Screening peptida siklis komersial sebagai inhibitor NS5 metiltransferase virus dengue melalui molecular docking dan simulasi molecular dynamics = Screening of commercial cyclic peptide as inhibitor NS5 methyltransferase of dengue virus by molecular docking and molecular dynamics

Bimo Budi Utomo, author

Abstrak

Penyakit yang disebabkan oleh infeksi virus dengue telah menjadi masalah kesehatan utama di dunia. Pengobatan baru bersifat antiviral yang menghambat aktivitas enzim yang berperan dalam replikasi di dalam tubuh sangat dibutuhkan saat ini. NS5 metiltransferase merupakan salah satu protein non struktural virus dengue yang diketahui dapat menjadi target inhibitor antiviral. Penelitian ini bertujuan menapis peptida siklis komersial yang dapat digunakan sebagai inhibitor NS5 metiltransferase virus dengue melalui molecular docking dan simulasi molecular dynamics.
Screening dilakukan melalui metode molecular docking berdasarkan nilai Gbinding. Stabilitas kompleks enzim-ligan dianalisis dengan simulasi molecular dynamics. Screening 300 peptida siklis komersial didapatkan ligan terbaik untuk masing-masing sisi ikatan SAM dan RNA-cap NS5 metiltransferase yaitu [Tyr123] Prepro Endothelin (110-130),amide,human dan Urotensin II, human berdasarkan nilai Gbinding, molecular weight (MW) dan uji ADME-Tox.
Hasil simulasi molecular dynamics menunjukan bahwa kedua ligan dapat mempertahankan interaksi dengan residu sisi aktif target. Ligan [Tyr123] Prepro Endothelin (110-130),amide,human dapat mempertahankan kestabilan konformasi kompleks enzim-ligan pada 310 K dan 312 K. Sedangkan ligan Urotensin II, human lebih reaktif pada 312 K dibandingkan pada 310 K. Oleh karena itu, kedua ligan dapat dijadikan kandidat inhibitor potensial untuk NS5 metiltransferase virus dengue.
.....Disease caused by dengue virus infection has become a major health problem in the world. New treatment is antiviral which inhibits the activity of enzymes that play a role in replication in the body is needed at this time. NS5 methyltransferase was one of dengue virus non-structural proteins which were known to be a target of antiviral inhibitors. This research aims to screen commercial cyclic peptides that was used as inhibitors of dengue virus NS5 methyltransferase by molecular docking and molecular dynamics simulation.
Screening was done through molecular docking method based on the value of Gbinding. Stability of complex enzyme-ligand were analyzed by molecular dynamics simulation. Screening of 300 commercial cyclic peptide obtained best ligand for SAM and RNA-cap binding site of NS5 methyltransferase recpectively based on Gbinding value, molecular weight (MW) and ADME-Tox test.
Result of molecular dynamics simulation show that both of the ligand can maintain interaction with the active site residues of target. Ligand [Tyr123] Prepro Endothelin (110- 130),amide,human can maintain stable conformation of complex enzyme-ligand at 310 K and 312 K. Meanwhile, ligand Urotensin II,human more reactive at 312 K than at 310 K. Therefore, both ligands can be used as a potential inhibitor candidates for NS5 methyltransferase of dengue virus.