

Supplementary Data

Identification and evaluation of inhibitors of lipase from *Malassezia restricta* using virtual High-throughput screening and molecular dynamics studies

Shahid Ali¹, Faez Iqbal Khan², Taj Mohammad³, Dongming Lan¹, Md. Imtaiyaz Hassan³ and Yonghua Wang^{1*}

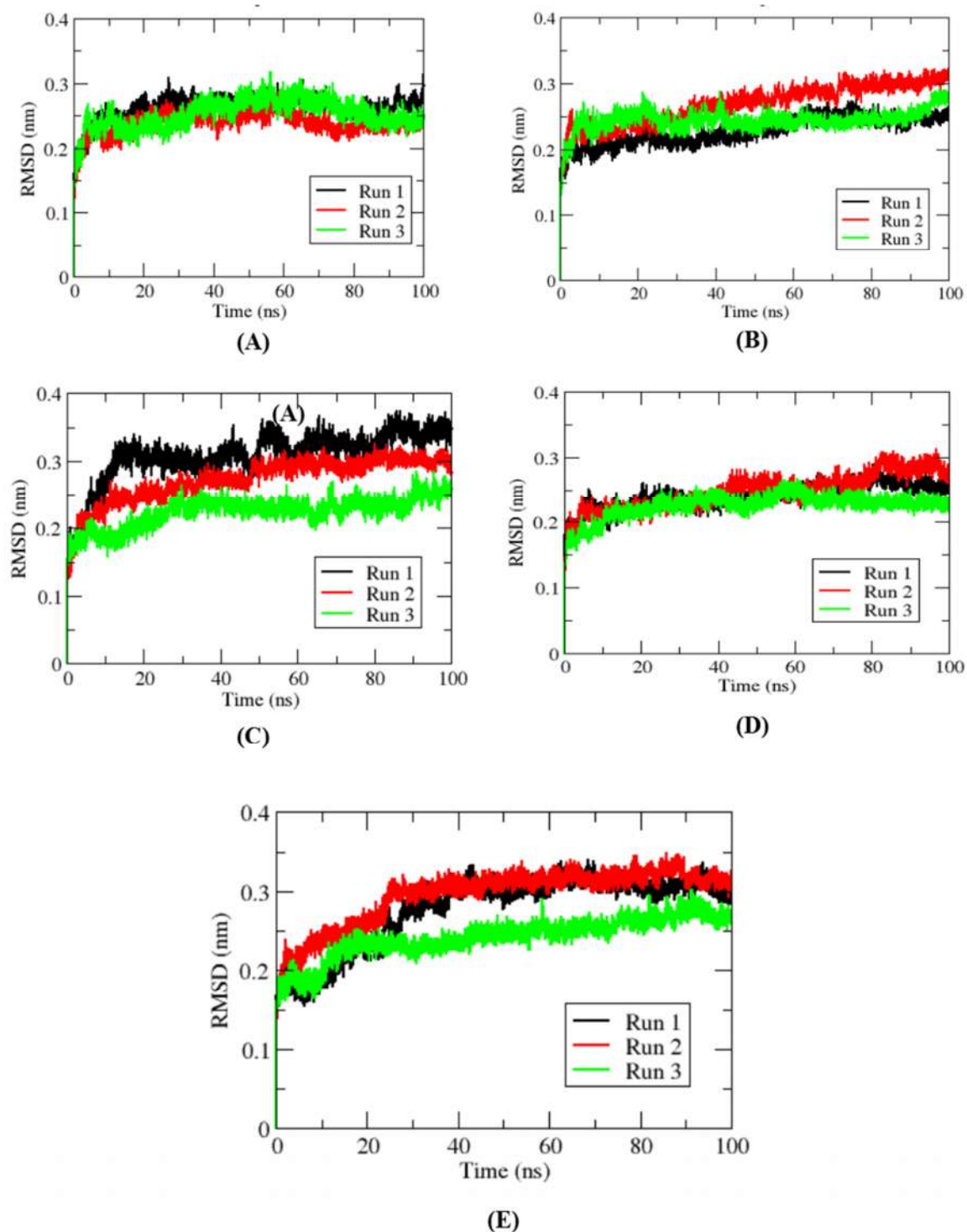


Figure S1. Convergence of each sets of MD results of protein. RMSD plot of Mrlip1(Backbone) for each sets of MD simulation as a function of time. (A) free Mrlip1, (B) Mrlip1-RHC80267, (C) Mrlip1-ZINC85530919, (D) Mrlip1- ZINC95914464 and (E) Mrlip1- ZINC85530320. The values were presented during 100,000 ps (100 ns) MD simulations time scale.

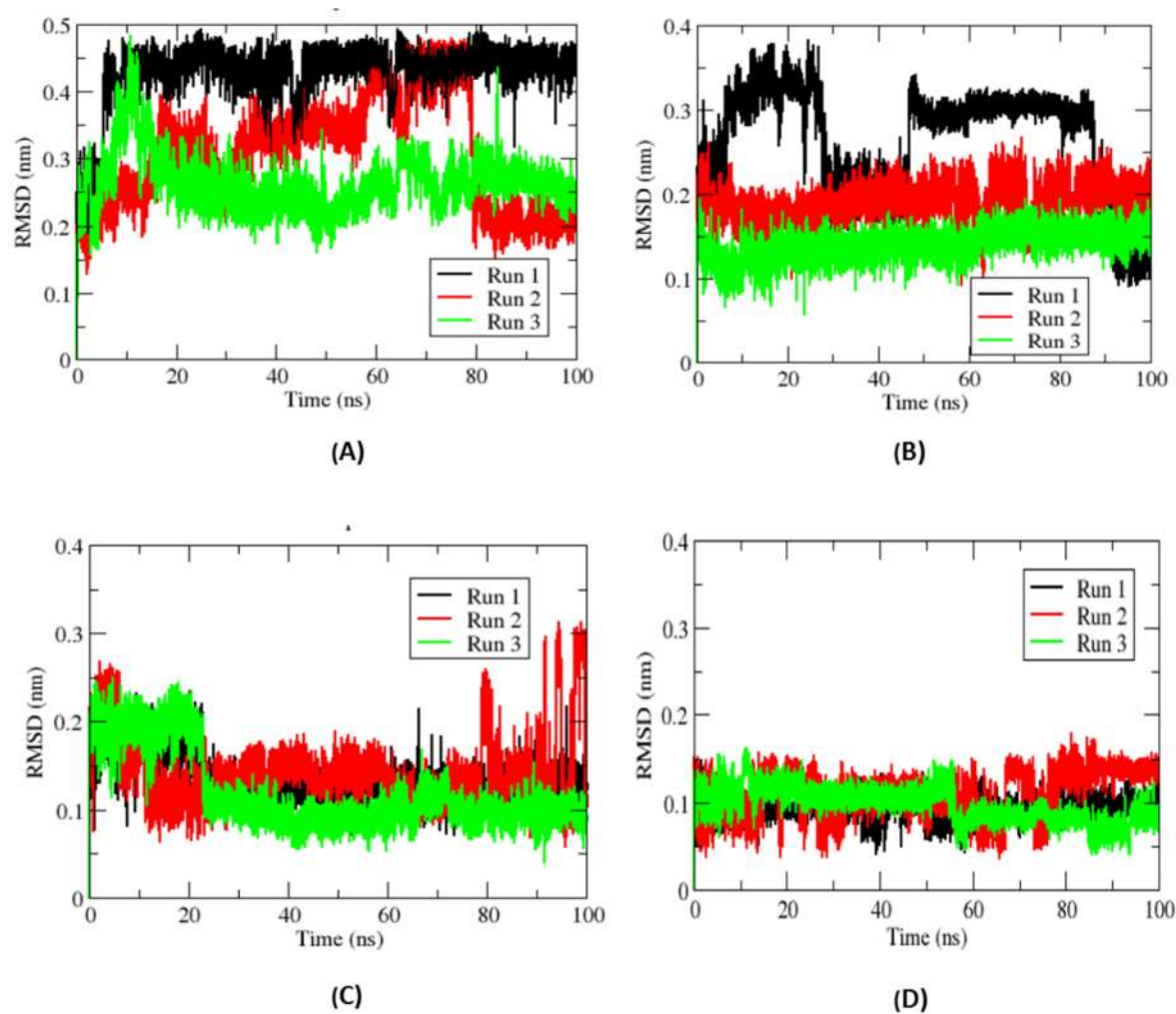


Figure S2. Convergence of each sets of MD results of ligands. RMSD plot of ligands within the catalytic pocket of Mrlip1 as a function of time. (A) RHC80267, (B) ZINC95914464 (C) ZINC85530919, and (D) ZINC85530320. The values were presented during 100,000 ps (100 ns) MD simulations time scale.

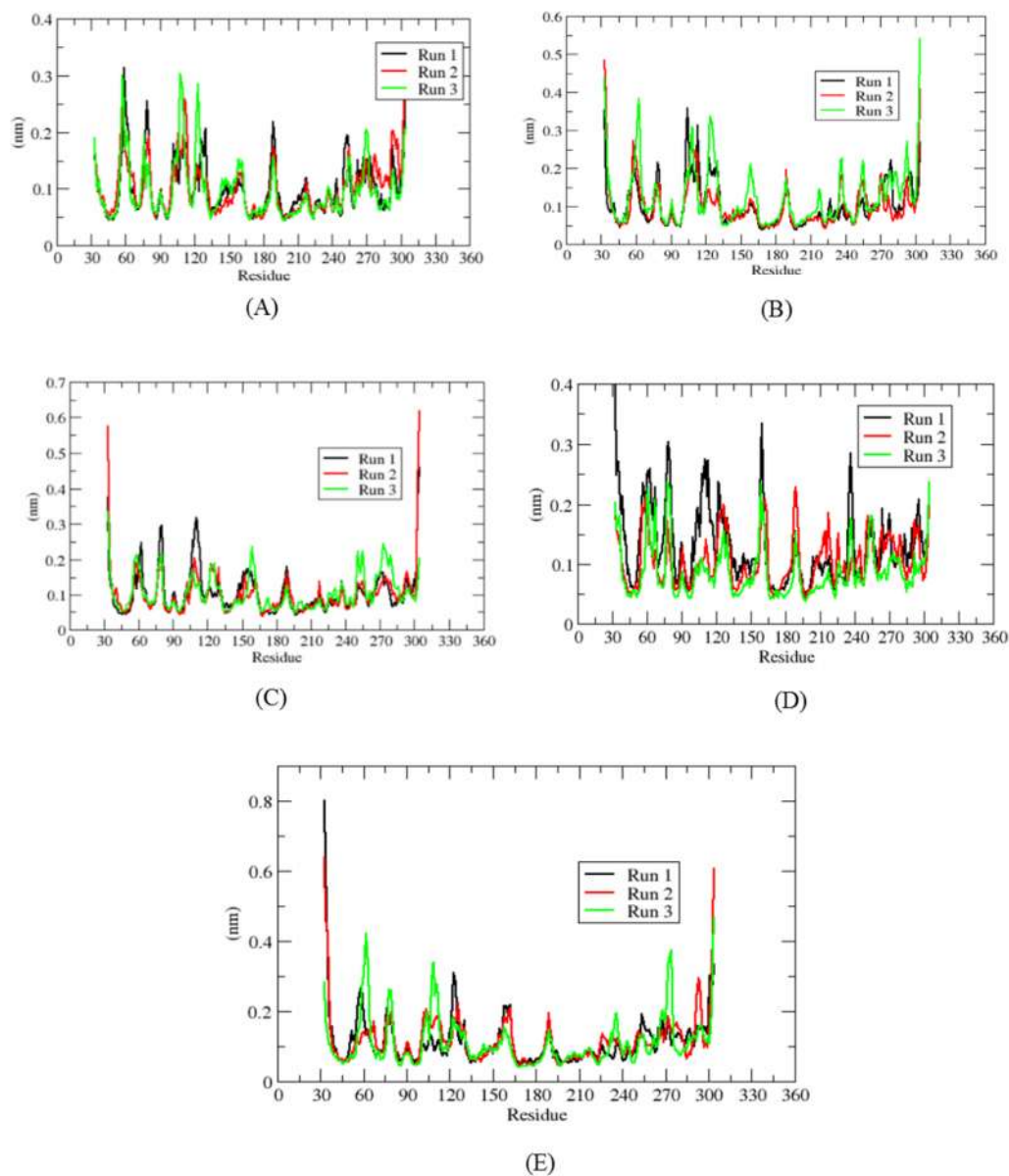


Figure S3. Convergence of each sets of MD results of protein. RMSF plot of Mrlip1(Backbone) for each sets of MD simulation as a function of time. (A) free Mrlip1, (B) Mrlip1-RHC80267, (C) Mrlip1-ZINC85530919, (D) Mrlip1- ZINC95914464 and (E) Mrlip1- ZINC85530320. The values were presented during 100,000 ps (100 ns) MD simulations time scale.

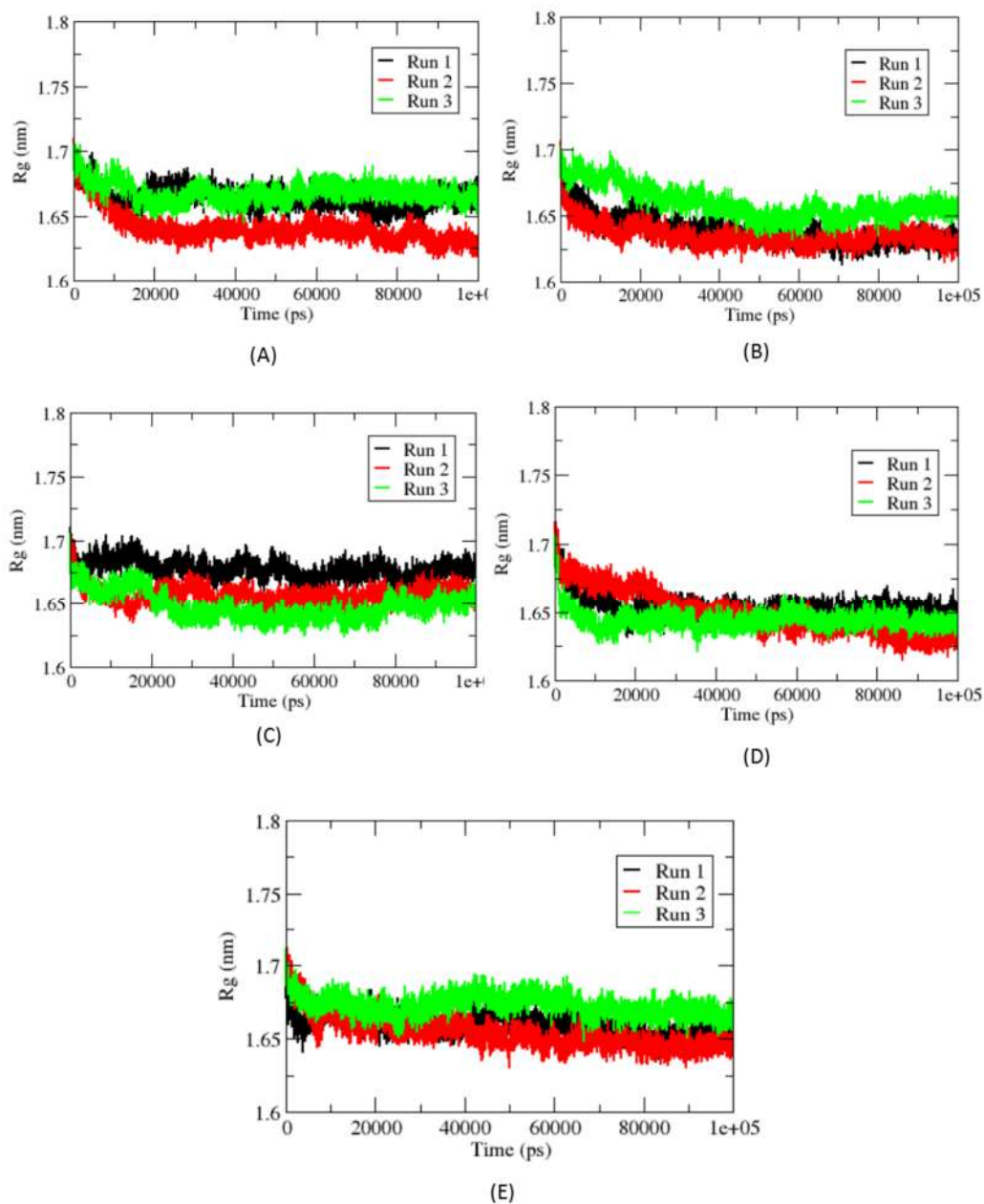


Figure S4. Convergence of each sets of MD results of protein. Radius of gyration plot of Mrlip1 for each sets of MD simulation as a function of time. (A) free Mrlip1, (B) Mrlip1-RHC80267, (C) Mrlip1-ZINC85530919, (D) Mrlip1- ZINC95914464 and (E) Mrlip1- ZINC85530320. The values were presented during 100,000 ps (100 ns) MD simulations time scale.

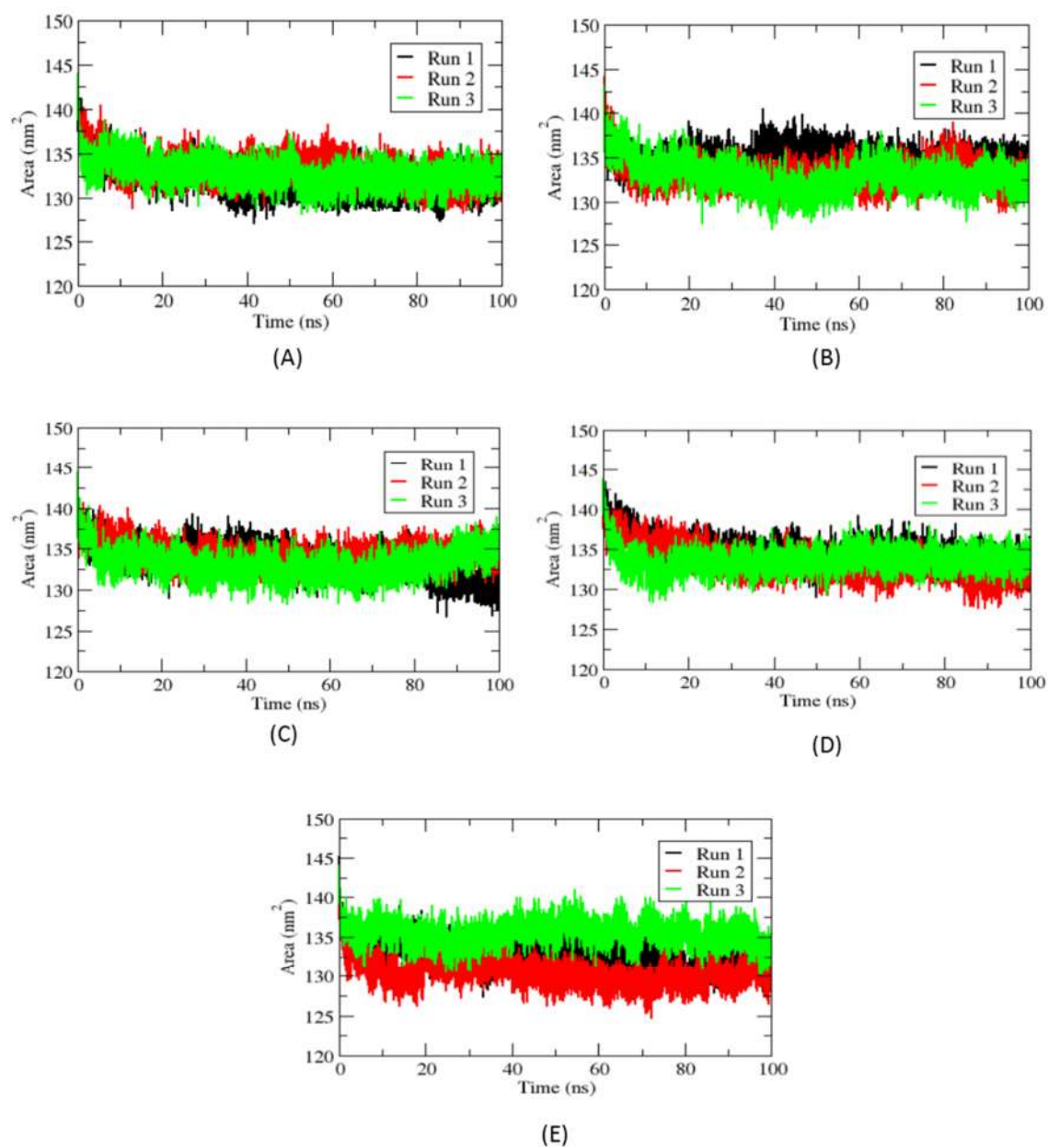
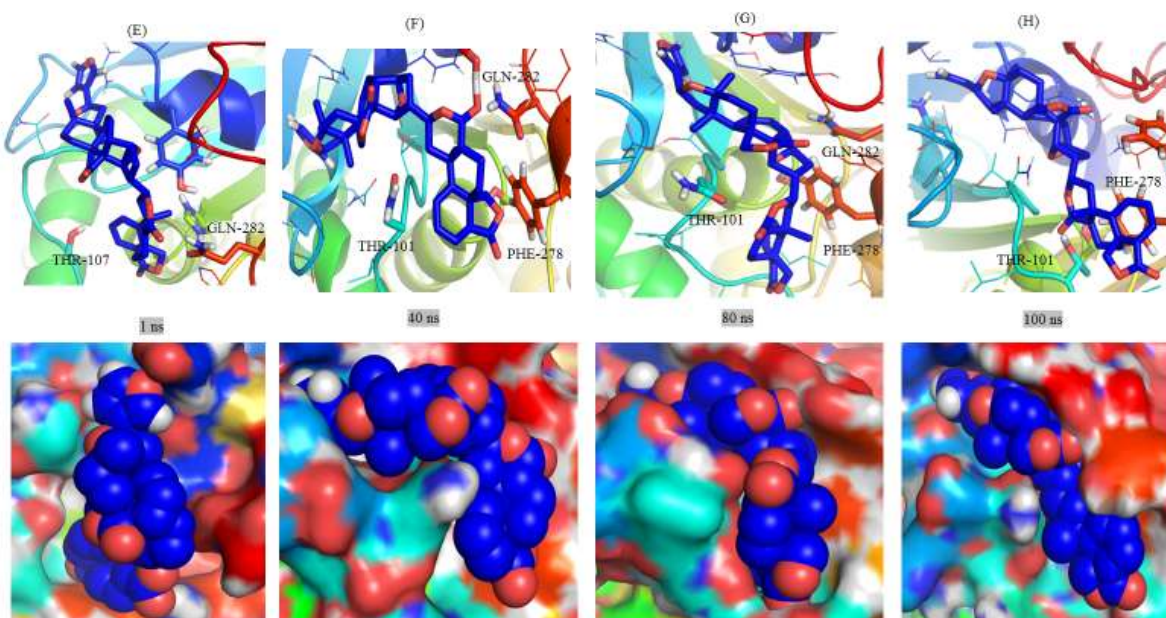
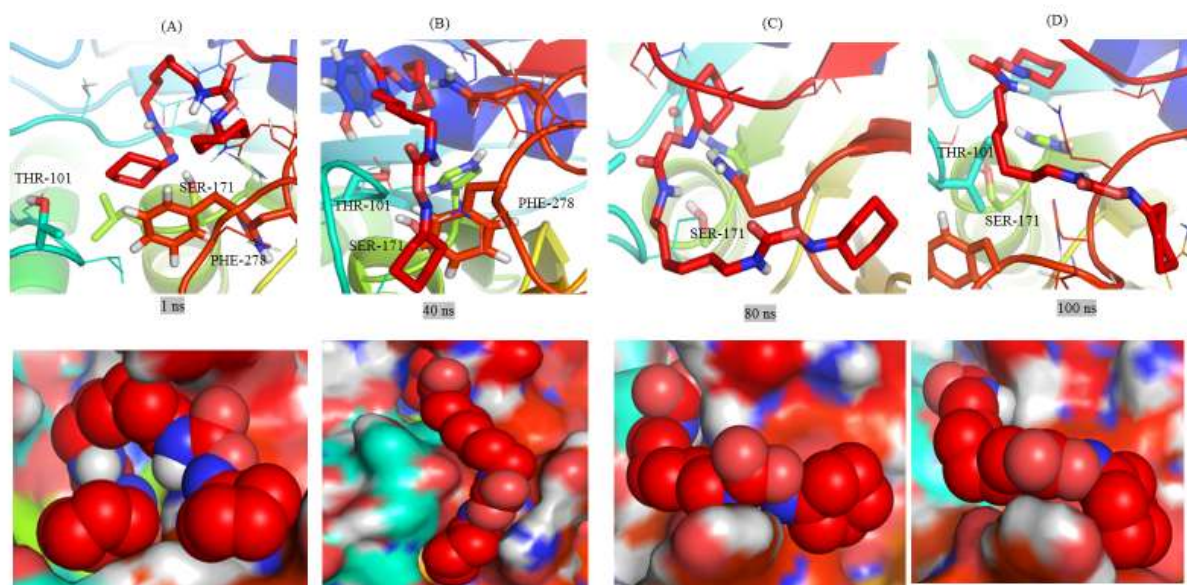


Figure S5. Convergence of each sets of MD results of protein. SASA plot of Mrlip1 for each sets of MD simulation as a function of time. (A) free Mrlip1, (B) Mrlip1-RHC80267, (C) Mrlip1- ZINC85530919, (D) Mrlip1- ZINC95914464 and (E) Mrlip1- ZINC85530320. The values were presented during 100,000 ps (100 ns) MD simulations time scale.



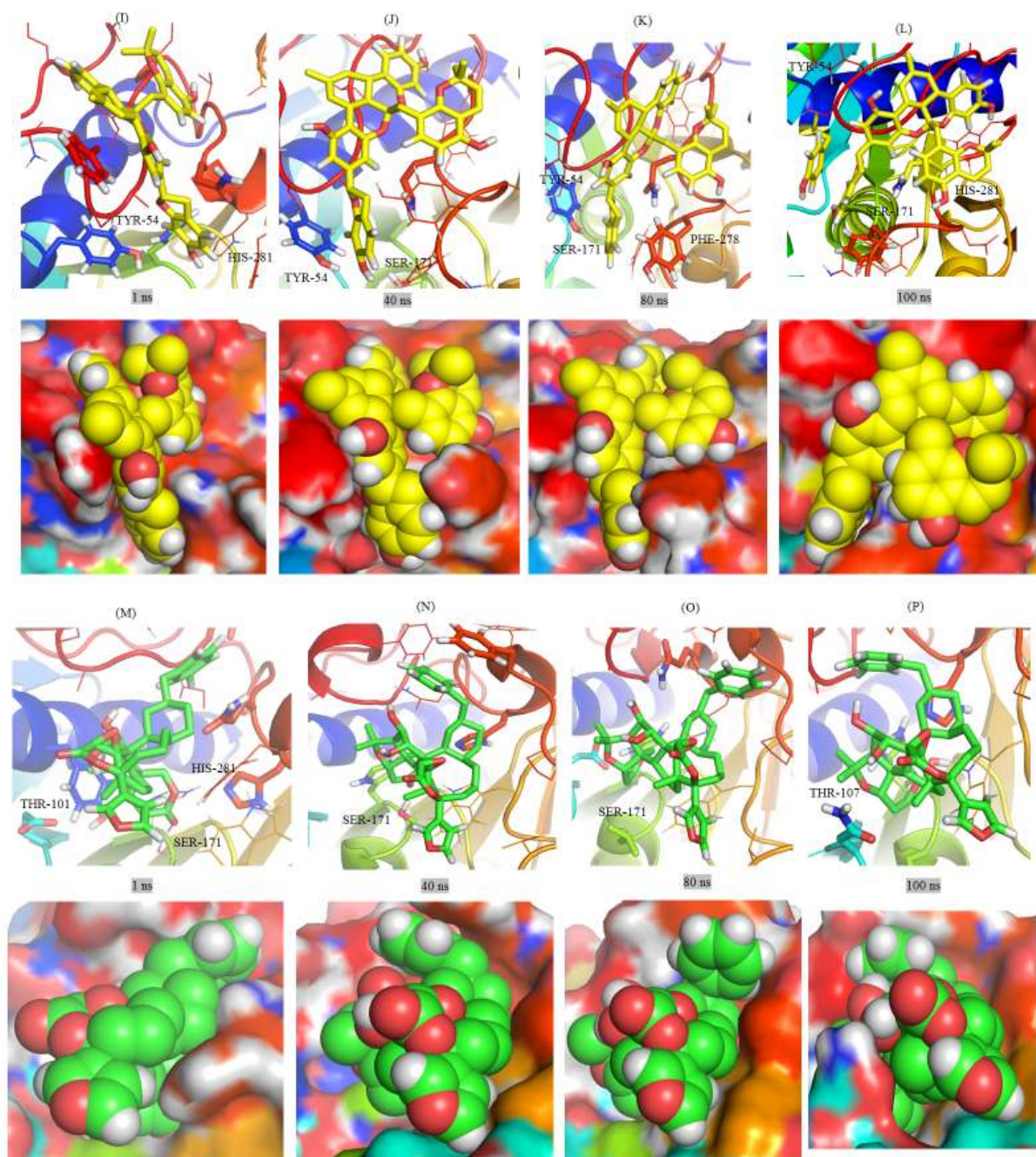
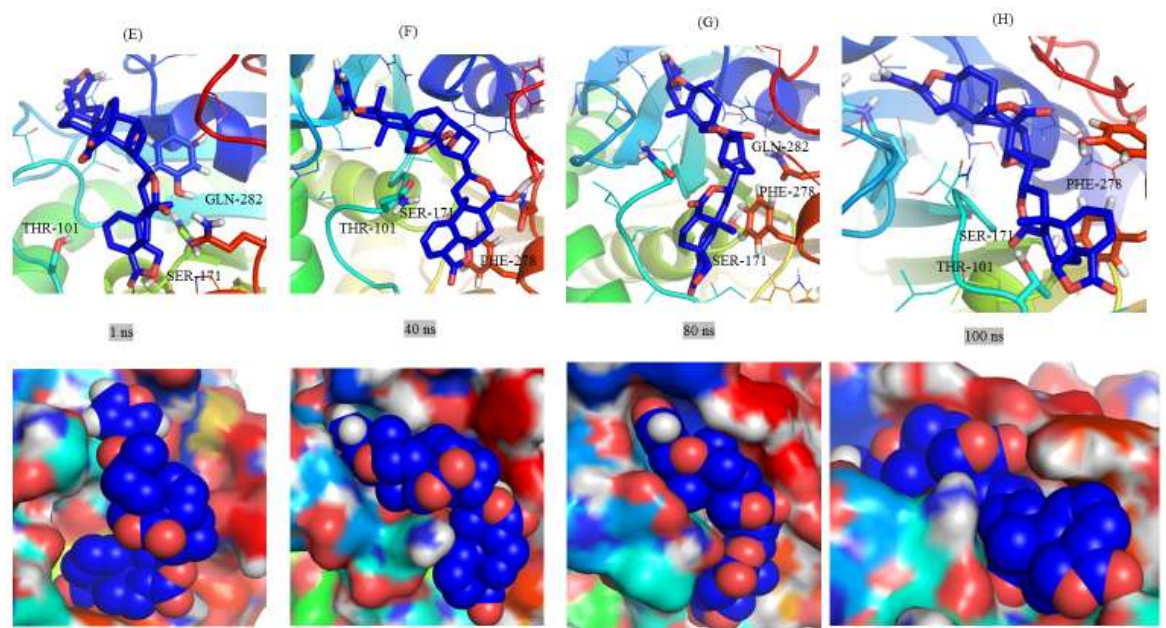
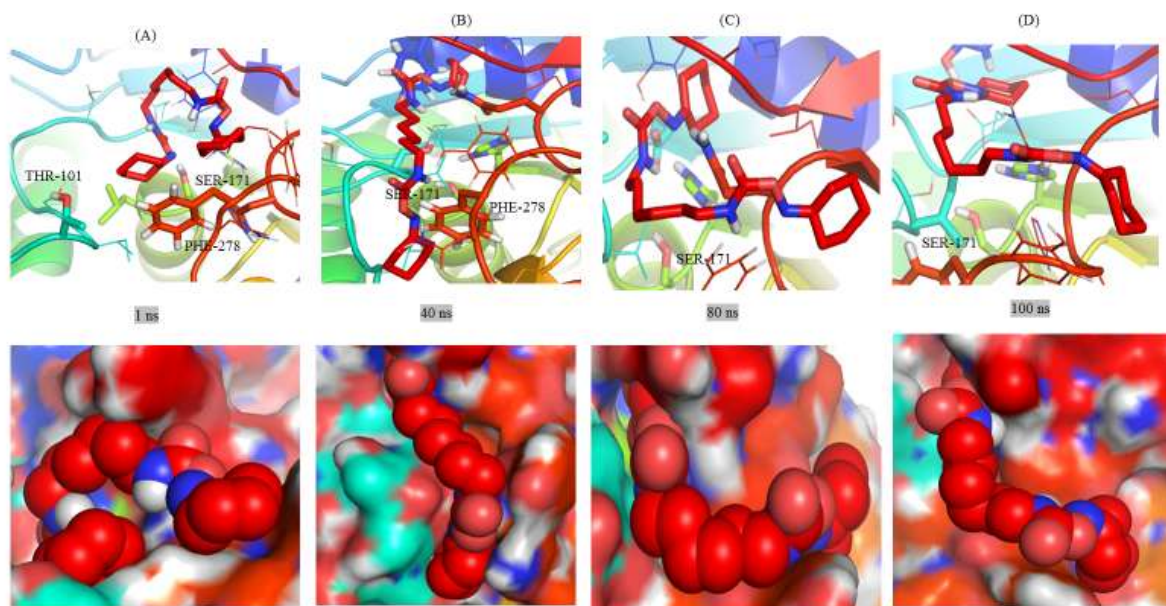


Figure S6. Ligands orientations during the different time scales (Replica). The MD trajectory of (A-D) Mrlip1- RHC80267, (E-H) Mrlip1- ZINC95914464, (I-L) Mrlip1- ZINC85530919, and (M-P) Mrlip1- ZINC85530320 complex during different time intervals. The Mrlip1 shown in cartoon as well as surface representation. Catalytic pocket residues were shown in stick model.



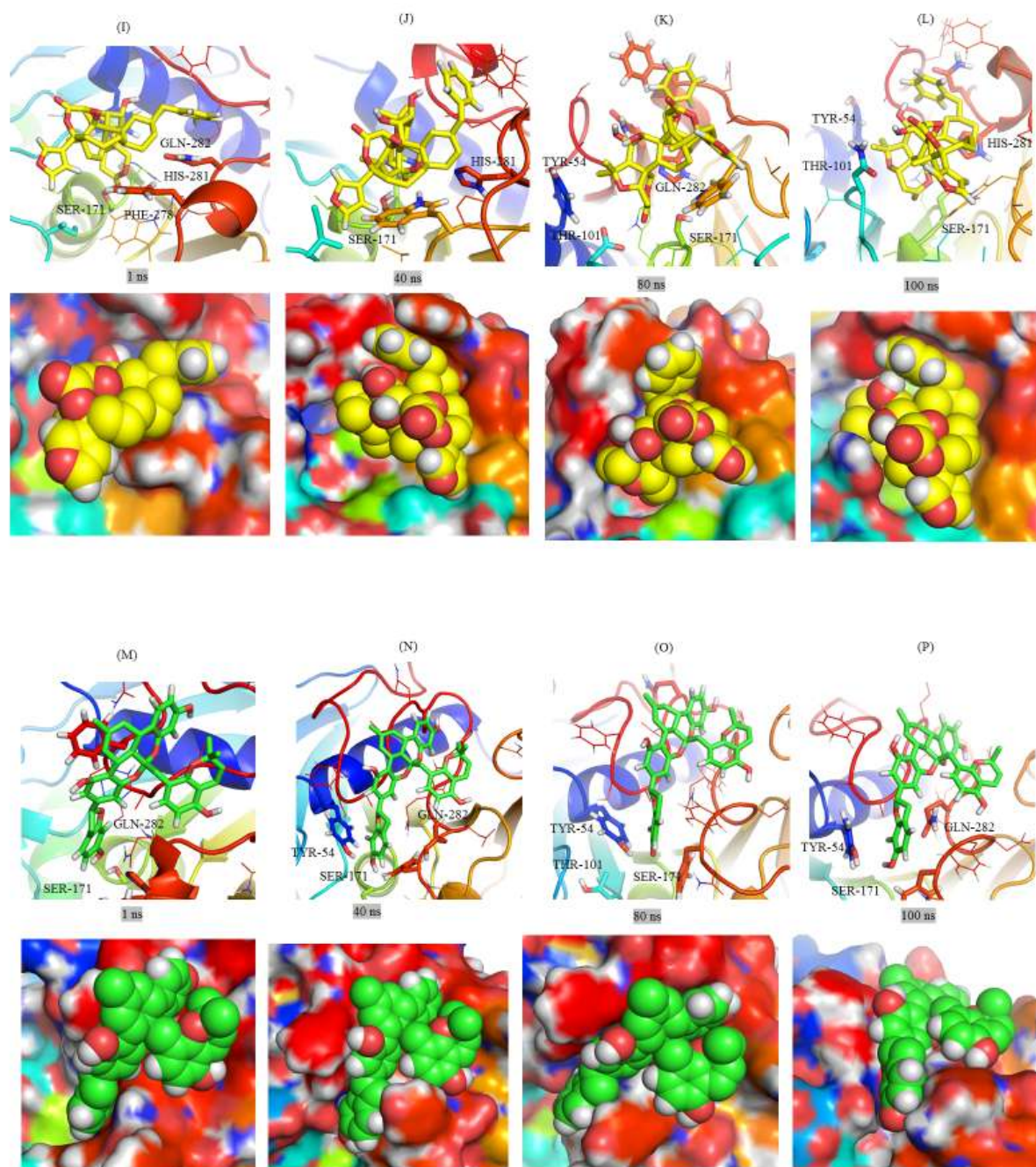
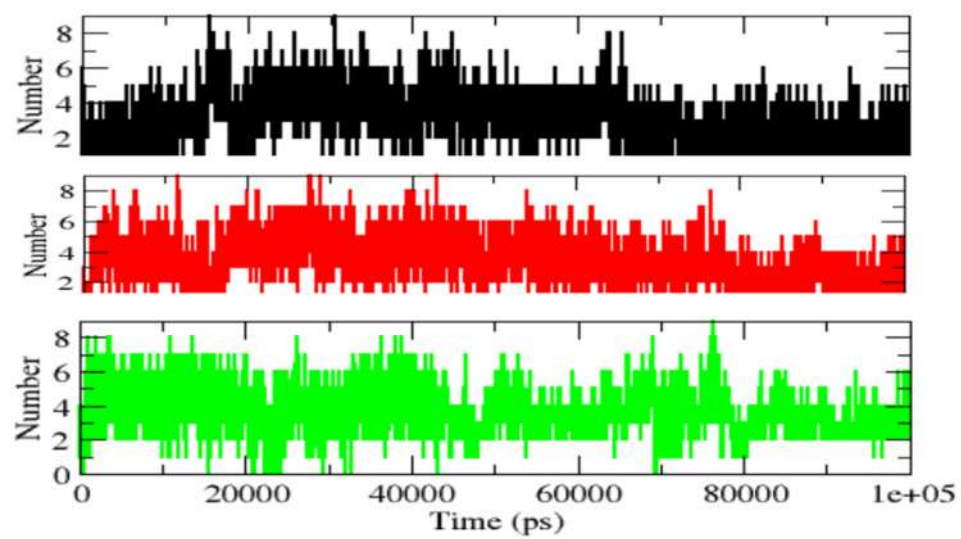
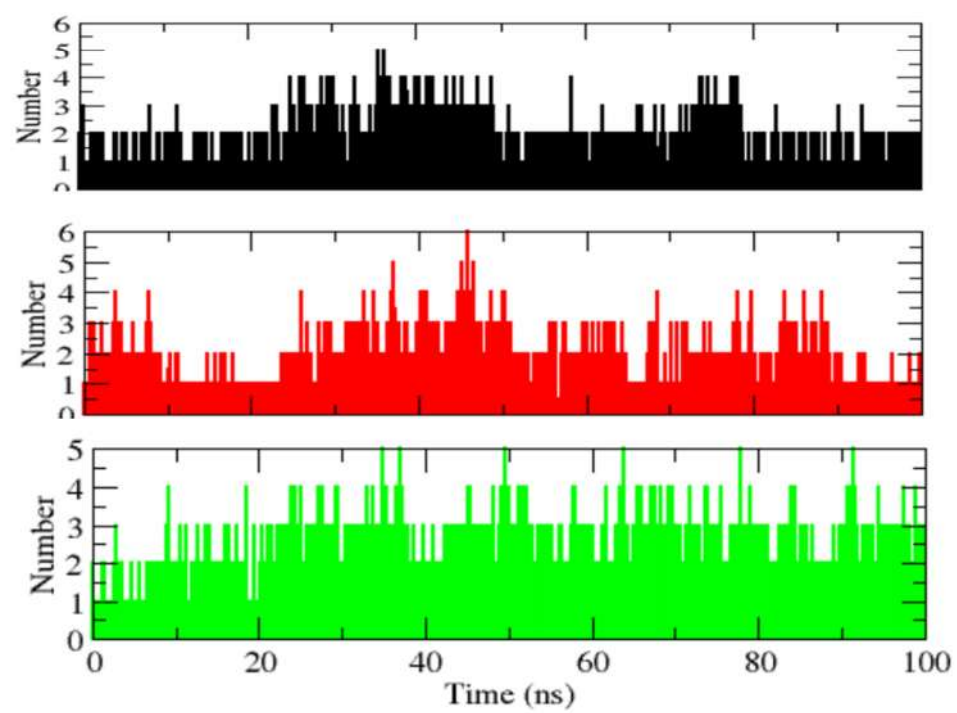


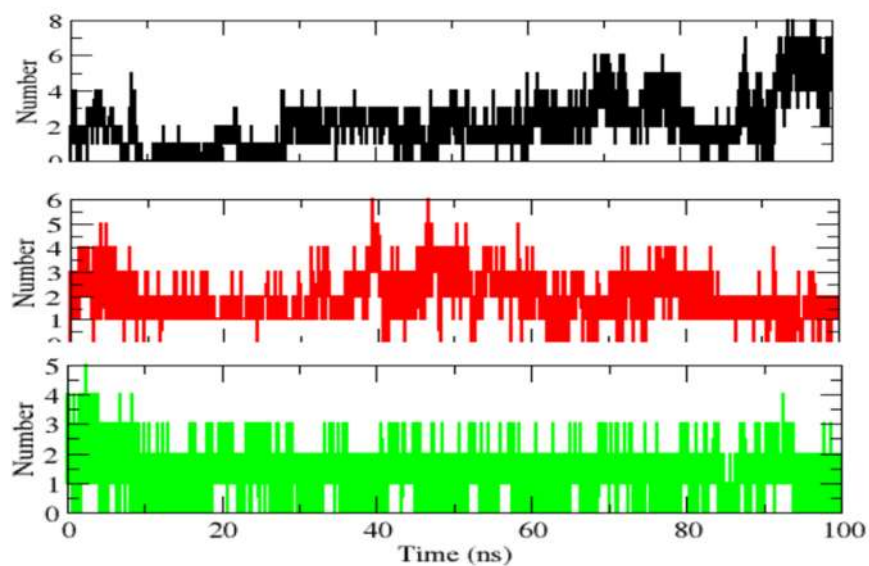
Figure S7. Ligands orientations during the different time scales (Replica). The MD trajectory of (A-D) Mrlip1-RHC80267, (E-H) Mrlip1-ZINC95914464, (I-L) Mrlip1-ZINC85530919, and (M-P) Mrlip1-ZINC85530320 complex during different time intervals. The Mrlip1 shown in cartoon as well as surface representation. Catalytic pocket residues were shown in stick model.



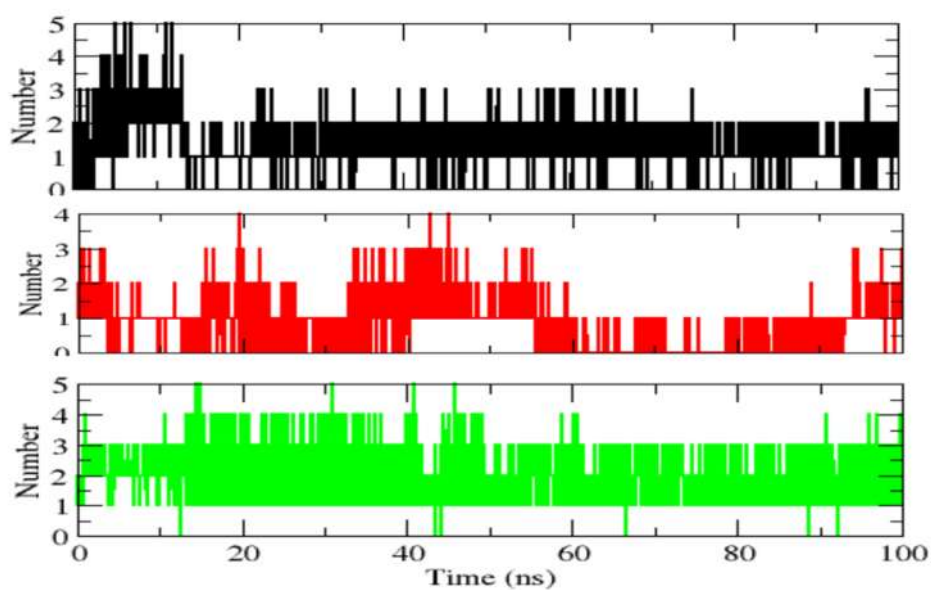
(A)



(B)



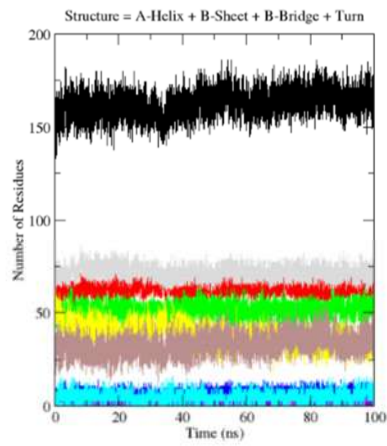
(C)



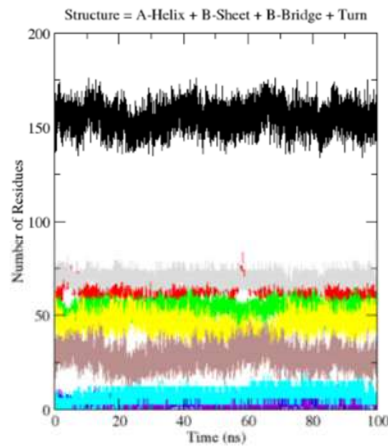
(D)

Figure S8. Hydrogen bonds analysis. The average number of hydrogen bonds between (A) Mrlip1-RHC80267, (B) Mrlip1- ZINC85530919, (C)Mrlip1- ZINC95914464 and (D) Mrlip1- ZINC85530320 as a function of time. The values were presented during 100,000 ps (100 ns) MD simulations time scale. The Black, Red and green colour represent the replica of complexes.

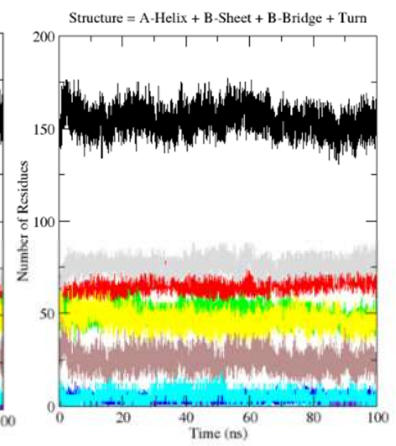
Run1



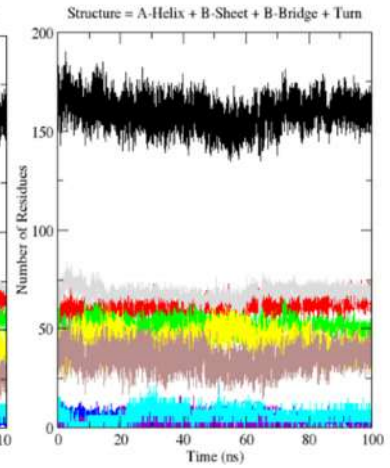
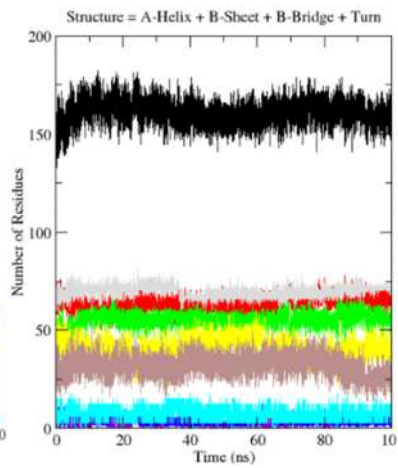
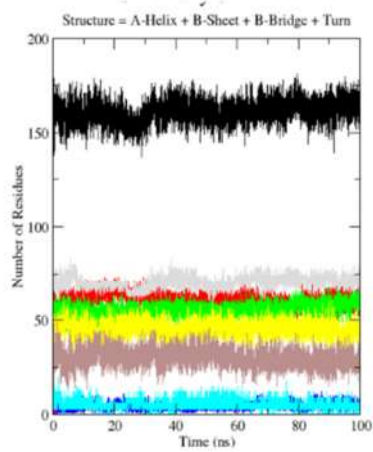
Run2



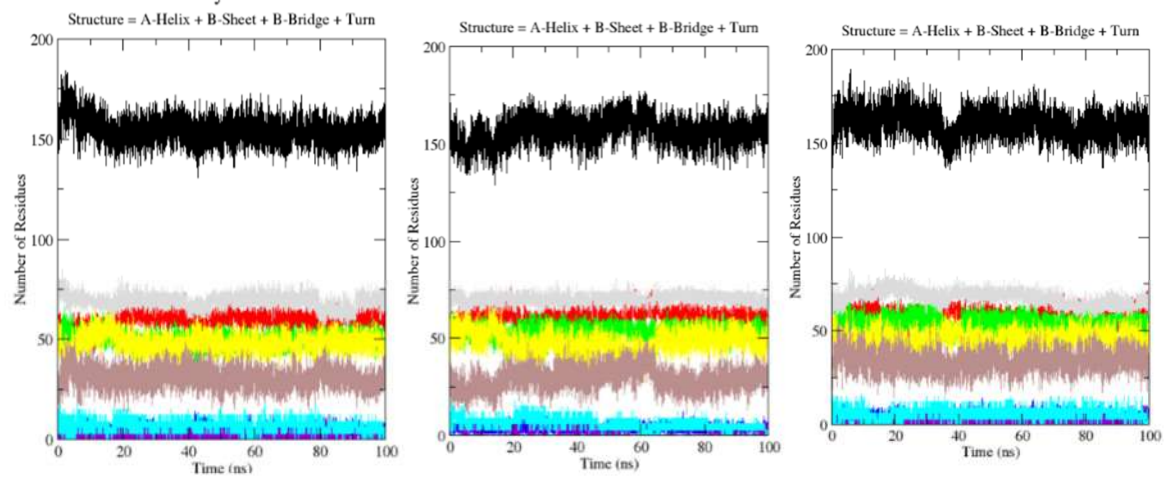
Run3



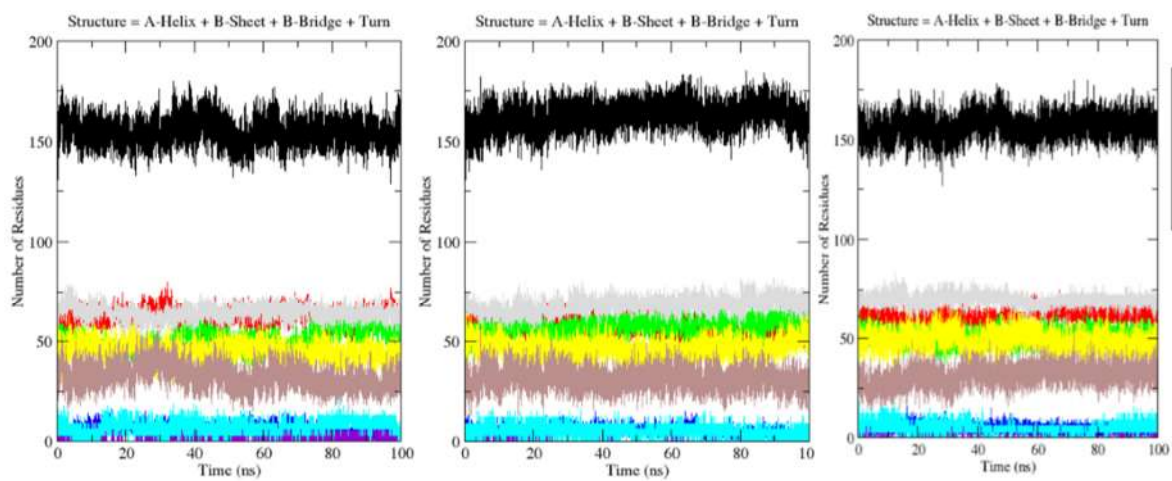
Free-Mrlip1



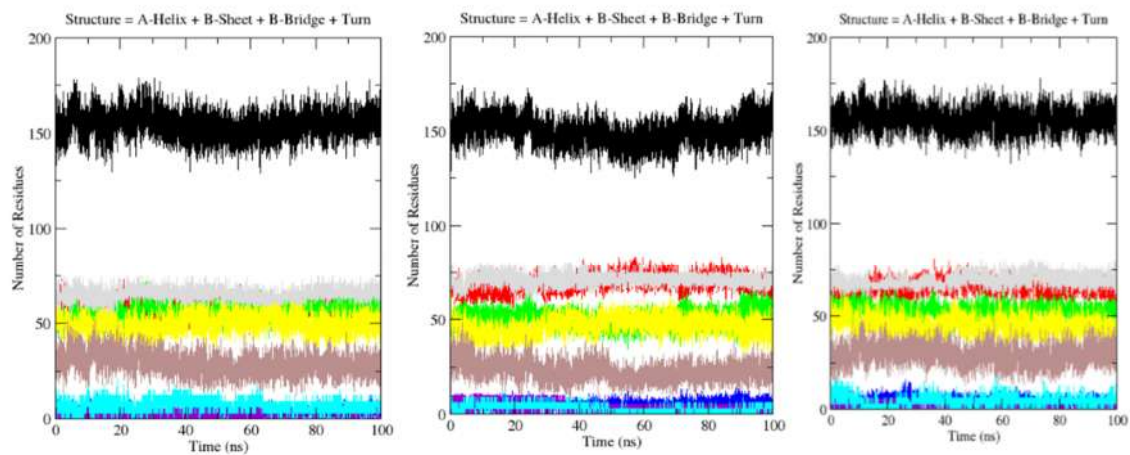
Mrlip1-RHC80267



Mrlip1- ZINC85530919



Mrlip1- ZINC95914464



Mrlip1- ZINC85530320

Figure 9. Secondary structure plot. The secondary structure analysis indicating the structural elements present in **complexes** during the 100 ns MD simulations.

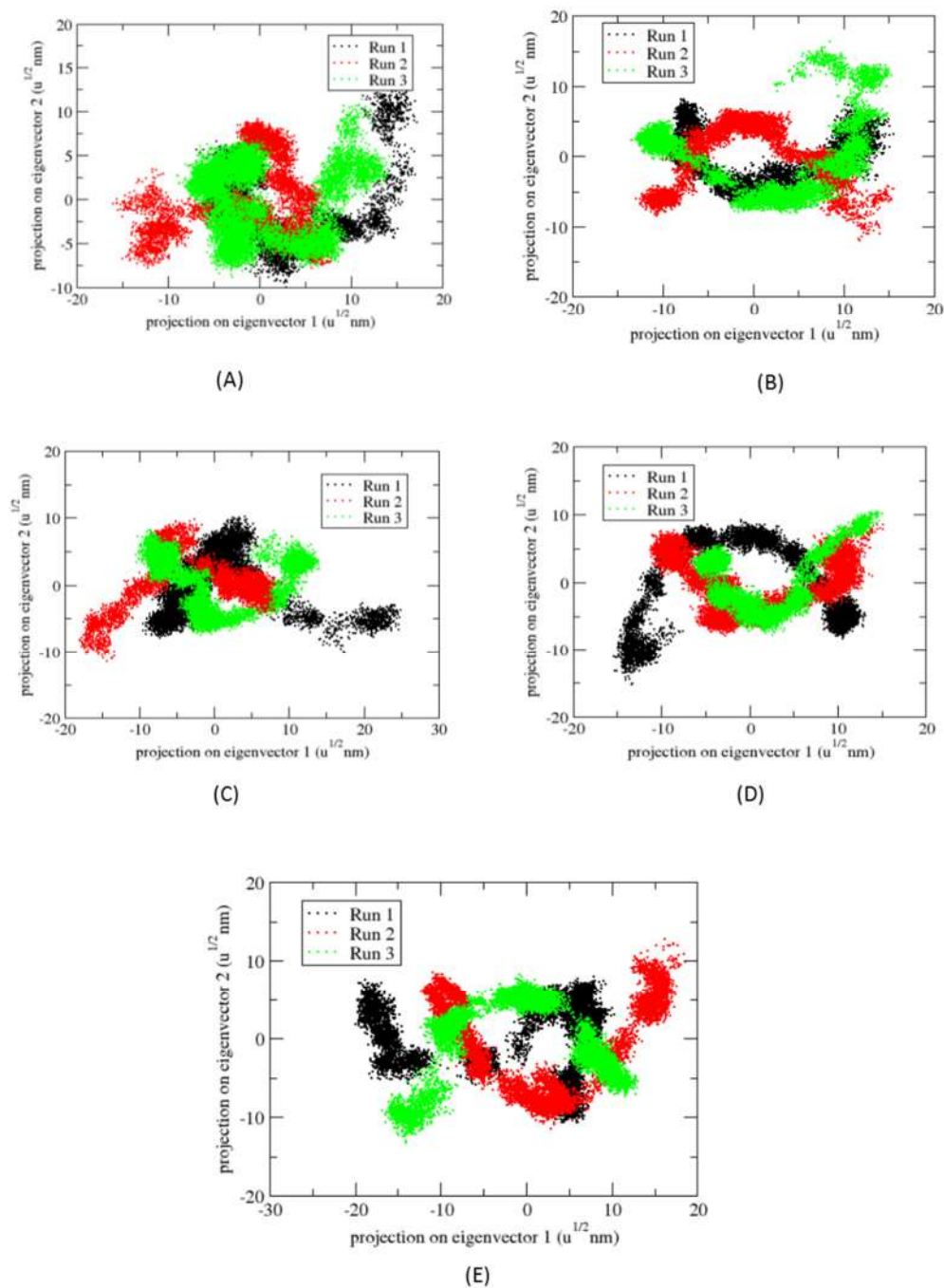
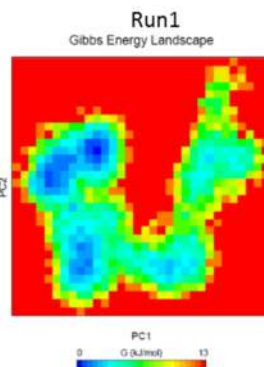
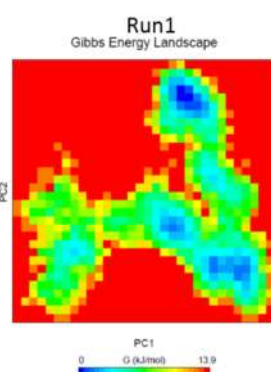
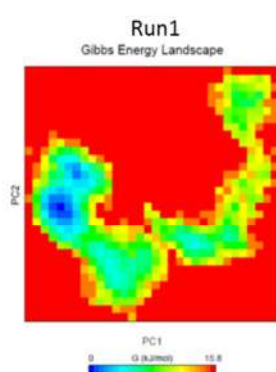
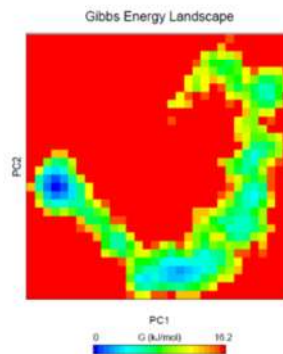
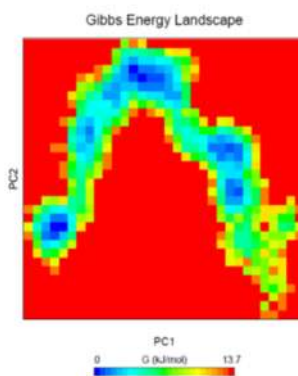
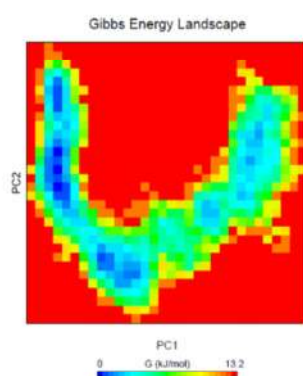


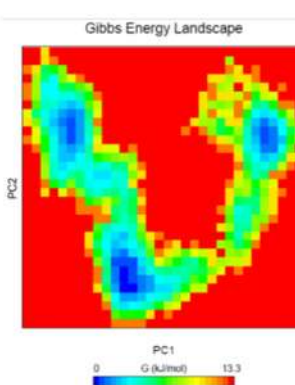
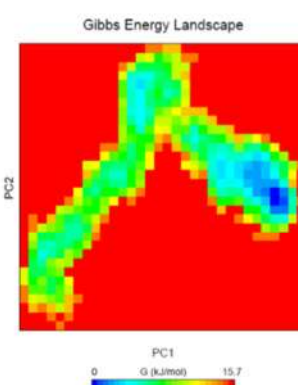
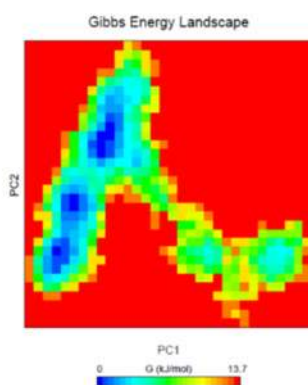
Figure S9. Principal Component Analysis. (A) The 2D projections of trajectories on eigenvectors showed different projections of Mrlip1. Black, red, and green colour represent values obtained from the different replica. (A) Free Mrlip1, (B) Mrlip1-RHC80267, (C) Mrlip1- ZINC85530919, (D) Mrlip1- ZINC95914464 and (E) Mrlip1- ZINC85530320.



Free-Mrlip1



Mrlip1-RHC80267



Mrlip1- ZINC85530919

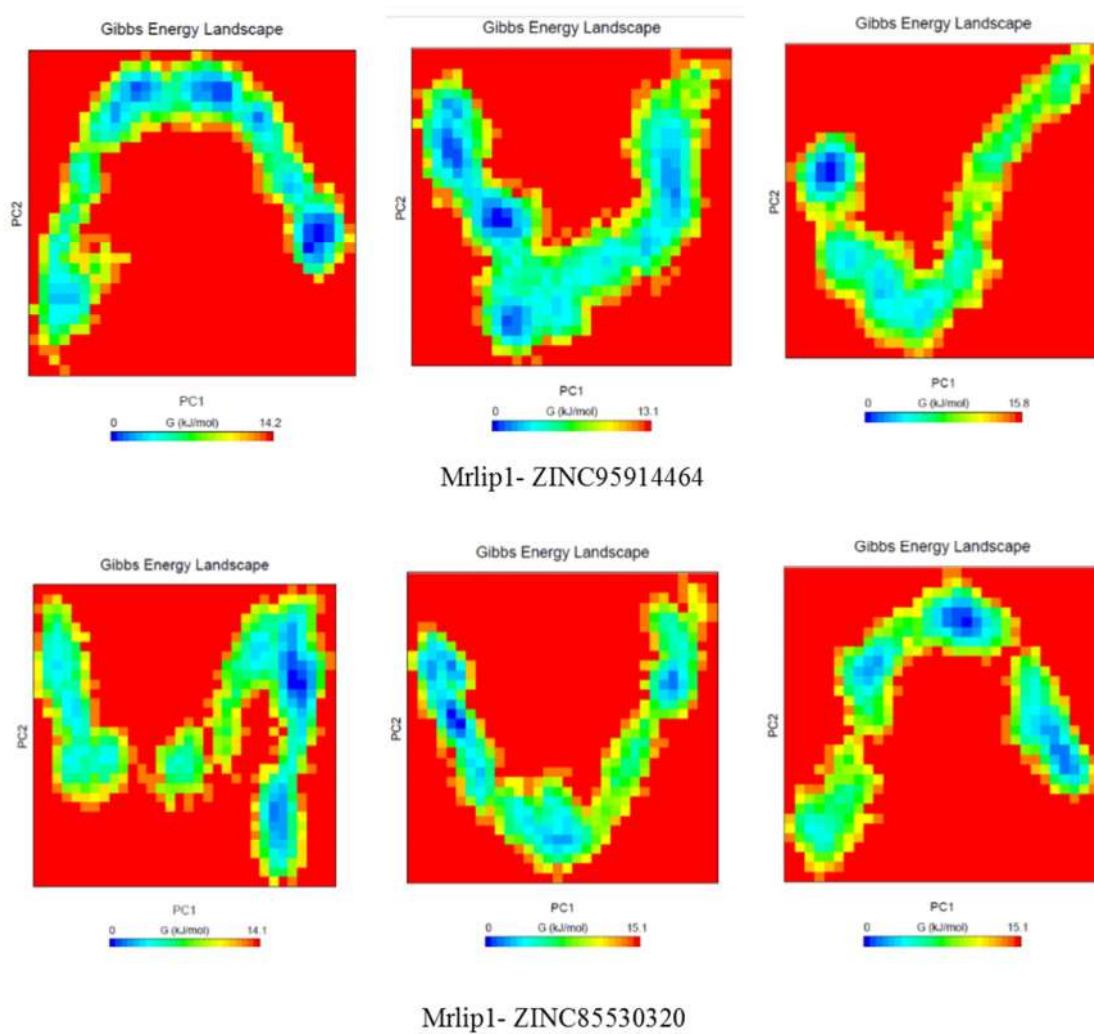


Figure S10. The Gibbs energy landscape. The Gibbs energy landscape plot obtained during 100 ns MD simulations for Free Mrlip1, Mrlip1-RHC80267, Mrlip1-ZINC85530919, Mrlip1- ZINC95914464 and Mrlip1- ZINC85530320.