**Supplementary Tables**

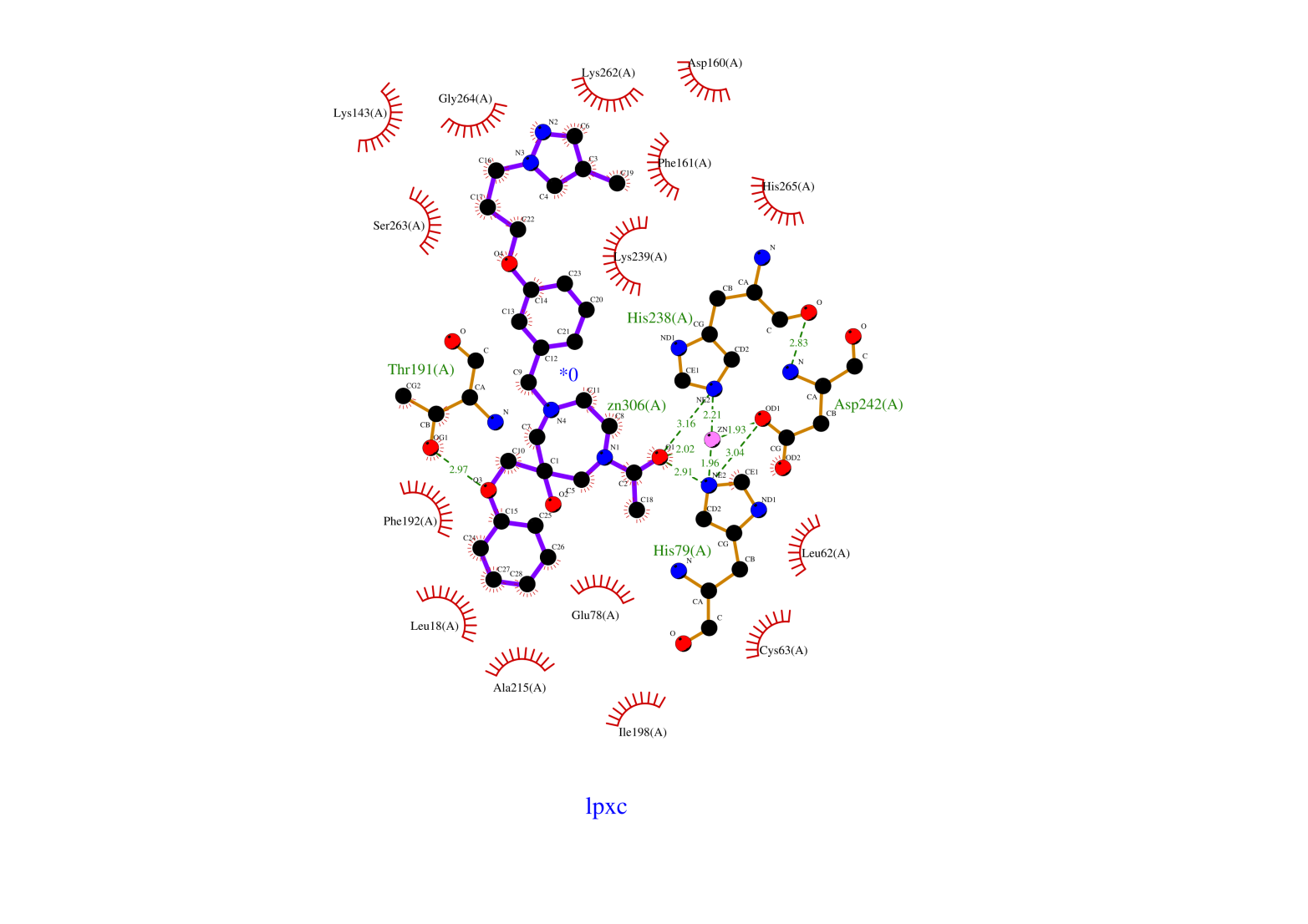
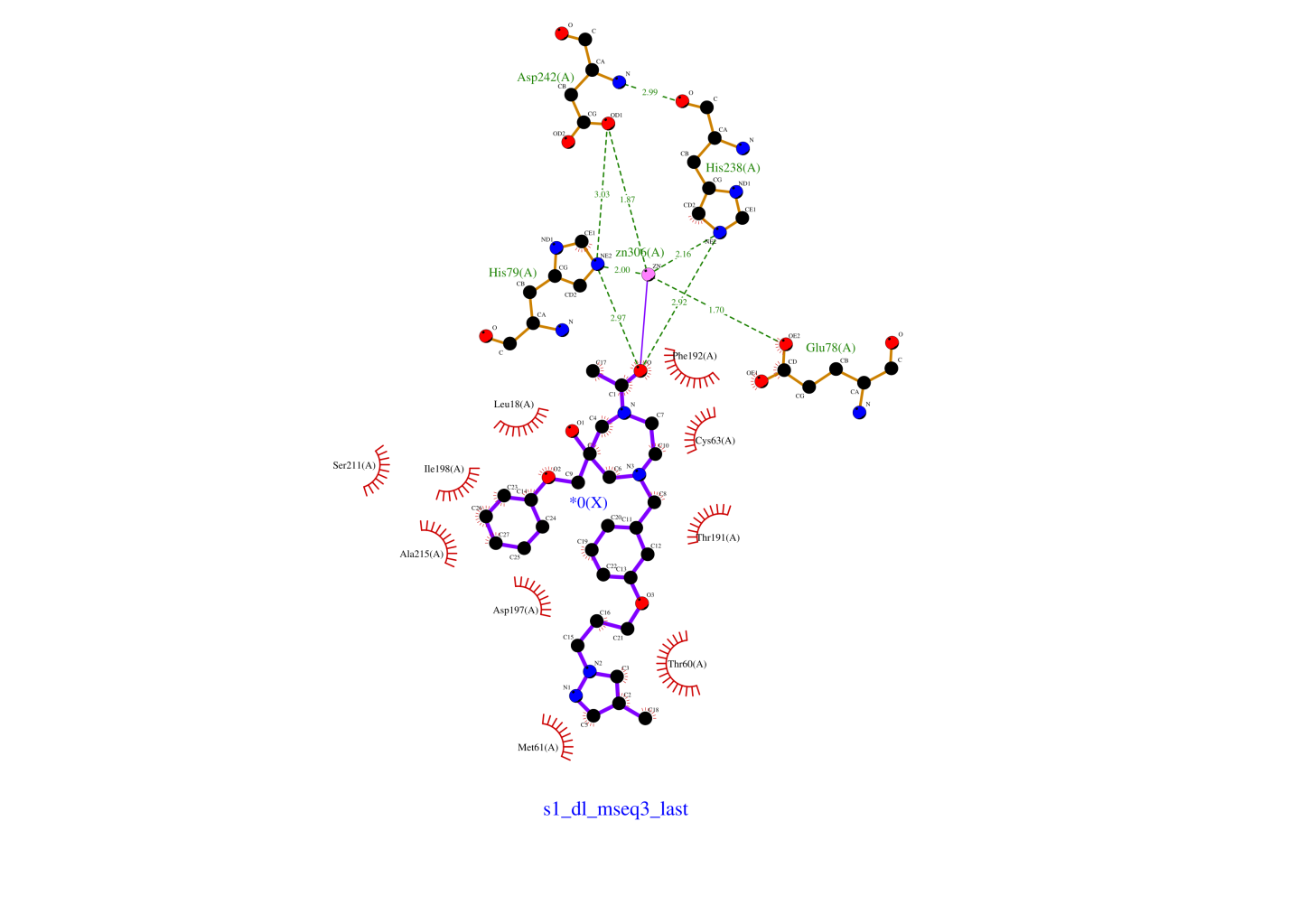
**Table 1.** All 103 molecules obtained after running all the three pharmacophoric model schemes under lead-like and drug-like filtering options.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scheme3\_leadlike** | **molecule** | **smiles** | **mseq** | **S** | **Ligand properties** | | | | | | **don** | **acc** |
|  |  |  |  |  | **toxic** | **Weight (g/mol)** | **TPSA (A^2)** | **logP** | **logD (pH=7)** | **logS** |  |  |
| 1 | ZINC04097895 | O([C@H]1[C@H](O)[C@@H](O)[C@H](O)[C@@H](CO)O1)c1cc([O-])c2C(=O)C[C@@H](c3ccc(O)cc3)Oc2c1 | 2217 | -11.8804 | no | 433.39 | 168.97 | 0.36 | 0.32 | -2.93 | 5 | 10 |
| 2 |  | O=C([O-])CN(C(=O)c1cc2[C@@H]3O[C@H](C)CC[C@H]3[C@](CCCC(O)(C)C)(C)Oc2cc1)Cc1c(OC)cccc1 | 782 | -11.7913 | no | 538.66 | 108.36 | 4.12 | 4.12 | -6.34 | 1 | 7 |
| 3 |  | Fc1cc(CCN(C(=O)c2cc3[C@@H]4O[C@H](C)CC[C@H]4[C@@](CCCC(O)(C)C)(C)Oc3cc2)CC(=O)[O-])ccc1 | 783 | -11.2115 | no | 540.65 | 99.13 | 4.44 | 4.44 | -6.55 | 1 | 6 |
| 4 |  | O=C([O-])c1ccc(-c2oc(/C=C(\C#N)/C([NH-])=C(C#N)C#N)cc2)cc1 | 1545 | -11.1973 | no | 328.29 | 124.64 | 3.76 | 3.74 | -6.09 | 1 | 6 |
| 5 |  | S(=O)(=O)(N=Nc1ccc(N(O)[O-])cc1)c1ccc(NC(=O)C)cc1 | 1366 | -11.1739 | Yes (unsub het-het) | 349.35 | 134.49 | 1.89 | 1.86 | -4.11 | 2 | 7 |
| 6 |  | O=C([O-])c1cc(C(=O)[O-])cc(-c2oc(/C=C(\C#N)/C([NH-])=C(C#N)C#N)cc2)c1 | 1606 | -11.0221 | no | 371.29 | 164.77 | 3.06 | 3.04 | -6.40 | 1 | 8 |
| 7 |  | O=C([O-])C(C(=O)[O-])(CCCCCCCCCCCCCO)C | 1304 | -11.0158 | no | 314.42 | 100.49 | 3.83 | 3.84 | -4.61 | 1 | 5 |
| 8 | ZINC31163718 | O=C(OC[C@@H]1[C@@H](O)[C@H](O)[C@@H](O)[C@H](OC2=C(C)OC=CC2=O)O1)C[C@@](O)(CC(=O)[O-])C | 2176 | -11.0068 | Yes (unsub unsat alkoxy) | 431.37 | 192.11 | -1.09 | -1.09 | -1.81 | 4 | 10 |
| 9 | ZINC35457471 | Clc1c([O-])cc(O)c2C(=O)O[C@H](C)C[C@H](O)/C=C/[C@H](O)CCC(=O)Cc12 | 2179 | -10.8992 | no | 383.80 | 127.12 | 1.97 | 1.97 | -3.71 | 3 | 6 |
| 10 |  | O=C(Nc1ccc(Oc2cnccc2)cc1)CN1C[C@@H](Oc2ccc(C(=O)[O-])cc2)[C@H](O)C1 | 758 | -10.7834 | no | 448.45 | 124.05 | 2.30 | 2.30 | -5.15 | 2 | 7 |
| 11 |  | O=C([O-])c1ccc(C(=O)NC[C@H]2[C@@](O)(C)C[C@H](c3ccccc3)C[C@H](O)CCC2)cc1 | 573 | -10.7229 | no | 424.52 | 109.69 | 3.08 | 3.09 | -5.02 | 3 | 5 |
| 12 | ZINC31156015 | O(C(C)(C)[C@@H]1Oc2c(c([O-])c3C(=O)C=C(C)Oc3c2)C1)[C@H]1[C@@H](O)[C@H](O)[C@H](O)[C@H](CO)O1 | 2182 | -10.6576 | no | 437.42 | 157.97 | 0.05 | 0.04 | -2.81 | 4 | 9 |
| 13 |  | O=C([O-])CC1(CC(=O)N[C@H]2[C@@H](O)[C@@H](O)[C@H](N3C(=O)NC(=O)C=C3)CC2)CCCC1 | 600 | -10.6424 | no | 408.43 | 159.10 | 0.26 | 0.24 | -2.87 | 4 | 7 |
| 14 | ZINC72320355 | O=C([O-])C=1[C@]2(CO)[C@@H]([C@](CC[C@H](CO)CCO)(C)[C@@H](C)CC2)CCC=1 | 2239 | -10.6155 | no | 353.48 | 100.82 | 3.35 | 3.35 | -3.60 | 3 | 5 |
| 15 |  | O=C([O-])COc1c(OCC)cc(/C=C/2\C(=O)N(c3ccc(C(=O)OC)cc3)N=C\2O)cc1 | 1514 | -10.5794 | no | 439.40 | 137.79 | 3.31 | 3.16 | -5.67 | 1 | 8 |
| 16 |  | Fc1ccc(C2(O)CCN(CC(=O)c3cc4c(N(C(=O)C(C)(C)C)CC4)cc3)CC2)cc1 | 1901 | -10.5623 | no | 438.54 | 60.85 | 3.97 | 3.80 | -5.58 | 1 | 4 |
| 17 |  | Fc1ccc(-c2n(CC(O)CC)nc(-c3c(OC)ccc(CC(=O)[O-])c3)c2)cc1 | 751 | -10.4986 | no | 397.43 | 87.41 | 3.80 | 3.80 | -5.39 | 1 | 5 |
| 18 |  | O=C([O-])c1c(CCc2ccc(OCC[NH3+])cc2)nc(N(CCc2ccccc2)C)nc1 | 764 | -10.4825 | no | 420.51 | 106.02 | -1.95 | 1.29 | -2.58 | 1 | 5 |
| 19 |  | O=C([O-])COCC(=O)N1CCC2(OC[C@@](O)(C)[C@@H](n3c4nc(N)nc(N)c4nc3)C2)CC1 | 677 | -10.4762 | Yes (aromatic amine) | 448.46 | 194.77 | -2.47 | -2.47 | -2.15 | 3 | 9 |
| 20 | ZINC31170345 | O=C([O-])[C@]1(O)[C@H]2OC[C@@]3([C@H](/C(=C(/CO[C@H]4[C@@H](O)[C@H](O)[C@H](O)[C@@H](CO)O4)\C)/CC3)CC1)C2 | 2167 | -10.467 | no | 443.47 | 168.97 | -2.03 | -2.03 | -1.19 | 5 | 10 |
| 21 |  | Clc1ccc([C@H]2O[C@@H](c3c(OC)ccc(C(=O)[O-])c3)C[C@@](NC(=O)CCO)(C)C2)cc1 | 755 | -10.4306 | no | 446.91 | 107.92 | 2.90 | 2.91 | -5.03 | 2 | 6 |
| 22 |  | Clc1cc(/[NH+]=C\2/N(C)C(=O)CC(C(=O)Nc3cc(C(=O)[O-])ccc3)S/2)ccc1 | 1503 | -10.4213 | no | 417.87 | 103.51 | 2.70 | 3.04 | -5.25 | 2 | 4 |
| 23 |  | Fc1ccc([C@H]2O[C@@H](c3c(OCC)cc(C(=O)[O-])cc3)C[C@@](NC(=O)CCO)(C)C2)cc1 | 756 | -10.3837 | no | 444.48 | 107.92 | 2.54 | 2.54 | -4.72 | 2 | 6 |
| 24 |  | O=C([O-])c1c(O)cc(Nc2scc(-c3c(C)nc(N)s3)n2)cc1 | 1626 | -10.3802 | Yes (aromatic amine) | 347.40 | 124.19 | 1.43 | 1.45 | -4.38 | 3 | 5 |
| 25 |  | O=C([O-])COc1ccc(C(=O)N2C[C@@H](O)[C@@H](CC=3N=Cc4n(ccn4)C=3)C2)cc1 | 539 | -10.3653 | no | 395.39 | 120.08 | 1.48 | 1.36 | -4.32 | 1 | 7 |
| **Scheme3\_druglike** | **molecule** | **smiles** | **mseq** | **S** | **Ligand properties** | | | | | | **don** | **acc** |
|  |  |  |  |  | **toxic** | **Weight (g/mol)** | **TPSA (A^2)** | **logP** | **logD (pH=7)** | **logS** |  |  |
| 1 | ZINC31164328 | O=C([O-])c1c(C)c2C(=O)c3c(O)cc(O[C@H]4[C@@H](O)[C@H](O)[C@H](O)[C@H](CO)O4)cc3C(=O)c2cc1[O-] | 3799 | -12.566 | no | 474.37 | 216.94 | 0.48 | 0.54 | -3.91 | 5 | 12 |
| 2 | ZINC04097895 | O([C@H]1[C@H](O)[C@@H](O)[C@H](O)[C@@H](CO)O1)c1cc([O-])c2C(=O)C[C@@H](c3ccc(O)cc3)Oc2c1 | 3846 | -12.1552 | no | 433.39 | 168.97 | 0.36 | 0.32 | -2.93 | 5 | 10 |
| 3 |  | O=C([O-])CN(C(=O)c1cc2[C@@H]3O[C@H](C)CC[C@H]3[C@](CCCC(O)(C)C)(C)Oc2cc1)Cc1c(OC)cccc1 | 1064 | -11.834 | no | 538.66 | 108.36 | 4.12 | 4.12 | -6.34 | 1 | 7 |
| 4 | ZINC31164332 | O=C([O-])c1c(C)c2C(=O)c3c(O)cc(O[C@@H]4[C@@H](O)[C@H](O)[C@H](O)[C@H](CO)O4)cc3C(=O)c2cc1[O-] | 3800 | -11.6335 | no | 474.37 | 216.94 | 0.48 | 0.54 | -3.91 | 5 | 12 |
| 5 | ZINC67910640 | O=C(O[C@H]1[C@@H](OC(=O)C)[C@@H]2[C@@]3(C)[C@@](C)([C@@H]([C@@H](C/C=C/C(O)(C)C)C)CC3)CC[C@@]32[C@]2([C@@H]1[C@@](C(=O)[O-])(C)[C@@H](O)CC2)C3)C | 3821 | -11.3552 | no | 587.77 | 133.19 | 5.55 | 5.55 | -6.75 | 2 | 6 |
| 6 | ZINC31164336 | O=C([O-])c1c(C)c2C(=O)c3c(O)cc(O[C@H]4[C@@H](O)[C@H](O)[C@H](O)[C@@H](CO)O4)cc3C(=O)c2cc1[O-] | 3805 | -11.3003 | no | 474.37 | 216.94 | 0.48 | 0.54 | -3.91 | 5 | 12 |
| 7 |  | O=C([O-])c1ccc(C(=O)N2[C@@H]3[C@@H](O[C@H]4[C@@H](C(C)(C)Oc5c(O)cccc45)C3)CC2)cc1 | 659 | -11.2908 | no | 422.46 | 99.13 | 2.28 | 2.28 | -4.93 | 1 | 6 |
| 8 | ZINC06041519 | O=C1C(c2ccc(O)cc2)=COc2c([C@@H]3[C@H](O)[C@H](O)[C@H](O)[C@H](CO)O3)c(O)cc([O-])c12 | 3728 | -11.2485 | no | 431.37 | 179.97 | 0.79 | 0.78 | -3.21 | 6 | 9 |
| 9 |  | O=C([O-])c1ccc(-c2oc(/C=C(\C#N)/C([NH-])=C(C#N)C#N)cc2)cc1 | 3047 | -11.2048 | no | 328.29 | 124.64 | 3.76 | 3.74 | -6.09 | 1 | 6 |
| 10 |  | Clc1cc(CCN(C(=O)c2cc3[C@@H]4O[C@H](C)CC[C@H]4[C@](CCCC(O)(C)C)(C)Oc3cc2)CC(=O)[O-])ccc1 | 1066 | -11.1661 | no | 557.11 | 99.13 | 5.09 | 5.09 | -7.13 | 1 | 6 |
| 11 |  | Fc1cc(CCN(C(=O)c2cc3[C@@H]4O[C@H](C)CC[C@H]4[C@@](CCCC(O)(C)C)(C)Oc3cc2)CC(=O)[O-])ccc1 | 1067 | -11.1582 | no | 540.65 | 99.13 | 4.44 | 4.44 | -6.55 | 1 | 6 |
| 12 |  | S(=O)(=O)(N=Nc1ccc(N(O)[O-])cc1)c1ccc(NC(=O)C)cc1 | 2792 | -11.1337 | Yes (unsub het-het) | 349.35 | 134.49 | 1.89 | 1.86 | -4.11 | 2 | 7 |
| 13 |  | Clc1ccc(-c2[nH]nc3OC(=[N-])C(C#N)=C(c4oc(-c5c(C)c(N(O)[O-])ccc5)cc4)c23)cc1 | 2688 | -11.1326 | Yes (unsub het-het) | 471.86 | 121.37 | 3.69 | 4.28 | -7.32 | 2 | 5 |
| 14 | ZINC04654620 | O=C([O-])[C@@H]1[C@@H](O)[C@H](O)[C@@H](O)[C@H](Oc2cc([O-])c3C(=O)C=C(c4cc(O)c(O)cc4)Oc3c2)O1 | 3776 | -11.1147 | no | 460.35 | 209.10 | 0.24 | 0.28 | -3.67 | 5 | 11 |
| 15 | ZINC31163371 | O=C([O-])[C@@H]([C@H](CO[C@H]1[C@@H](O)[C@H](O)[C@H](O)[C@H](CO)O1)C/C=C(\C[C@@H]1OC(=O)[C@@H](C)C1)/C)C | 3705 | -11.1115 | no | 445.48 | 165.81 | -0.64 | -0.64 | -1.93 | 4 | 9 |
| 16 | ZINC31164450 | O=C([O-])[C@@H](CCC(=O)[O-])N1C(=O)c2c(c3O[C@H]4[C@@](O)(C)CC[C@@H]5[C@@](CC/C=C(\C)/C)(C)Oc(c3[C@@H]45)c2)C1 | 3832 | -11.0613 | no | 511.57 | 139.26 | 2.32 | 2.32 | -5.71 | 1 | 8 |
| 17 |  | O=C([O-])c1cc(C(=O)[O-])cc(-c2oc(/C=C(\C#N)/C([NH-])=C(C#N)C#N)cc2)c1 | 3122 | -11.0312 | no | 371.29 | 164.77 | 3.06 | 3.04 | -6.40 | 1 | 8 |
| 18 |  | O=C([O-])C(C(=O)[O-])(CCCCCCCCCCCCCO)C | 2705 | -11.0237 | no | 314.42 | 100.49 | 3.83 | 3.84 | -4.61 | 1 | 5 |
| 19 |  | Clc1ccc(CCN(C(=O)c2cc3[C@@H]4O[C@H](C)CC[C@H]4[C@](CCCC(O)(C)C)(C)Oc3cc2)CC(=O)[O-])cc1 | 1061 | -11.0234 | no | 557.11 | 99.13 | 5.09 | 5.09 | -7.12 | 1 | 6 |
| 20 | ZINC31163718 | O=C(OC[C@@H]1[C@@H](O)[C@H](O)[C@@H](O)[C@H](OC2=C(C)OC=CC2=O)O1)C[C@@](O)(CC(=O)[O-])C | 3724 | -11.0128 | Yes (unsub unsat alkoxy) | 431.37 | 192.11 | -1.09 | -1.09 | -1.81 | 4 | 10 |
| 21 | ZINC67902639 | O=C([O-])[C@@H]1[C@@H](O)[C@H](O)[C@@H](O)[C@H](O[C@@H]2C(C)(C)[C@@H]3[C@@](C)([C@@H]4C([C@]5(C)[C@](C)([C@@H]6[C@@H](C)[C@H](C)CC[C@]6(C(=O)[O-])CC5)CC4)=CC3)CC2)O1 | 3916 | -11.0125 | no | 630.82 | 159.41 | 5.45 | 5.45 | -7.01 | 3 | 9 |
| 22 |  | O=C([O-])[C@@H](NC(=O)[C@@H](NC(=O)c1c(OCC[NH2+]C(C)C)cccc1CCC)Cc1ccccc1)CO | 1071 | -11.0073 | no | 499.61 | 144.40 | -0.08 | 1.91 | -3.33 | 4 | 6 |
| 23 | ZINC35464464 | Clc1c([O-])cc(O)c2C(=O)OC(C/C=C/[C@@H](O)[C@@H](SC[C@H](O)C(=O)[O-])[C@@H](O)C[C@H](O)C)=Cc12 | 3826 | -10.9531 | no | 502.92 | 190.64 | 1.61 | 1.61 | -4.50 | 5 | 9 |
| 24 |  | O=C([O-])c1c(CCc2ccc(OCC[NH3+])cc2)nc(N(CCc2ccccc2)C)nc1 | 1033 | -10.9441 | no | 420.51 | 106.02 | -1.95 | 1.29 | -2.58 | 1 | 5 |
| 25 |  | O=C([O-])c1c(-c2oc(CN3C(c4[nH]nc(CO)c4)CCCC3)cc2)cccc1 | 285 | -10.9384 | no | 380.42 | 105.42 | 2.12 | 1.74 | -4.51 | 2 | 5 |
| **Scheme2\_leadlike** | **molecule** | **smiles** | **mseq** | **S** | **Ligand properties** | | | | | | **don** | **acc** |
|  |  |  |  |  | **toxic** | **Weight (g/mol)** | **TPSA (A^2)** | **logP** | **logD (pH=7)** | **logS** |  |  |
| 1 |  | O=C([O-])COc1c(OCC)cc(/C=C/2\C(=O)N(c3ccc(C(=O)OC)cc3)N=C\2O)cc1 | 64 | -10.7529 | no | 439.40 | 137.79 | 3.31 | 3.16 | -5.67 | 1 | 8 |
| 2 |  | O=C(Nc1ccc(Oc2cnccc2)cc1)CN1C[C@@H](Oc2ccc(C(=O)[O-])cc2)[C@H](O)C1 | 18 | -10.4549 | no | 448.45 | 124.05 | 2.30 | 2.30 | -5.15 | 2 | 7 |
| 3 |  | Fc1ccc(-c2n(CC(O)CC)nc(-c3c(OC)ccc(CC(=O)[O-])c3)c2)cc1 | 16 | -10.3263 | no | 397.43 | 87.41 | 3.80 | 3.80 | -5.39 | 1 | 5 |
| 4 |  | FC=1C([O-])=NC(=O)N([C@@H]2[C@@H](O)CN(C(=O)c3cc(Cn4cncc4)ccc3)C2)C=1 | 11 | -10.024 | no | 398.37 | 114.09 | 1.50 | 1.35 | -4.37 | 1 | 6 |
| 5 |  | O=C([O-])COc1ccc(C(=O)N2C[C@@H](O)[C@H](N3C(=O)NC(=O)C(C)=C3)C2)cc1 | 8 | -9.83533 | no | 388.36 | 139.31 | 0.60 | 0.59 | -3.50 | 2 | 7 |
| 6 |  | O=C([O-])CC1C(=O)NC(=N/N=C/c2ccc(N3CCOCC3)cc2)S1 | 61 | -9.73657 | no | 361.40 | 106.42 | 0.42 | 0.44 | -3.62 | 1 | 6 |
| 7 |  | S=C(N(CCO)CC=1C(=O)Nc2c(cc3OCOc3c2)C=1)NCCC[NH+]1CCOCC1 | 53 | -9.52998 | no | 449.55 | 128.82 | -2.21 | -0.17 | -1.77 | 4 | 6 |
| 8 |  | O=C(NCCc1nn2c(N=C(c3ccncc3)C=C2)c1)CCc1c(C)n(C)nc1C | 73 | -9.45523 | no | 403.49 | 89.99 | 3.13 | 3.11 | -5.38 | 1 | 5 |
| 9 |  | O=C(NCCNC(=O)c1onc(-c2cc3OCOc3cc2)n1)COc1c(C)c(C)ccc1 | 59 | -9.4394 | no | 438.44 | 124.81 | 3.24 | 3.24 | -5.42 | 2 | 7 |
| 10 |  | O=C(N[C@H]1[C@H](O)C[NH+](Cc2ccc(OCCN3CCOCC3)cc2)C[C@H](O)C1)C | 42 | -9.33875 | no | 408.52 | 95.70 | -2.44 | -0.81 | -0.65 | 4 | 6 |
| 11 |  | O=C(C)N1CCN([C@@H]2[C@@H](O)C[NH+](Cc3ccc(OCCN4C(=O)CCC4)cc3)C2)CC1 | 35 | -9.31587 | no | 431.56 | 77.76 | -1.74 | -0.19 | -1.67 | 2 | 5 |
| 12 |  | O(CCO)c1ccc(CN2[C@H](CO)[C@@H](O)[C@@H](O)[C@@H]2Cc2ccccc2)cc1 | 52 | -9.2773 | no | 373.45 | 93.39 | 1.69 | 1.46 | -2.94 | 4 | 6 |
| 13 |  | Clc1c(Cl)ccc(OCC2(O)CC[NH+](Cc3ccc(OCc4n(C)ccn4)cc3)CC2)c1 | 38 | -9.10382 | no | 477.41 | 60.95 | 1.93 | 3.10 | -4.42 | 2 | 4 |
| 14 | ZINC12902599 | O=C(COc1cc2OC(=O)C(c3cc(OC)c(OC)cc3)=Cc2cc1)N1[C@H](CO)CCC1 | 129 | -8.89048 | no | 439.46 | 94.53 | 3.76 | 3.76 | -5.34 | 1 | 6 |
| 15 |  | O(CCOc1ccc(C[NH+]2CC(O)(C[NH+](Cc3ccc(OC)cc3)C)CC2)cc1)CCO | 32 | -8.85636 | no | 446.59 | 77.03 | -3.02 | -0.12 | -0.42 | 4 | 5 |
| 16 |  | Fc1ccc(C=2C=C(CNc3ccc(Cc4c(C)[nH]nc4C)cc3)C(=O)NC=2)cc1 | 75 | -8.79326 | no | 402.47 | 69.81 | 4.05 | 4.05 | -5.70 | 3 | 2 |
| 17 |  | Fc1ccc(C=2C=C(CNc3cc(C)c(NC(=O)C[NH+]4CCCC4)cc3)C(=O)NC=2)cc1 | 74 | -8.78352 | no | 435.52 | 74.67 | 0.60 | 3.01 | -3.64 | 4 | 2 |
| 18 |  | Fc1ccc(OCC2(O)CC[NH+](Cc3ccc(OCC[NH+]4CCCC4)cc3)CC2)cc1 | 48 | -8.76102 | no | 430.56 | 47.57 | -2.49 | 0.03 | -1.07 | 3 | 3 |
| 19 |  | O=C(N)C1CCN(c2ccc(NCC=3C(=O)Nc4c(cc(C)cc4)C=3)cc2)CC1 | 57 | -8.74152 | no | 390.49 | 87.46 | 2.78 | 2.78 | -4.71 | 3 | 2 |
| 20 |  | Fc1c(OCC2(O)CC[NH+](Cc3ccc(OCCCNC(=O)C)cc3)CC2)cccc1 | 49 | -8.71099 | no | 431.53 | 72.23 | 0.30 | 1.70 | -2.73 | 3 | 4 |
| 21 |  | O=C1C(CNc2ccc(N3CC[NH+](C)CC3)cc2)=Cc2c(N1)ccc(CCC)c2 | 55 | -8.69211 | no | 391.54 | 48.81 | 1.38 | 2.75 | -3.82 | 3 | 1 |
| 22 | ZINC12888068 | O=C(Nc1c(C(=O)N)cccc1)COc1cc2OC(=O)C(Cc3ccccc3)=C(C)c2cc1 | 131 | -8.68546 | no | 442.47 | 107.72 | 5.07 | 5.07 | -6.69 | 2 | 4 |
| 23 |  | O=C(NC(C)c1ccc(N2CCOCC2)cc1)C[NH+]1CCC(c2ccccc2)CC1 | 107 | -8.68515 | no | 408.57 | 46.01 | 0.44 | 2.68 | -3.13 | 2 | 2 |
| 24 |  | O=C1C(CNc2ccc(N3CC[NH+](C)CC3)cc2)=Cc2c(c(C)ccc2)N1 | 85 | -8.62364 | no | 363.48 | 48.81 | 0.10 | 1.47 | -2.86 | 3 | 1 |
| 25 |  | O=C(Nc1cc(C)c(-n2nnnc2)cc1)CN1C(=O)C(N)=CC(c2c(C)oc(C)c2)=N1 | 79 | -8.61536 | no | 420.43 | 144.53 | 2.07 | 2.07 | -5.11 | 2 | 6 |
| **Scheme2\_druglike** | **molecule** | **smiles** | **mseq** | **S** | **Ligand properties** | | | | | | **don** | **acc** |
|  |  |  |  |  | **toxic** | **Weight (g/mol)** | **TPSA (A^2)** | **logP** | **logD (pH=7)** | **logS** |  |  |
| 1 |  | O=C([O-])COc1c(OCC)cc(/C=C/2\C(=O)N(c3ccc(C(=O)OC)cc3)N=C\2O)cc1 | 192 | -10.8961 | no | 439.40 | 137.79 | 3.31 | 3.16 | -5.67 | 1 | 8 |
| 2 |  | O(C)c1ccc(Cn2c(C(N(CCCO)CC=3C(=O)Nc4c(cc(C)cc4)C=3)C(C)C)nnn2)cc1 | 171 | -10.8848 | no | 490.61 | 105.40 | 3.55 | 3.53 | -5.95 | 2 | 7 |
| 3 |  | O=C(Nc1ccc(Oc2cnccc2)cc1)CN1C[C@@H](Oc2ccc(C(=O)[O-])cc2)[C@H](O)C1 | 33 | -10.4683 | no | 448.45 | 124.05 | 2.30 | 2.30 | -5.15 | 2 | 7 |
| 4 |  | O=C(Nc1scc(-c2ccc(OC)cc2)n1)CN1C[C@H]2[C@H](NC(=O)[C@H](Cc3ccccc3)NC(=O)C3(C/C=C/C2)CCOCC3)CC1 | 34 | -10.3413 | no | 657.84 | 121.89 | 3.88 | 3.81 | -7.49 | 3 | 7 |
| 5 |  | O=C(C)N1CC(O)(COc2ccc(C)cc2)CN(Cc2ccc(OCCCN3C(=O)NC(=O)C3)cc2)CC1 | 87 | -10.3252 | no | 524.62 | 111.65 | 2.77 | 2.48 | -5.19 | 2 | 7 |
| 6 |  | Fc1ccc(-c2n(CC(O)CC)nc(-c3c(OC)ccc(CC(=O)[O-])c3)c2)cc1 | 31 | -10.3211 | no | 397.43 | 87.41 | 3.80 | 3.80 | -5.39 | 1 | 5 |
| 7 |  | O=C(COC)N1CC(O)(COc2ccc(C)cc2)CN(Cc2ccc(OCCCn3c(C)[nH+]cc3)cc2)CC1 | 85 | -10.2505 | no | 537.68 | 90.54 | 2.38 | 2.67 | -4.67 | 2 | 6 |
| 8 |  | O=C(C)N1CC(O)(COc2ccccc2)CN(Cc2cc(OCCCn3ncc(C)c3)ccc2)CC1 | 111 | -10.2268 | no | 492.62 | 80.06 | 3.79 | 3.55 | -5.62 | 1 | 6 |
| 9 |  | Clc1c(OCC2(O)CC[NH+](Cc3ccc(OCCn4nc(C)cc4)cc3)CCC2)cc(C)cc1 | 82 | -10.037 | no | 485.05 | 60.95 | 2.44 | 3.48 | -4.65 | 2 | 4 |
| 10 |  | O=C(OC(C)(C)C)N[C@H]1[C@H](O)C[NH+](Cc2ccc(OCCOCCO)cc2)C[C@H](O)C1 | 52 | -9.98754 | no | 441.54 | 121.92 | -1.87 | 0.10 | -0.84 | 5 | 6 |
| 11 |  | Fc1ccc(OCC2(O)C[NH+](Cc3cc(OCCn4cncc4)c(OC)cc3)CCOC2)cc1 | 117 | -9.95551 | no | 472.54 | 79.41 | 0.16 | 2.20 | -2.99 | 2 | 6 |
| 12 |  | Clc1c(OCC2(O)C[NH+](Cc3cc(OCCn4c(C)[nH+]cc4)c(OC)cc3)CCC2)cc(C)cc1 | 95 | -9.90211 | no | 502.05 | 71.43 | 0.50 | 2.55 | -3.31 | 3 | 4 |
| 13 |  | O=C(N(C)[C@H]1[C@@H](O)[C@H](Oc2ccccc2)CC1)c1ccc(OCC[NH+]2CCCC2)cc1 | 9 | -9.90082 | no | 425.55 | 63.44 | 0.37 | 1.55 | -2.99 | 2 | 4 |
| 14 |  | O=C(C)N1CCN([C@@H]2[C@@H](O)C[NH+](Cc3cc(OC)c(OCCN4CCOCC4)cc3)C2)CC1 | 66 | -9.88736 | no | 463.60 | 79.15 | -2.18 | -0.83 | -1.42 | 2 | 7 |
| 15 |  | O=C([O-])COc1ccc(C(=O)N2C[C@@H](O)[C@H](N3C(=O)NC(=O)C(C)=C3)C2)cc1 | 12 | -9.83587 | no | 388.36 | 139.31 | 0.60 | 0.59 | -3.50 | 2 | 7 |
| 16 |  | O(CCCn1c(CC)[nH+]cc1)c1c(OC)ccc(C[NH+]2C[C@](O)(COc3cc(C)ccc3)[C@@H](O)CC2)c1 | 137 | -9.82337 | no | 511.66 | 91.66 | -0.38 | 2.20 | -2.64 | 4 | 5 |
| 17 |  | O=C(C)N1C[C@H](OC)[C@@H](O)[C@@H](O)COCCCC[NH+](Cc2cc(OCCCn3nccc3)ccc2)CCC1 | 161 | -9.78697 | no | 533.69 | 110.72 | -0.51 | 0.45 | -2.53 | 3 | 7 |
| 18 |  | FC=1C([O-])=NC(=O)N([C@@H]2[C@@H](O)CN(C(=O)c3cc(Cn4cncc4)ccc3)C2)C=1 | 18 | -9.7853 | no | 398.37 | 114.09 | 1.50 | 1.35 | -4.37 | 1 | 6 |
| 19 |  | O=C([O-])CC1C(=O)NC(=N/N=C/c2ccc(N3CCOCC3)cc2)S1 | 188 | -9.74022 | no | 361.40 | 106.42 | 0.42 | 0.44 | -3.62 | 1 | 6 |
| 20 |  | O=C(C)N1CC(O)(COc2ccc(C)cc2)CN(Cc2cc(OCCN3CCOCC3)ccc2)CC1 | 142 | -9.72466 | no | 497.64 | 74.71 | 2.96 | 2.43 | -4.89 | 1 | 7 |
| 21 |  | Fc1ccc(Cn2c(CN(CCO)CC=3C(=O)Nc4c(cc5OCCOc5c4)C=3)nnn2)cc1 | 170 | -9.6638 | no | 466.47 | 114.63 | 1.75 | 1.74 | -4.86 | 2 | 8 |
| 22 |  | Fc1cc(F)cc(OCC2(O)CN(C(=O)COC)CCN(Cc3cc(OCCn4ncc(C)c4)ccc3)C2)c1 | 118 | -9.62164 | no | 544.60 | 89.29 | 3.72 | 3.53 | -5.71 | 1 | 7 |
| 23 |  | O=C([O-])COc1ccc(C(=O)N2CCC3(OC[C@@](O)(C)[C@@H](N4C(=O)NC(=O)C(C)=C4)C3)CC2)cc1 | 20 | -9.61667 | no | 486.50 | 148.54 | 1.00 | 0.99 | -4.37 | 2 | 8 |
| 24 |  | O=C(OCC)C1CN(c2ccc(NCC=3C(=O)Nc4c(cc(C(C)(C)C)cc4)C=3)cc2)CCC1 | 179 | -9.59636 | no | 461.61 | 70.67 | 5.42 | 5.42 | -6.54 | 2 | 2 |
| 25 |  | Clc1cc(OCC2(O)CC[NH+](Cc3cc(OC)c(OCCCn4ncc(C)c4)cc3)CC2)ccc1 | 119 | -9.5716 | no | 501.05 | 70.18 | 1.82 | 3.28 | -4.35 | 2 | 5 |
| **Scheme1\_leadlike** | **molecule** | **smiles** | **mseq** | **S** | **Ligand properties** | | | | | | **don** | **acc** |
|  |  |  |  |  | **toxic** | **Weight (g/mol)** | **TPSA (A^2)** | **logP** | **logD (pH=7)** | **logS** |  |  |
| 1 | ZINC12897948 | O=C(N[C@H](CO)Cc1ccccc1)COc1cc2OC=C(c3ccc(OC)cc3)C(=O)c2cc1 | 2 | -8.03163 | no | 459.50 | 94.09 | 5.0 | 5.0 | -6.31 | 2 | 5 |
| **Scheme1\_druglike** | **molecule** | **smiles** | **mseq** | **S** | **Ligand properties** | | | | | | **don** | **acc** |
|  |  |  |  |  | **toxic** | **Weight (g/mol)** | **TPSA (A^2)** | **logP** | **logD (pH=7)** | **logS** |  |  |
| 1 |  | O=C(C)N1CC(O)(COc2ccccc2)CN(Cc2cc(OCCCn3ncc(C)c3)ccc2)CC1 | 3 | -10.6526 | no | 492.62 | 80.06 | 3.79 | 3.55 | -5.62 | 1 | 6 |
| 2 |  | O=C(COc1ccc(C[NH+]2C[C@@H](O)[C@](O)(CNC(=O)c3ncsc3)C2)cc1)N1CCOCC1 | 2 | -9.23514 | no | 477.56 | 125.66 | -1.89 | 0.36 | -2.03 | 4 | 7 |

**Table 2.** List of toxicity properties (Organ Toxicity, Toxicity Endpoints, Tox21-Nuclear receptor signalling pathways, Tox21-Stress response pathway of the selected 23 compounds.

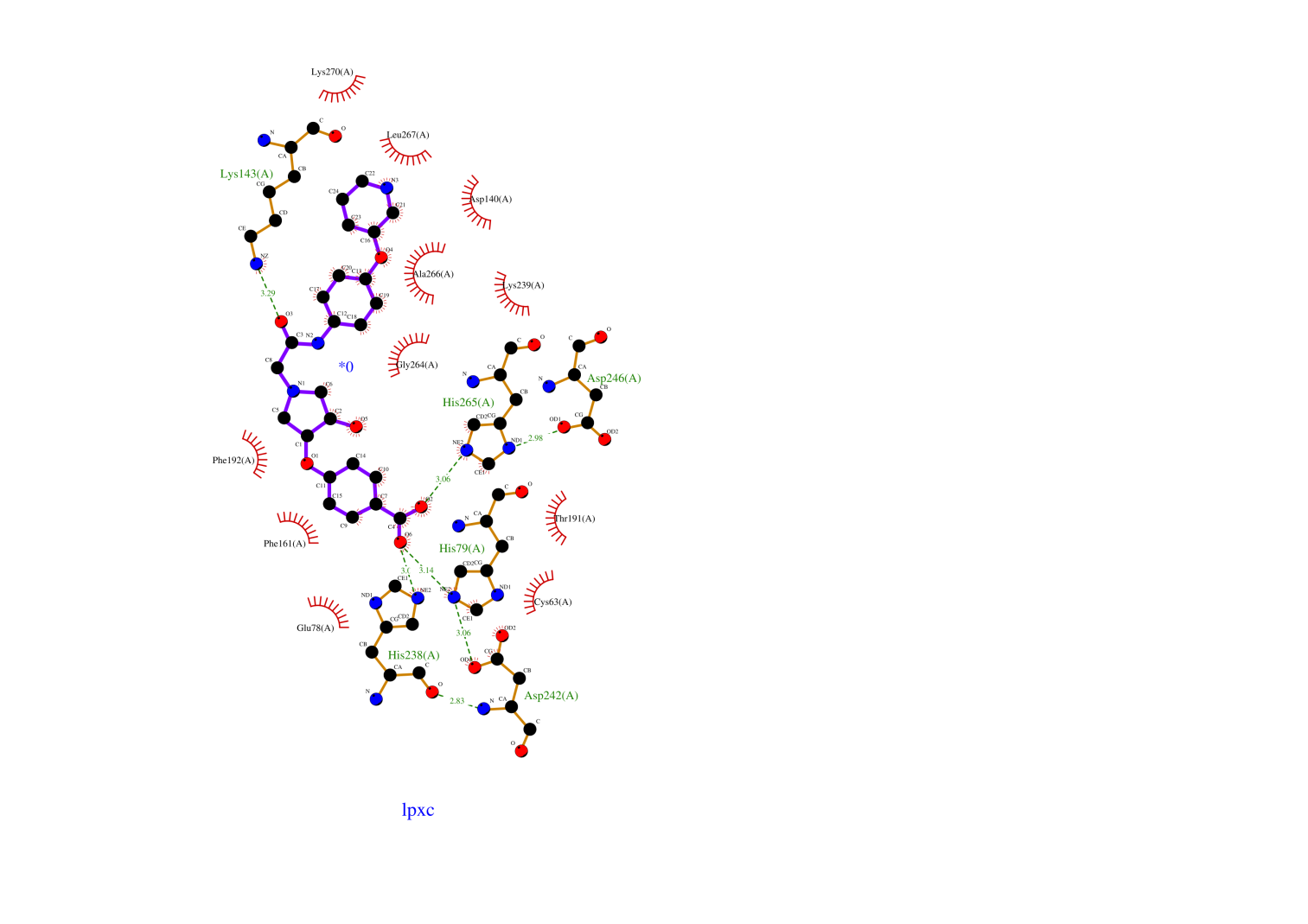
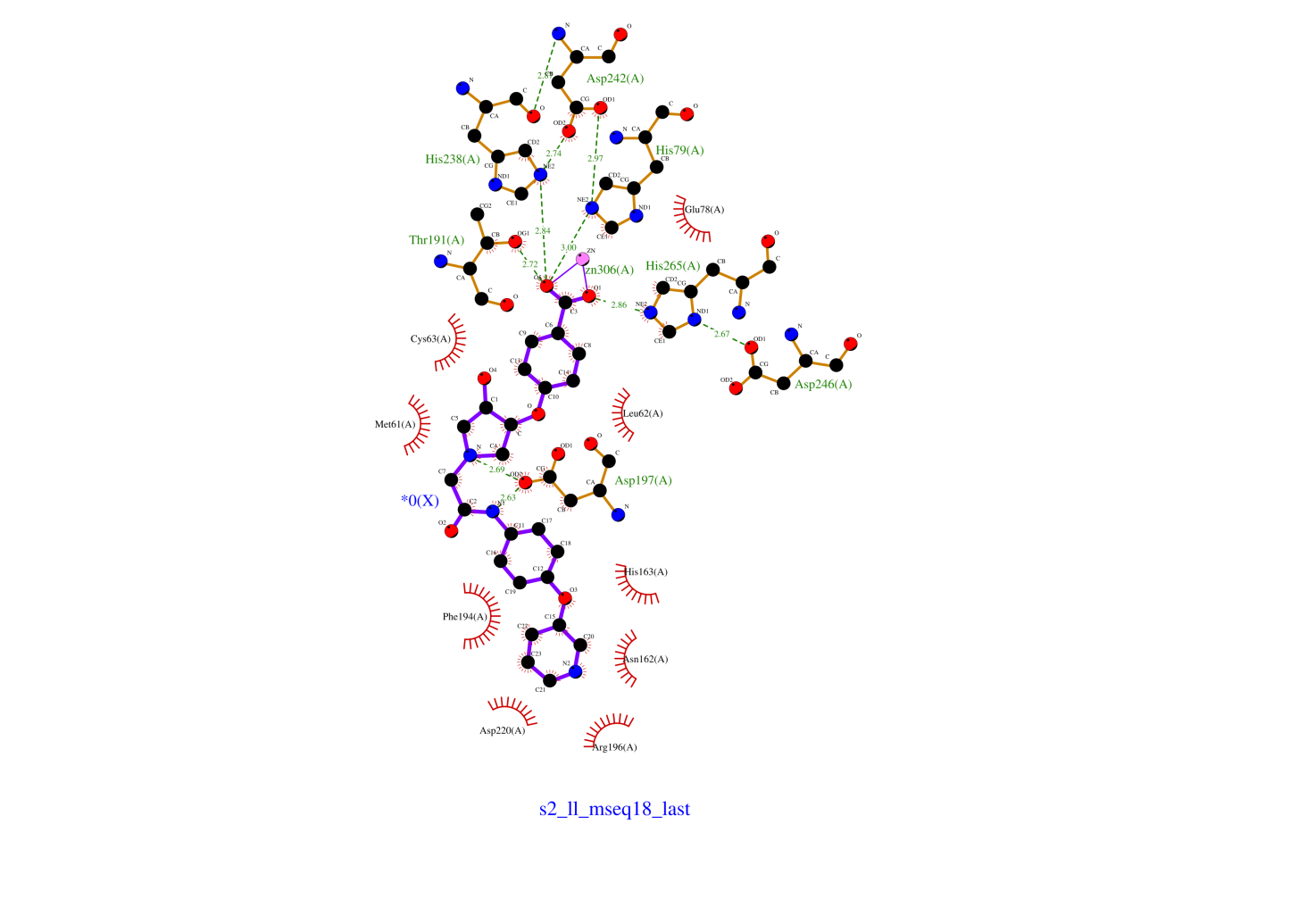
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scheme3\_leadlike** | **molecule** | **smiles** | **mseq** | **Organ toxicity** | **Toxicity endpoints** | | | | | | **Tox-21-Nuclear receptor signaling pathwys** | | **Tox-21-Stress response pathway** |
|  |  |  |  | **Hepatotoxicity** | **Carcinogenicity** | **Immunotoxicity** | **Mutagenicity** | **Cytotoxicity** | **LD50 (mg/kg)** | **Toxicity class** | **Androgen Receptor (AR)** | **Aryl hydrocarbon Receptor (AhR)** | **Heat shock factor response element** |
| 1 | ZINC04097895 | O([C@H]1[C@H](O)[C@@H](O)[C@H](O)[C@@H](CO)O1)c1cc([O-])c2C(=O)C[C@@H](c3ccc(O)cc3)Oc2c1 | 2217 | Inactive | Inactive | Active | Inactive | Inactive | 2300 | 5 | Inactive | Inactive | Inactive |
| 2 |  | O=C([O-])CN(C(=O)c1cc2[C@@H]3O[C@H](C)CC[C@H]3[C@](CCCC(O)(C)C)(C)Oc2cc1)Cc1c(OC)cccc1 | 782 | Inactive | Inactive | Active | Inactive | Inactive | 1000 | 4 | Inactive | Inactive | Inactive |
| 3 |  | Fc1cc(CCN(C(=O)c2cc3[C@@H]4O[C@H](C)CC[C@H]4[C@@](CCCC(O)(C)C)(C)Oc3cc2)CC(=O)[O-])ccc1 | 783 | Inactive | Inactive | Active | Inactive | Inactive | 900 | 4 | Inactive | Inactive | Inactive |
| 4 |  | O=C([O-])c1ccc(-c2oc(/C=C(\C#N)/C([NH-])=C(C#N)C#N)cc2)cc1 | 1545 | Active | Inactive | Inactive | Inactive | Inactive | 250 | 3 | Inactive | Inactive | Inactive |
| 5 |  | S(=O)(=O)(N=Nc1ccc(N(O)[O-])cc1)c1ccc(NC(=O)C)cc1 | 1366 | Inactive | Inactive | Inactive | Inactive | Inactive | 5000 | 5 | Inactive | Inactive | Inactive |
| **Scheme3\_druglike** | **molecule** | **smiles** | **mseq** | **Organ toxicity** | **Toxicity endpoints** | | | | | | **Tox-21-Nuclear receptor signaling pathwys** | | **Tox-21-Stress response pathway** |
|  |  |  |  | **Hepatotoxicity** | **Carcinogenicity** | **Immunotoxicity** | **Mutagenicity** | **Cytotoxicity** | **LD50 (mg/kg)** | **Toxicity class** | **Androgen Receptor (AR)** | **Aryl hydrocarbon Receptor (AhR)** | **Heat shock factor response element** |
| 1 | ZINC31164328 | Cc1c(C(=O)O)c(O)cc2c1C(=O)c1c(O)cc(O[C@@H]3O[C@@H](CO)[C@@H](O)[C@@H](O)[C@@H]3O)cc1C2=O | 3799 | Inactive | Inactive | Active | Active | Inactive | 3000 | 5 | Inactive | Inactive | Inactive |
| 2 | ZINC04097895 | O([C@H]1[C@H](O)[C@@H](O)[C@H](O)[C@@H](CO)O1)c1cc([O-])c2C(=O)C[C@@H](c3ccc(O)cc3)Oc2c1 | 3846 | Inactive | Inactive | Active | Inactive | Inactive | 2300 | 5 | Inactive | Inactive | Inactive |
| 3 |  | O=C([O-])CN(C(=O)c1cc2[C@@H]3O[C@H](C)CC[C@H]3[C@](CCCC(O)(C)C)(C)Oc2cc1)Cc1c(OC)cccc1 | 1064 | Inactive | Inactive | Active | Inactive | Inactive | 1000 | 4 | Inactive | Inactive | Inactive |
| 4 | ZINC31164332 | Cc1c(C(=O)O)c(O)cc2c1C(=O)c1c(O)cc(O[C@H]3O[C@@H](CO)[C@@H](O)[C@@H](O)[C@@H]3O)cc1C2=O | 3800 | Inactive | Inactive | Active | Active | Inactive | 3000 | 5 | Inactive | Inactive | Inactive |
| 5 | ZINC67910640 | O=C(O[C@H]1[C@@H](OC(=O)C)[C@@H]2[C@@]3(C)[C@@](C)([C@@H]([C@@H](C/C=C/C(O)(C)C)C)CC3)CC[C@@]32[C@]2([C@@H]1[C@@](C(=O)[O-])(C)[C@@H](O)CC2)C3)C | 3821 | Inactive | Inactive | Active | Inactive | Inactive | 11210 | 6 | Inactive | Inactive | Inactive |
| **Scheme2\_leadlike** | **molecule** | **smiles** | **mseq** | **Organ toxicity** | **Toxicity endpoints** | | | | | | **Tox-21-Nuclear receptor signaling pathwys** | | **Tox-21-Stress response pathway** |
|  |  |  |  | **Hepatotoxicity** | **Carcinogenicity** | **Immunotoxicity** | **Mutagenicity** | **Cytotoxicity** | **LD50 (mg/kg)** | **Toxicity class** | **Androgen Receptor (AR)** | **Aryl hydrocarbon Receptor (AhR)** | **Heat shock factor response element** |
| 1 |  | O=C([O-])COc1c(OCC)cc(/C=C/2\C(=O)N(c3ccc(C(=O)OC)cc3)N=C\2O)cc1 | 64 | Active | Inactive | Active | Inactive | Inactive | 10000 | 6 | Inactive | Inactive | Inactive |
| 2 |  | O=C(Nc1ccc(Oc2cnccc2)cc1)CN1C[C@@H](Oc2ccc(C(=O)[O-])cc2)[C@H](O)C1 | 18 | Inactive | Inactive | Inactive | Inactive | Inactive | 1550 | 4 | Inactive | Inactive | Inactive |
| 3 |  | Fc1ccc(-c2n(CC(O)CC)nc(-c3c(OC)ccc(CC(=O)[O-])c3)c2)cc1 | 16 | Active | Inactive | Inactive | Inactive | Inactive | 1000 | 4 | Inactive | Inactive | Inactive |
| 4 |  | FC=1C([O-])=NC(=O)N([C@@H]2[C@@H](O)CN(C(=O)c3cc(Cn4cncc4)ccc3)C2)C=1 | 11 | Inactive | Inactive | Active | Inactive | Inactive | 1000 | 4 | Inactive | Inactive | Inactive |
| 5 |  | O=C([O-])COc1ccc(C(=O)N2C[C@@H](O)[C@H](N3C(=O)NC(=O)C(C)=C3)C2)cc1 | 8 | Inactive | Inactive | Inactive | Inactive | Inactive | 1000 | 4 | Inactive | Inactive | Inactive |
| **Scheme2\_druglike** | **molecule** | **smiles** | **mseq** | **Organ toxicity** | **Toxicity endpoints** | | | | | | **Tox-21-Nuclear receptor signaling pathwys** | | **Tox-21-Stress response pathway** |
|  |  |  |  | **Hepatotoxicity** | **Carcinogenicity** | **Immunotoxicity** | **Mutagenicity** | **Cytotoxicity** | **LD50 (mg/kg)** | **Toxicity class** | **Androgen Receptor (AR)** | **Aryl hydrocarbon Receptor (AhR)** | **Heat shock factor response element** |
| 1 |  | O=C([O-])COc1c(OCC)cc(/C=C/2\C(=O)N(c3ccc(C(=O)OC)cc3)N=C\2O)cc1 | 192 | Active | Inactive | Active | Inactive | Inactive | 10000 | 6 | Inactive | Inactive | Inactive |
| 2 |  | O(C)c1ccc(Cn2c(C(N(CCCO)CC=3C(=O)Nc4c(cc(C)cc4)C=3)C(C)C)nnn2)cc1 | 171 | Inactive | Inactive | Inactive | Active | Inactive | 500 | 4 | Inactive | Inactive | Inactive |
| 3 |  | O=C(Nc1ccc(Oc2cnccc2)cc1)CN1C[C@@H](Oc2ccc(C(=O)[O-])cc2)[C@H](O)C1 | 33 | Inactive | Inactive | Inactive | Inactive | Inactive | 1550 | 4 | Inactive | Inactive | Inactive |
| 4 |  | O=C(Nc1scc(-c2ccc(OC)cc2)n1)CN1C[C@H]2[C@H](NC(=O)[C@H](Cc3ccccc3)NC(=O)C3(C/C=C/C2)CCOCC3)CC1 | 34 | Inactive | Inactive | Inactive | Inactive | Inactive | 1000 | 4 | Inactive | Inactive | Inactive |
| 5 |  | O=C(C)N1CC(O)(COc2ccc(C)cc2)CN(Cc2ccc(OCCCN3C(=O)NC(=O)C3)cc2)CC1 | 87 | Inactive | Inactive | Inactive | Inactive | Inactive | 2000 | 4 | Inactive | Inactive | Inactive |
| **Scheme1\_leadlike** | **molecule** | **smiles** | **mseq** | **Organ toxicity** | **Toxicity endpoints** | | | | | | **Tox-21-Nuclear receptor signaling pathwys** | | **Tox-21-Stress response pathway** |
|  |  |  |  | **Hepatotoxicity** | **Carcinogenicity** | **Immunotoxicity** | **Mutagenicity** | **Cytotoxicity** | **LD50 (mg/kg)** | **Toxicity class** | **Androgen Receptor (AR)** | **Aryl hydrocarbon Receptor (AhR)** | **Heat shock factor response element** |
| 1 | ZINC12897948 | O=C(N[C@H](CO)Cc1ccccc1)COc1cc2OC=C(c3ccc(OC)cc3)C(=O)c2cc1 | 2 | Inactive | Inactive | Inactive | Inactive | Inactive | 2710 | 5 | Inactive | Inactive | Inactive |
| **Scheme1\_druglike** | **molecule** | **smiles** | **mseq** | **Organ toxicity** | **Toxicity endpoints** | | | | | | **Tox-21-Nuclear receptor signaling pathwys** | | **Tox-21-Stress response pathway** |
|  |  |  |  | **Hepatotoxicity** | **Carcinogenicity** | **Immunotoxicity** | **Mutagenicity** | **Cytotoxicity** | **LD50 (mg/kg)** | **Toxicity class** | **Androgen Receptor (AR)** | **Aryl hydrocarbon Receptor (AhR)** | **Heat shock factor response element** |
| 1 |  | O=C(C)N1CC(O)(COc2ccccc2)CN(Cc2cc(OCCCn3ncc(C)c3)ccc2)CC1 | 3 | Inactive | Inactive | Active | Inactive | Inactive | 1000 | 4 | Inactive | Inactive | Inactive |
| 2 |  | O=C(COc1ccc(C[NH+]2C[C@@H](O)[C@](O)(CNC(=O)c3ncsc3)C2)cc1)N1CCOCC1 | 2 | Inactive | Inactive | Inactive | Inactive | Inactive | 2000 | 4 | Inactive | Inactive | Inactive |

**Supplementary Figures**

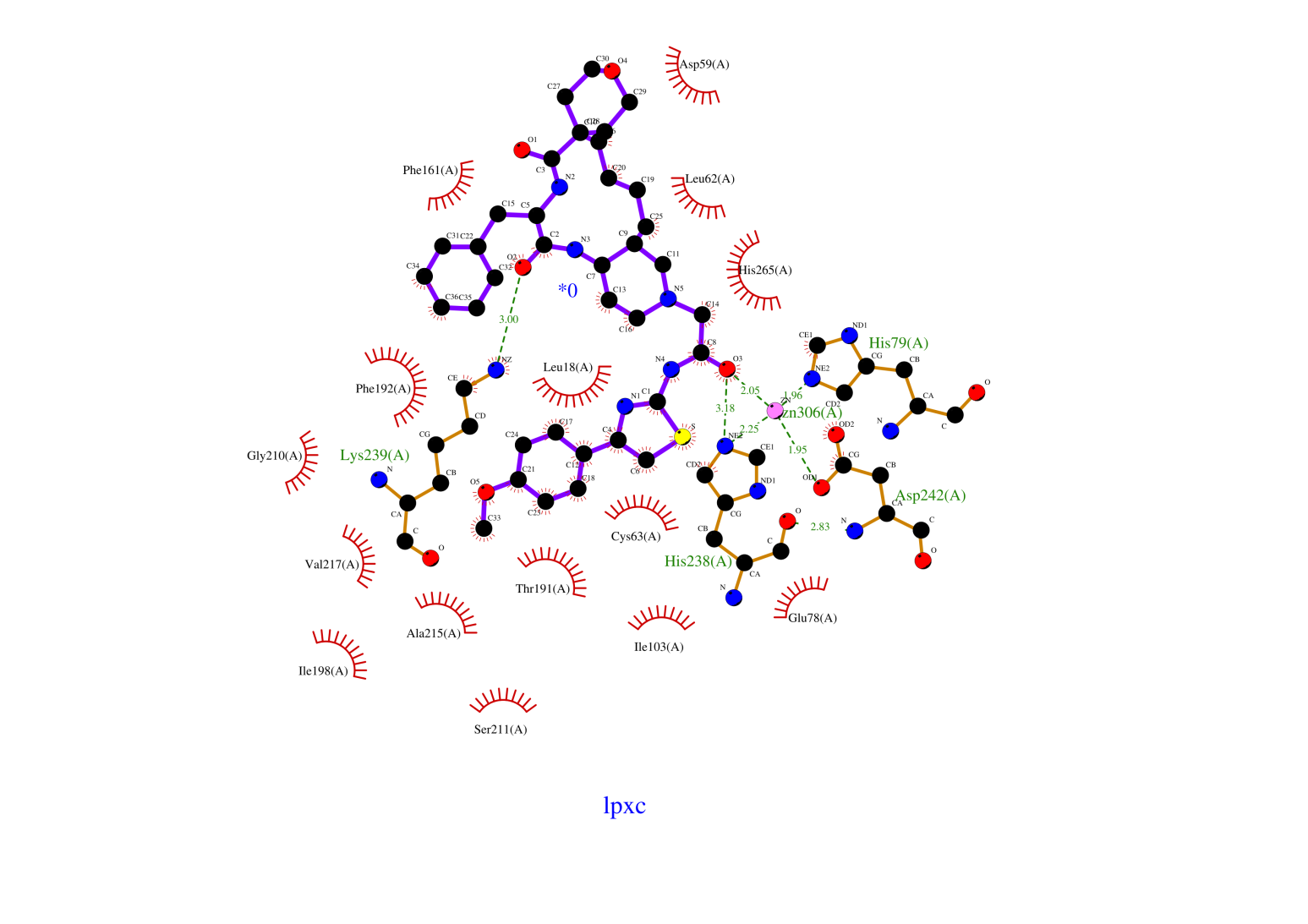
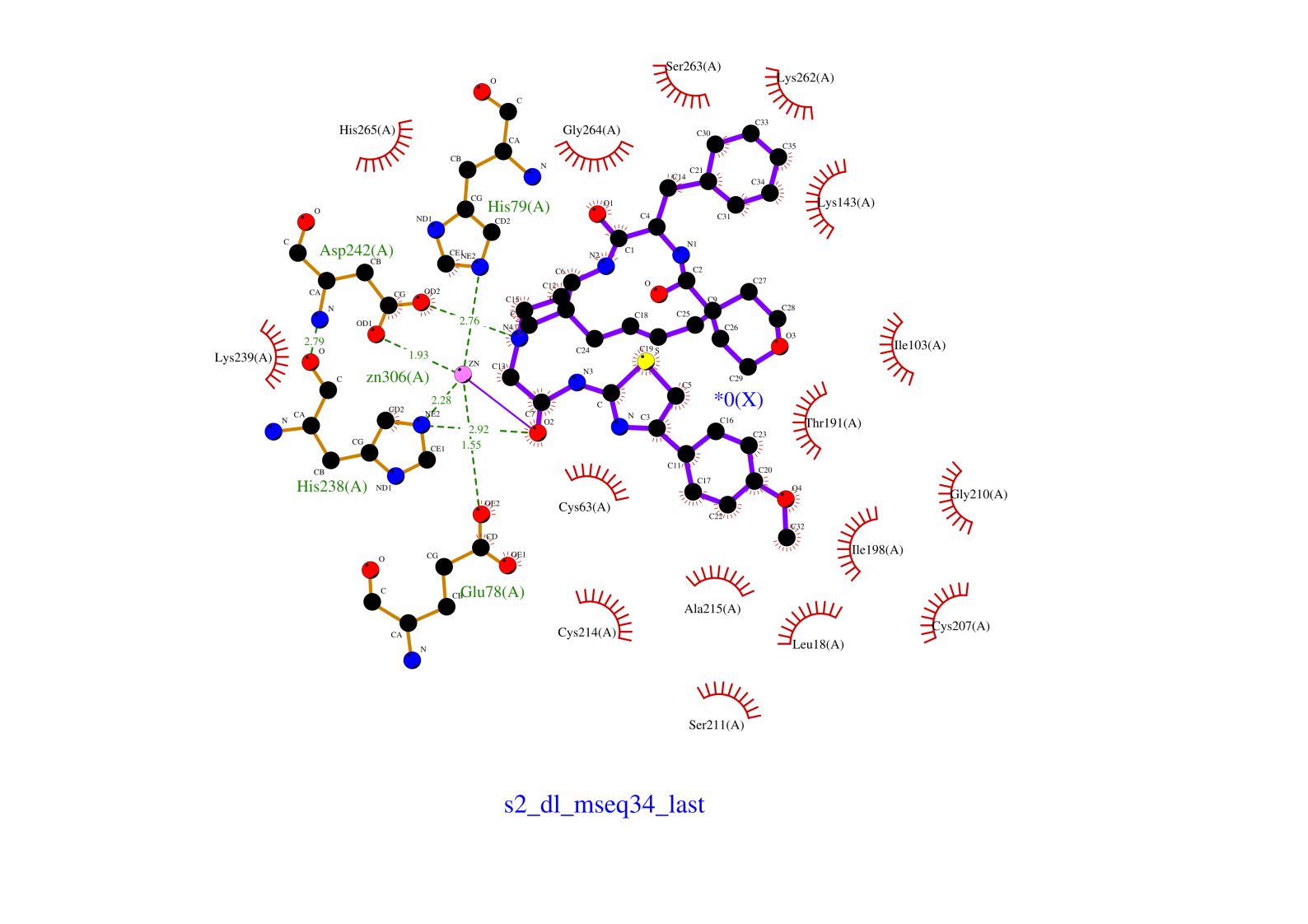
S1\_dl\_mseq3 S1\_dl\_mseq3\_last

**Figure 1.** Protein Ligand interaction profile for selected bound molecules docked with *St*LpxC enzyme. Figure shows the profile for s1\_dl\_mseq3 compound after docking (left) and after 100ns simulation (right).

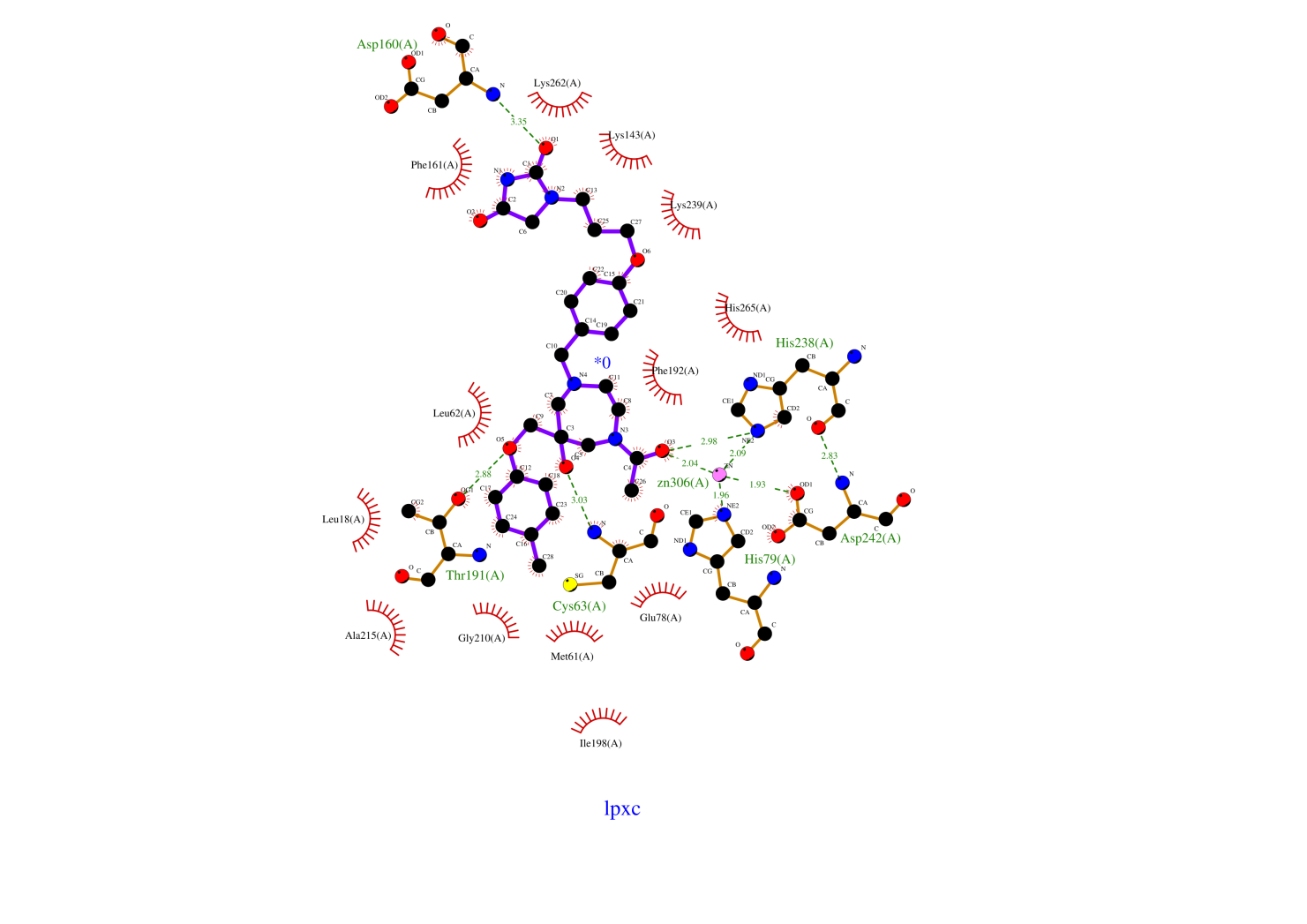
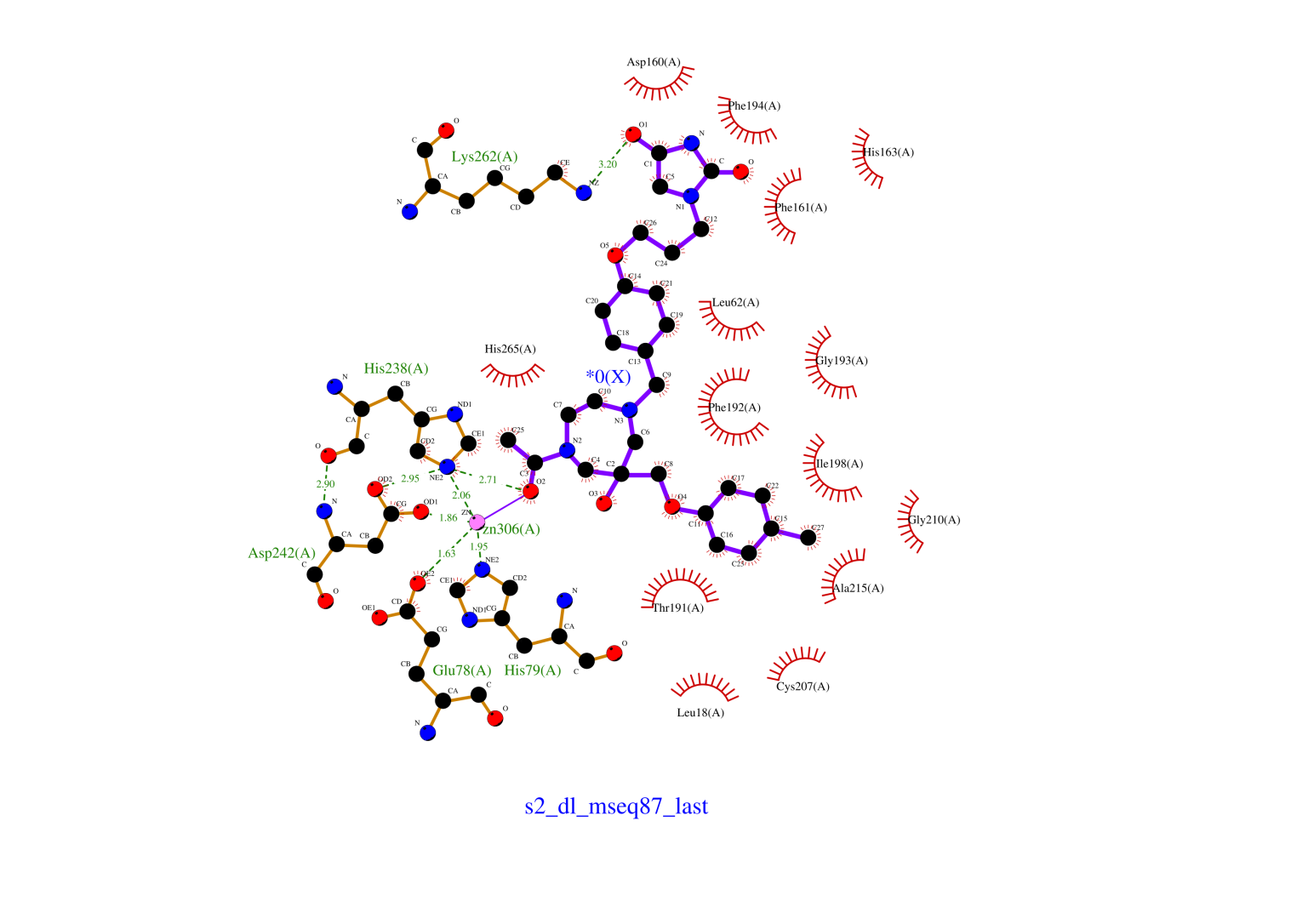
S2\_ll\_mseq18 S2\_ll\_mseq18\_last

**Figure 2.** Protein Ligand interaction profile for selected bound molecules docked with *St*LpxC enzyme. Figure shows the profile for s2\_ll\_mseq18 compound after docking (left) and after 100ns simulation (right).

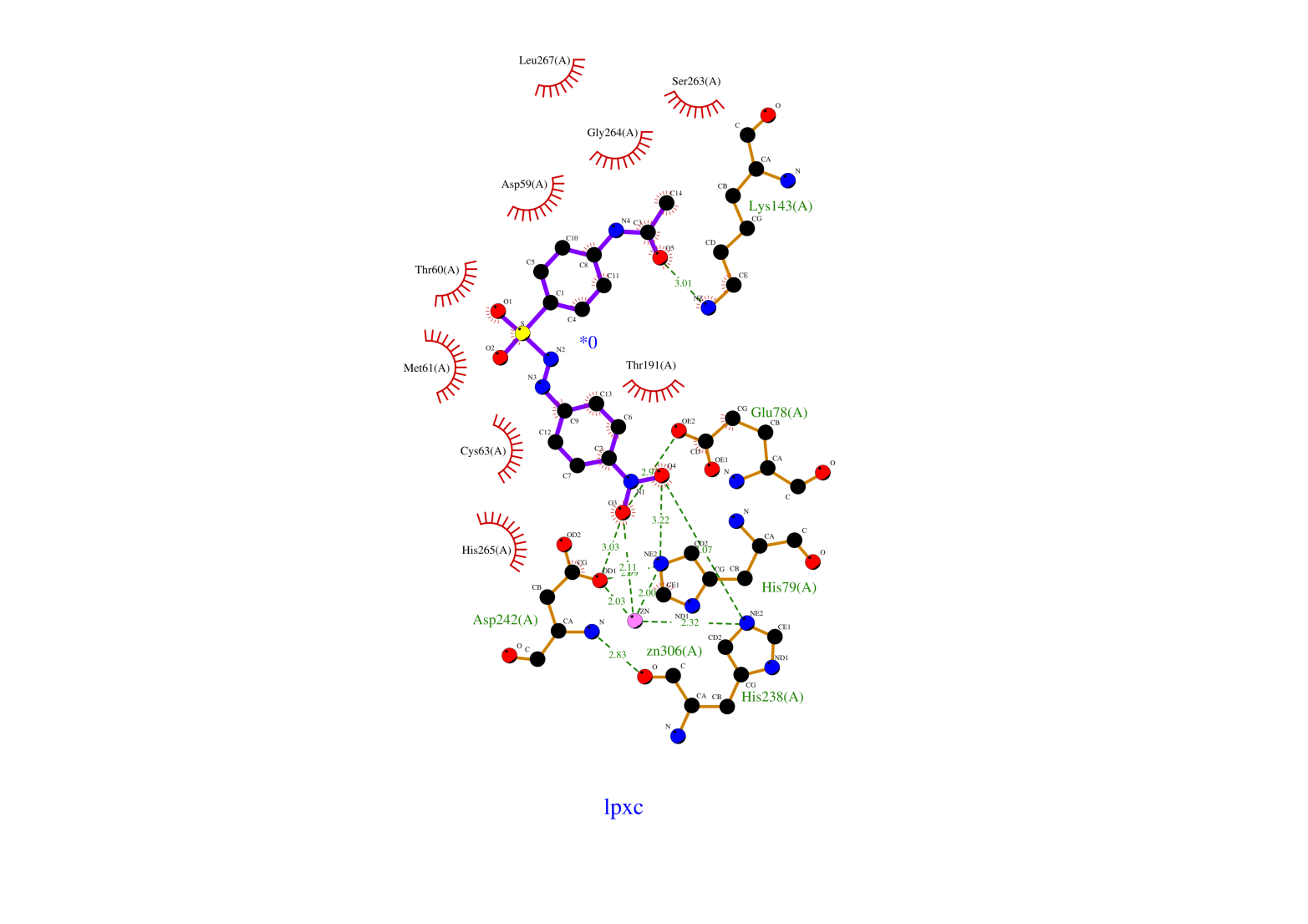
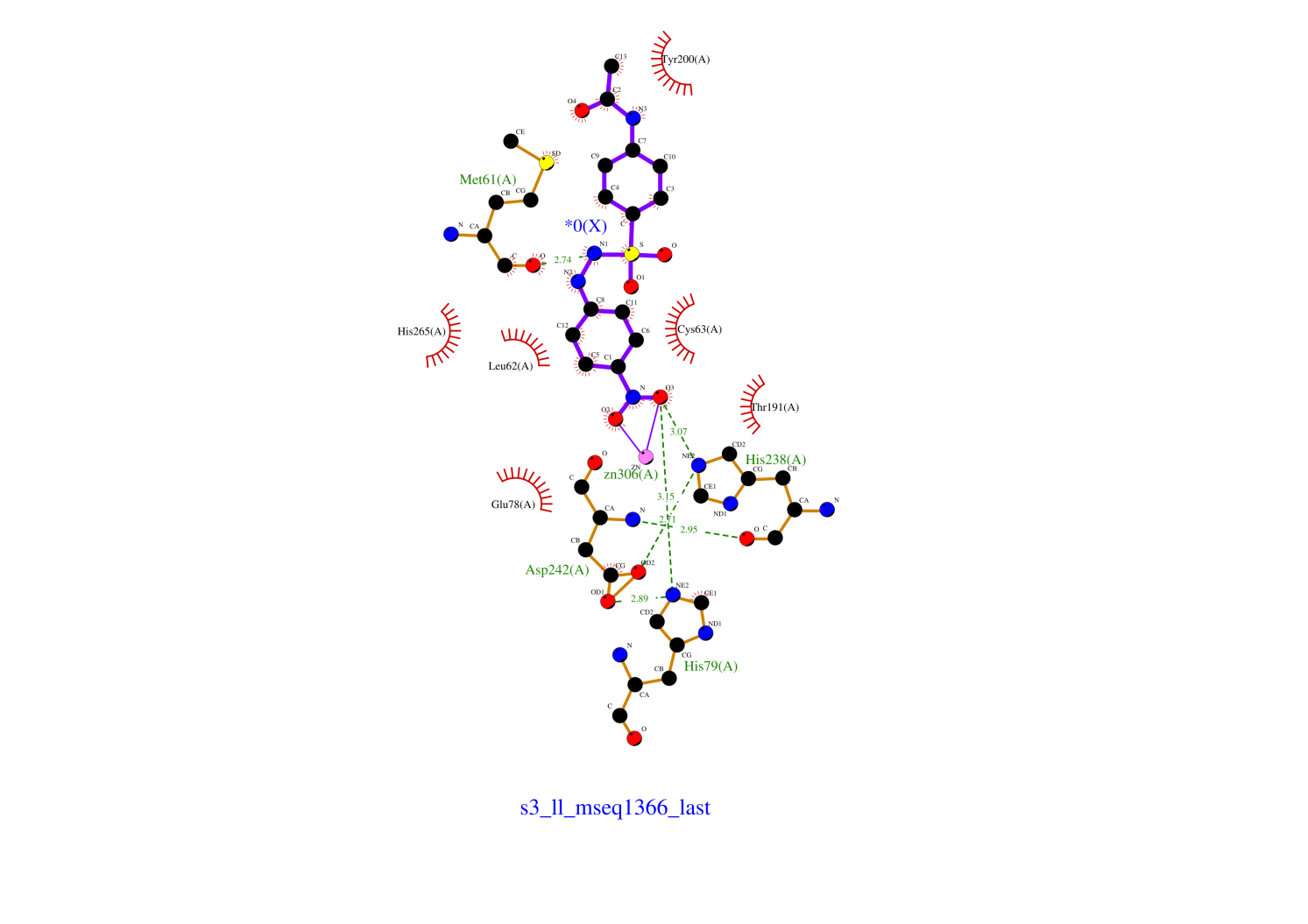
S2\_dl\_mseq34 S2\_dl\_mseq34\_last

**Figure 3.** Protein Ligand interaction profile for selected bound molecules docked with *St*LpxC enzyme. Figure shows the profile for s2\_dl\_mseq34 compound after docking (left) and after 100ns simulation (right).

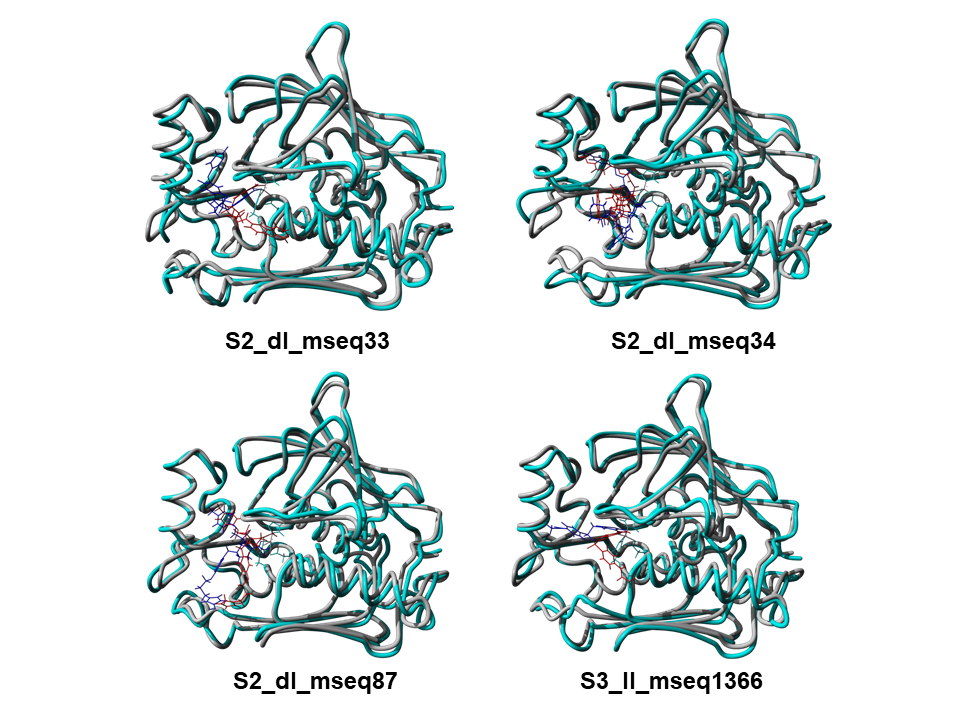
S2\_dl\_mseq87 S2\_dl\_mseq87\_last

**Figure 4.** Protein Ligand interaction profile for selected bound molecules docked with *St*LpxC enzyme. Figure shows the profile for s2\_dl\_mseq87 compound after docking (left) and after 100ns simulation (right).

S3\_ll\_mseq1366 S3\_ll\_mseq1366\_last

**Figure 5.** Protein Ligand interaction profile for selected bound molecules docked with *St*LpxC enzyme. Figure shows the profile for s3\_ll\_mseq1366 compound after docking (left) and after 100ns simulation (right).



**Figure 6.** Pictures of aligned superimposed conformational poses obtained before and after the simulation.