Aktivitas Ekstrak Curcuma longa pada Penghambatan Reseptor Sel dan Protein Virus Dengue Serotipe 2 Secara In Vitro dan In Silico = In Vitro and In Silico Inhibitory Activity of Curcuma longa Extract on Cell Receptor and Dengue Serotype 2 Protein

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Abstrak

Demam dengue (DD) merupakan penyakit infeksi virus dengue (DENV) dengan vektor Aedes aegypti dan Aedes albopictus. Secara global, terjadi peningkatan kasus DD sebanyak enam kali lipat dari tahun 2010 hingga 2016 namun sampai saat ini regimen terapi DD adalah terapi suportif yaitu terapi cairan dan simptomatik. Ekstrak Curcuma longa telah diteliti memiliki potensi sebagai antiviral untuk DENV. Namun, mekanisme penghambatannya masih belum diketahui sehingga penelitian ini dilakukan untuk mengetahui efek ekstrak Curcuma longa terhadap penghambatan reseptor dan penempelan virus dengue serotipe 2 (DENV-2) secara in vitro dan ikatan curcumin dengan protein E secara in silico.
Penelitian ini merupakan studi eksperimental untuk menganalisa mekanisme kerja dari ekstrak Curcuma longa sebagai antivirus terhadap DENV-2 menggunakan sel Vero sebagai sel uji dan in silico untuk mengetahui ikatan energi curcumin dengan protein E DENV. Focus assay dan MTT Assay digunakan untuk menilai penghambatan reseptor dan protein virus, serta viabilitas sel secara berturut-turut. Konsentrasi ekstrak Curcuma longa yang digunakan yaitu dua kali IC50 (17,91 g/mL). DMSO digunakan sebagai kontrol.
Persentase hambat pada reseptor sel dan protein virus masing-masing adalah 98,67 ± 1,33% dan 2,29 ± 1,19%. Persentase viabilitas sel pasca pemberian ekstrak Curcuma longa adalah 97,07 ± 0,50%. Energi ikatan pada konformasi terbaik curcumin dengan protein E bernilai -2,71 kkal/mol dengan konstanta inhibisi 10,34 mM.
Ekstrak Curcuma longa memiliki efek penghambatan reseptor sel lebih baik daripada protein E virus serta memiliki ikatan yang relatif baik dengan protein E.
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Dengue fever (DF) is an disease caused by dengue virus infection (DENV). From 2010 to 2016, there has been a sixfold increase of DF cases globally. However, therapy for DF currently only consist of supportive treatments. Curcuma longa (turmeric) extract has been studied and its potential antiviral activity against dengue serotype 2 virus was found but inhibitory mechanism is still unknown. This research aims to find the inhibitory effect of turmeric extract against cell receptor and attachment protein of DENV-2 in vitro and binding energy between curcumin and dengue protein E in silico.

Experimental, in vitro study was done to analyze inhibitory mechanism of turmeric extract as antivirus to DENV-2 using Vero cell as test cell. In silico calculation of binding energy between curcumin and DENV protein E was also done using a docking software. Focus assay and MTT assay were used to evaluate receptor and viral attachment protein inhibition as well as cell viability, respectively. Turmeric extract concentration used was twice of IC50 (17,91 g/mL) . DMSO was used as control.

Inhibition percentage on cell receptor and viral attachment protein yielded 98,67±1,33% and 2,29±1,19% respectively. Viability percentage of the cells after treatment with turmeric extract is 97,07 ± 0,50%. Binding energy at the best conformation between curcumin and viral protein E is -2.71 kcal/mol with inhibition constant of 10,34 mM

Turmeric extract has a higher inhibition effect against cell receptor compared to viral attachment protein and has a relatively strong bond with protein E.<i/>