’-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



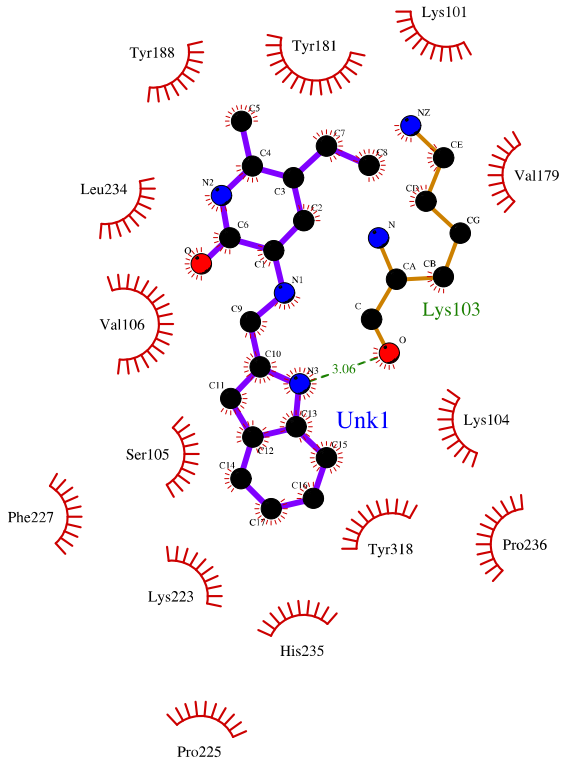
12. 3-naphthalene-5- ethyl-6-methylpyridin-2(1H)-one



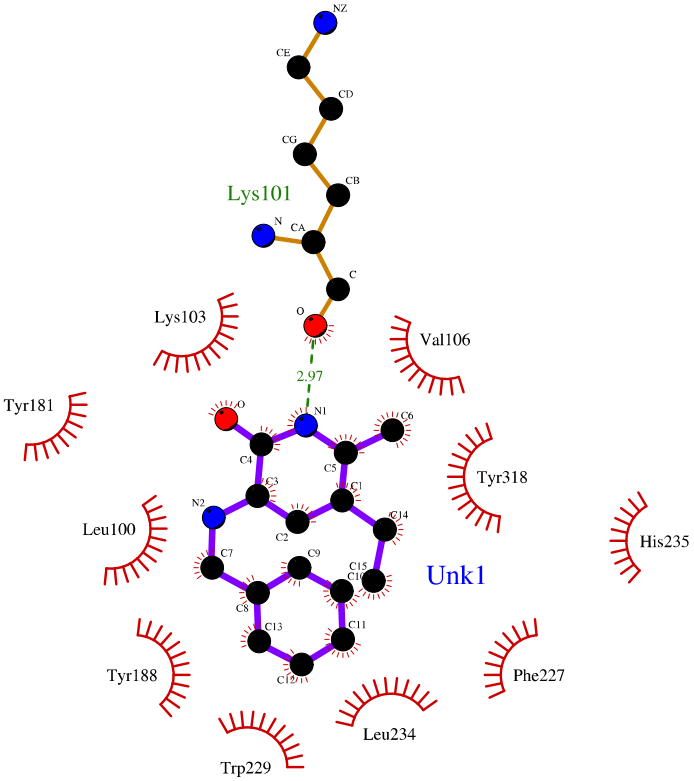
13. 3-{[(5’-phenyl-oxazole-2’-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



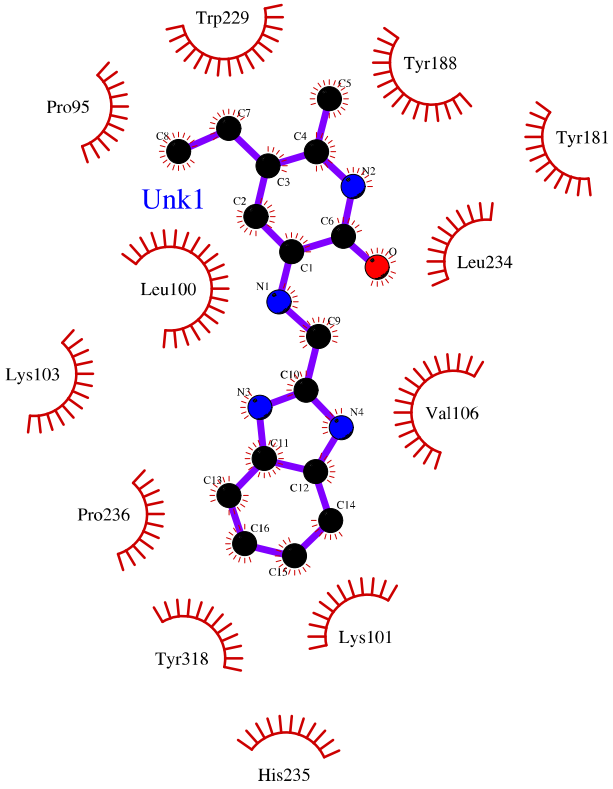
16. 3-{[(indol-2’-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



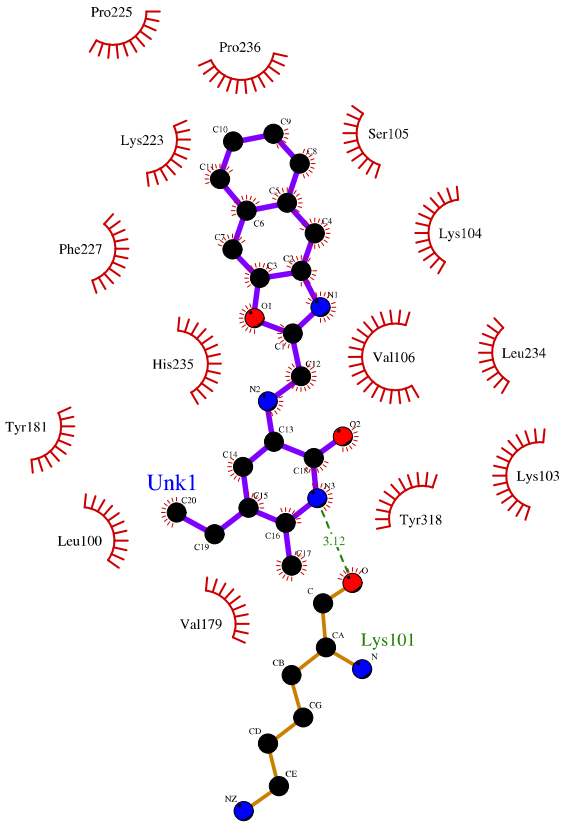
17. 3-benzylamino-5-ethyl-6-methylpyridin-2(1H)-one



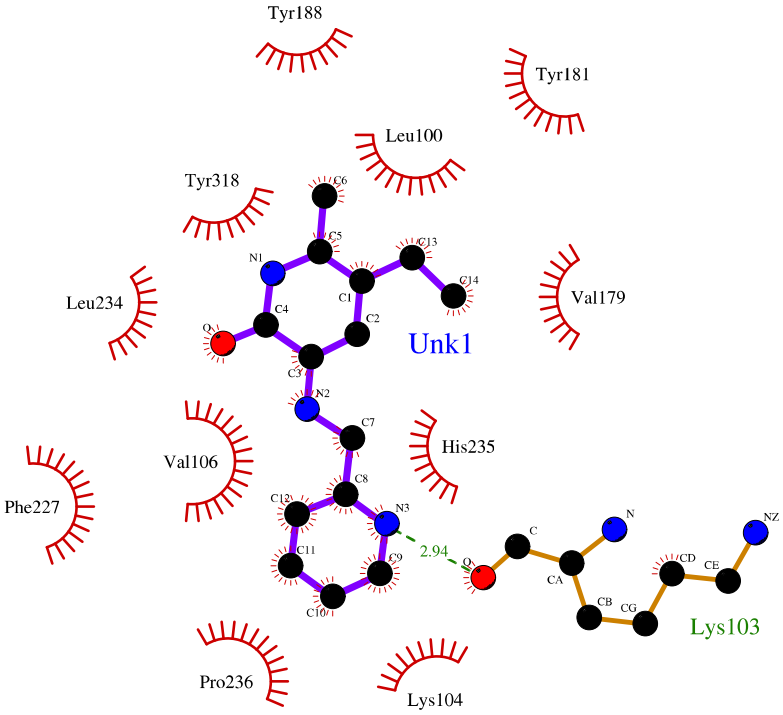
18. 3-{[(quinazolin-2'-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



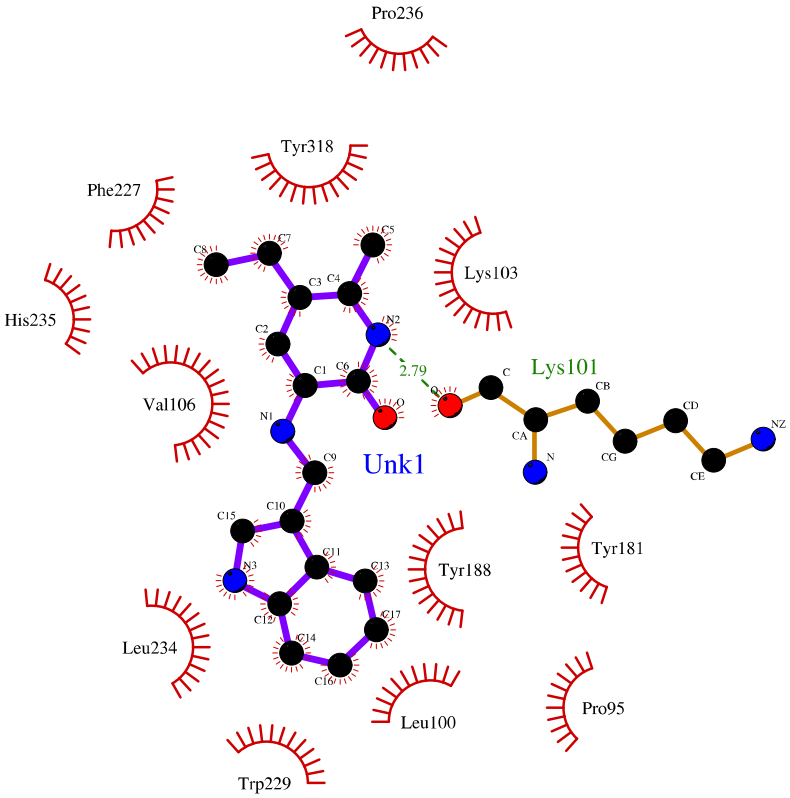
20. 3-{[(1’,4’-naftoxazole-2’-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



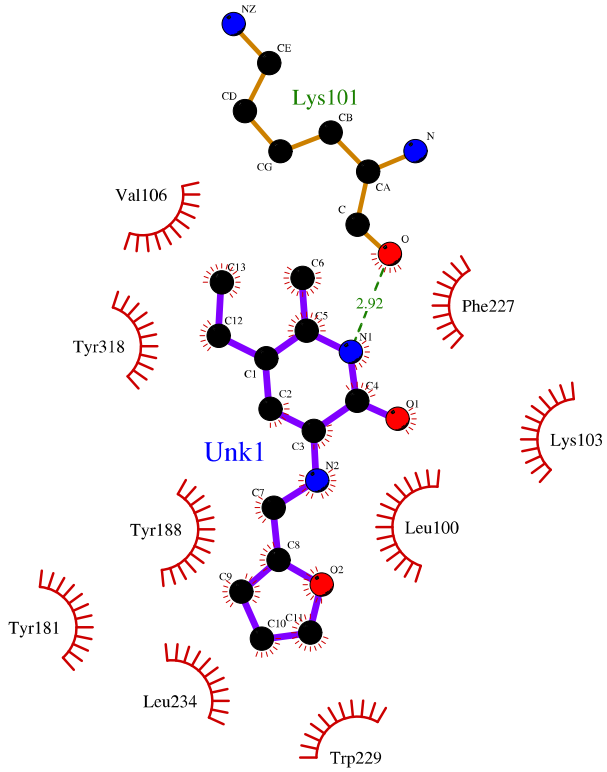
21. 3-{[(pyridine-2’-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



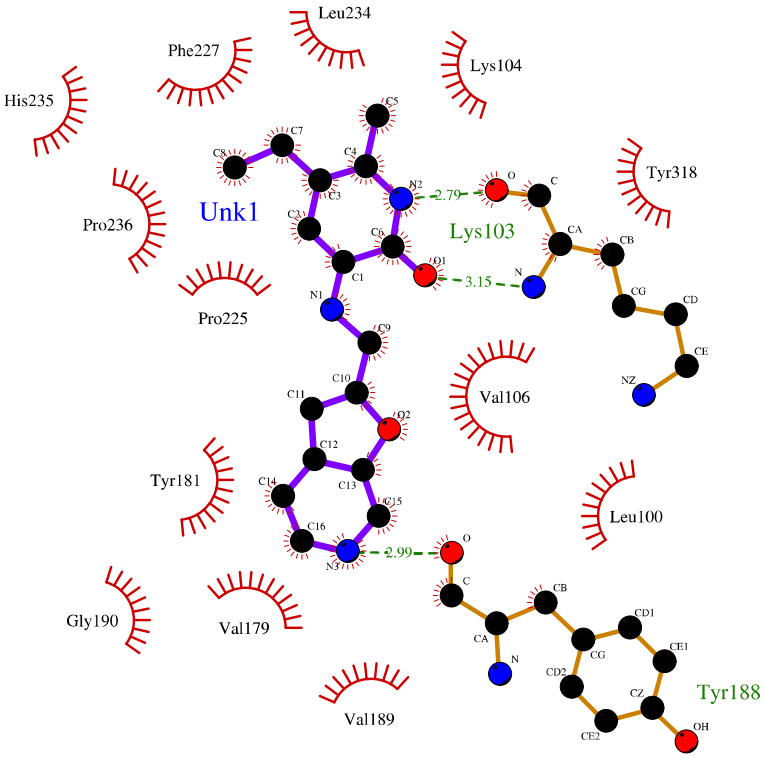
22. 3-{[(indol-3’-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



23. 3-{[(furan-2’-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one

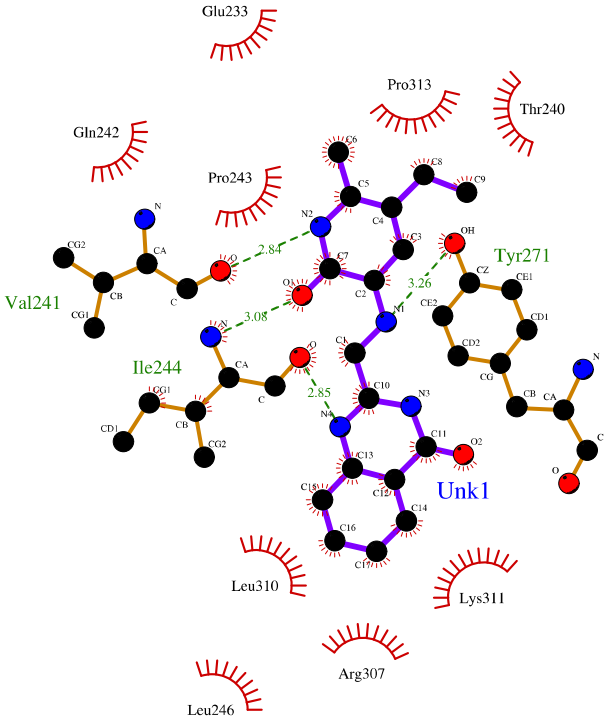


25. 3-{[(6’-azabenzofuran-2’-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one

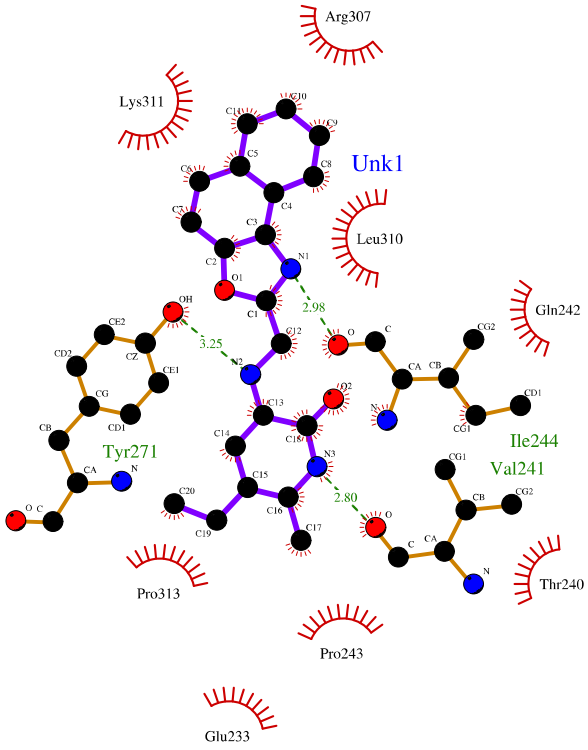


Lampiran 5. Pola interaksi 3 senyawa turunan 3-aminopiridin-2(1H)-on terhadap *binding site* RT HIV-1 pada daerah (b).

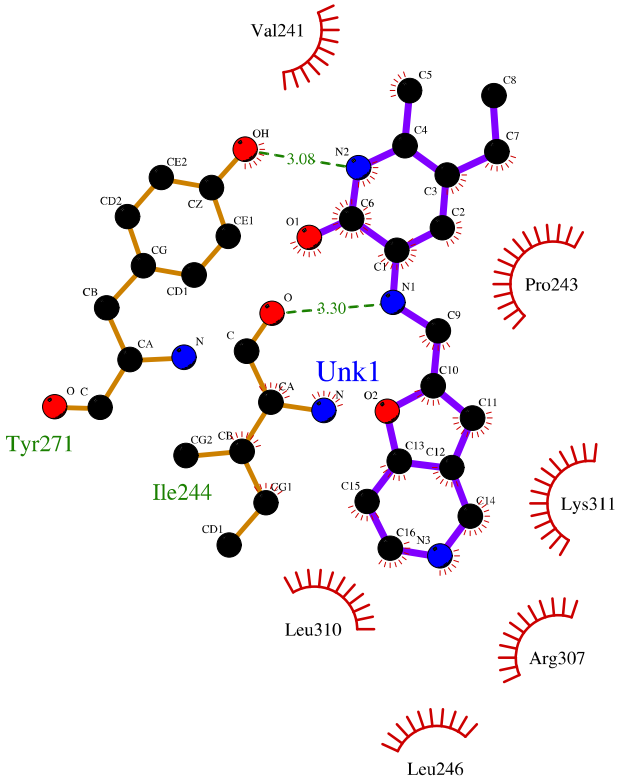
14. 3-{[(4’-quinozolone-2’-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



15. 3-{[(1’,3’-naftoxazol-2’-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-on

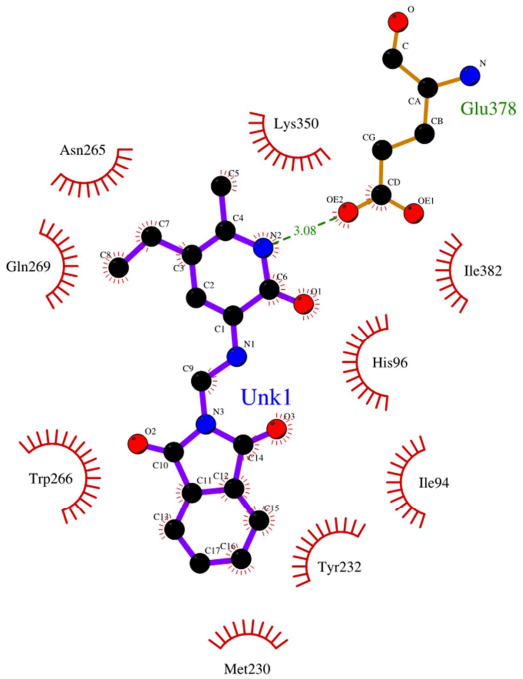


24. 3-{[(5’-azabenzofuran-2’-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one

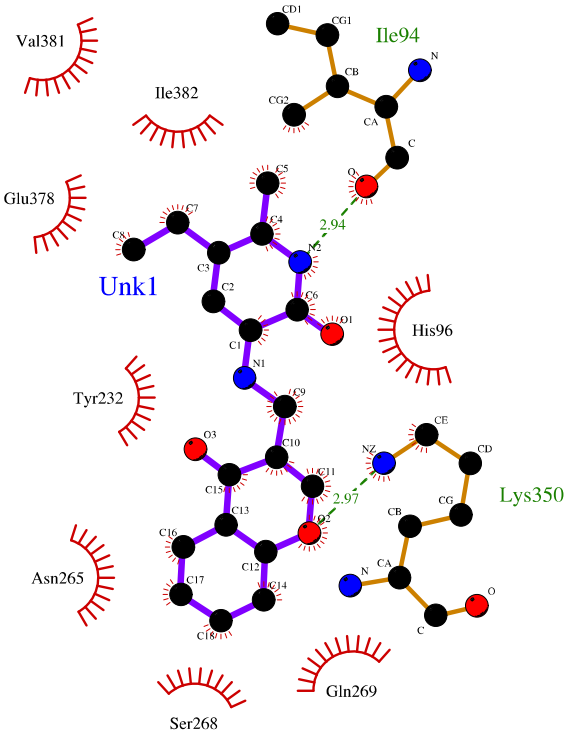


Lampiran 6. Pola interaksi 3 senyawa turunan 3-aminopiridin-2(1H)-on terhadap *binding site* RT HIV-1 pada daerah (c).

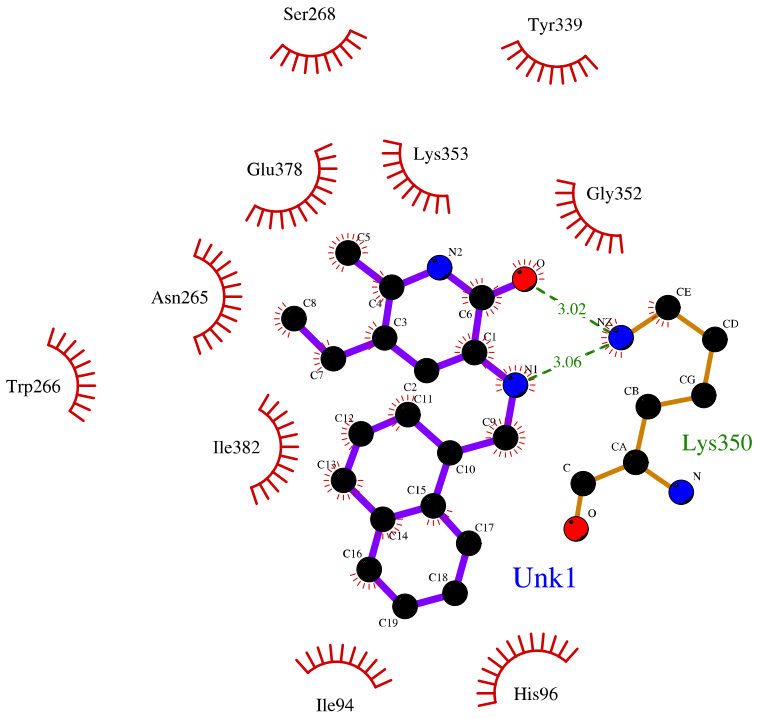
1. 3-(aminomethyl)phtahlimide-5-ethyl-6-methylpyridin-2(1H)-one



10. 3-{[(1'-benzopyran-4'-one-3'-yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one

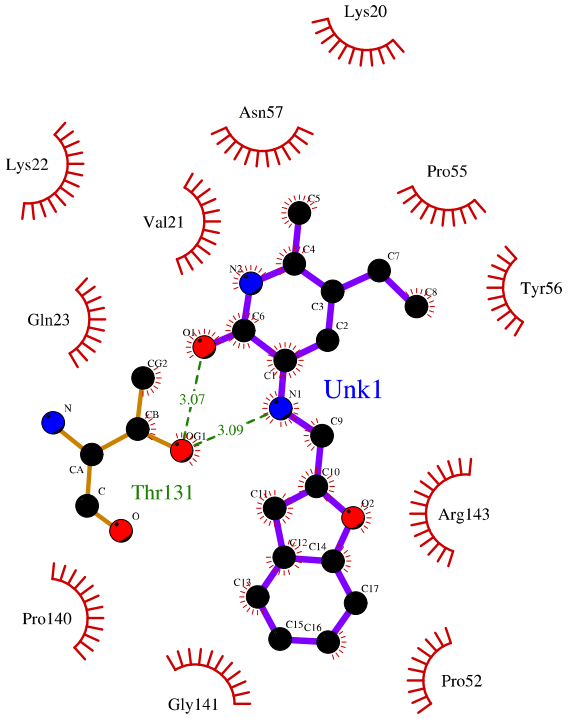


19. 3-[(1’,2’,3’,4’-tetrahydronaphtalene)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one

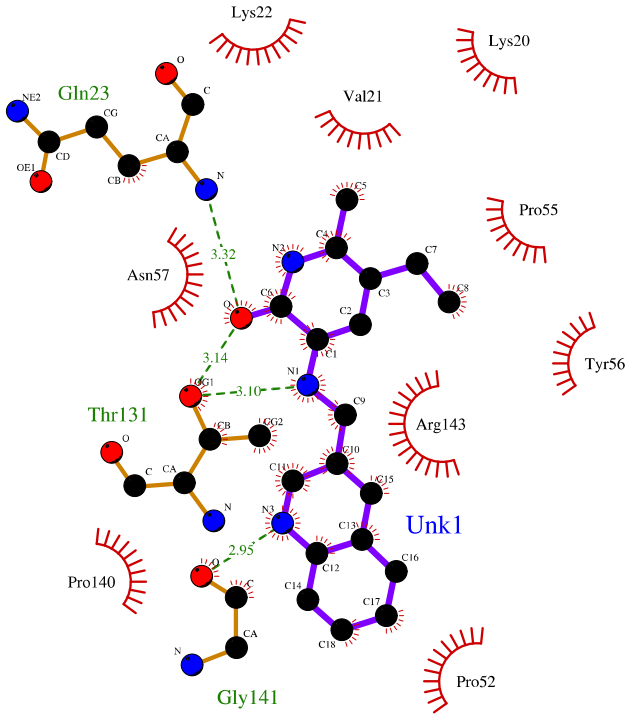


Lampiran 7. Pola interaksi 3 senyawa turunan 3-aminopiridin-2(1H)-on terhadap *binding site* RT HIV-1 pada daerah (d)**.**

3. 3-{[(benzofuran-2’-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



5. 3-{[quinoline-3’yl) methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one



26. 3-{[(pyridine-2’-yl)methyl]amino}-5-ethyl-6-methylpyridin-2(1H)-one