AKTIVITAS SITOTOKSIK SIMVASTATIN PADA SEL KANKER PAYUDARA T47D SERTA PENGARUHNYA TERHADAP EKSPRESI *CYCLIN* D1 DAN APOPTOSIS (Annexin V-Pi)

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ABSTRAK

Latar Belakang : Statin (HMG-CoA *Inhibitor*) merupakan golongan obat yang digunakan untuk menurunkan kadar kolesterol plasma serta terapi untuk mencegah jantung koroner. Penelitian pada hewan coba dan studi epidemiologi menunjukkan bahwa terapi statin dapat menurunkan resiko terhadap kanker yang berhubungan dengan kolesterol. Berdasarkan fakta tersebut mendorong dilakukannya penelitian mengetahui aktivitas sitotoksik simvastatin terhadap kultur sel kanker payudara T47D dan pengaruhnya dalam menurunkan ekspresi *cyclin* D1 dan induksi apoptosis.

Tujuan Penelitian: Penelitian ini bertujuan untuk membuktikan aktivitas simvastatin terhadap kultur sel kanker payudara T47D, khususnya mengkaji aktivitas sitotoksik, ekspresi *cyclin* D1, dan pengaruhnya terhadap induksi apoptosis.

Metode Penelitian: Jenis penelitian ini adalah eksperimen kuasi dengan menggunakan *post test with non equivalent control group design*. Uji sitotoksisitas dilakukan pada kultur sel kanker payudara T47D dengan metode MTT *assay* untuk menetapkan nilai IC_{50} setelah diberikan simvastatin. Ekspresi *cyclin* D1 dan uji induksi apoptosis dideteksi menggunakan *flowcytometry* dengan penambahan *antibody monoclonal anti-cyclin* D1 dan Annexin V-Pi, kemudian dianalisis dengan program FACS-Calibur.

Hasil : Simvastatin berefek sitotoksik terhadap sel kanker payudara T47D dengan nilai IC_{50} sebesar 25,25 µg/ml. Simvastatin dengan konsentrasi 6,31; 12,62; 25,25 dan 50,5 µg/mL mampu menurunkan ekspresi *cyclin* D1. Selain itu, simvastatin dapat menginduksi apoptosis dengan nilai EC_{50} sebesar 26,96 µg/mL pada sel kanker payudara T47D.

Kesimpulan : Simvastatin memiliki aktivitas sitotoksik pada sel kanker payudara T47D dan dapat menurunkan ekspresi *cyclin* D1 serta menginduksi aktivitas apoptosis pada sel kanker payudara T47D.

Kata Kunci : simvastatin, sitotoksik, *cyclin* D1, apoptosis, T47D.

CYTOTOXIC ACTIVITY of SIMVASTATIN in T47D BREAST CANCER CELLS and ITS EFFECT on CYCLIN D1 EXPRESSION and APOPTOSIS

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ABSTRACT

Background: Statins (HMG-CoA Inhibitors) is a drug used for decreasing plasma cholesterol levels and used in therapy to prevent coronary artery disease. Research in animals and epidemiological studies showed that statin therapy can decrease risk against cancer associated with cholesterol. Based on that result then research of cytotoxic activity against simvastatin knowing cultur T47D breast cancer cells and his influence in decreasing expression of cyclin D1 and induction of apoptosis has been done.

Research objectives: The aims of this research is to prove activities of simvastatin against T47D breast cancer cell culture, especially to examine cytotoxic activity, cyclin D1 expression, and simvastatin effect in apoptotic induction.

Research method: The type of this research is quasi experiment with using posttest with non-equivalent control group design. Cytotoxicity test performed on T47D breast cancer cell cultures using MTT assay to determine IC_{50} values after given simvastatine. Expression of cyclin D1 and apoptosis induction test detected using flow cytometry with antibody monoclonal anti-cyclin D1 and Annexin V-Pi, then analyzed by FACS-Calibur program.

Results: Simvastatin has cytotoxic effect against T47D breast cancer cells with IC_{50} values 25.25 µg/mL. Simvastatin with concentrations of 6.31; 12.62; 25.25 and 50.5 µg/mL was able to decrease the cyclin D1 expression. Furthermore, simvastatin can induce apoptosis with EC_{50} values 26.96 µg/mL in T47D breast cancer cells.

Conclusion: Simvastatin has cytotoxic activity of in T47D breast cancer cells and decreasing cyclin D1 expression and inducing apoptosis activity in T47D breast cancer cells.

Keywords: simvastatin, cytotoxic, cyclin D1, apoptotic, T47D.