Efek pemberian ekstrak etanol daun sirsak (annona muricata l.) terhadap viablitas sel kanker kolorektal ht-29 dan molecular docking senyawa aktifnya pada protein siklin d1 = The effect of ethanolic leave extract of soursop (annona muricata l.) on the viability of ht-29 colorectal cell line and molecular docking of its active compound to cyclin d1 protein.

Debby Desmarini Herdaus, author

Abstrak

Latar Belakang: Kanker kolorektal merupakan perubahan patologis jaringan epitel kolon dan rektum normal menjadi massa jaringan yang abnormal, salah satunya disebabkan ekspresi berlebih pada protein siklin D1 sehingga menyebabkan proliferasi sel di kolorektal yang berlebihan. Upaya pencegahan dan pengobatan penyakit kanker kolorektal dapat dilakukan secara alami salah satunya dengan mengonsumsi ekstrak daun Annona muricata L. (sirsak). Sirsak diketahui banyak mengandung komponen fitokimia yang berperan sebagai anti-kanker.
Metode: Penelitian ini menggunakan sel kultur kanker kolorektal HT-29 yang diberi paparan ekstrak etanol daun sirsak dan 5-Fluorourasil (5-FU) sebagai kontrol positif, kontrol pelarut, kontrol sel sebagai kontrol negatif untuk dicari konsentrasi optimumnya (CC50) dan dilanjutkan dengan konsentrasi ½ x CC50,1 x CC50, dan 2 x CC50. Parameter yang dinilai adalah viabilitas sel dengan MTT Assay dan analisis penambatan molekuler dari ekstrak etanol daun sirsak terhadap protein siklin D1 dengan molecular operating environment (MOE) 2013.08 software.
Hasil: Konsentrasi optimum (CC50) ekstrak etanol daun sirsak sebesar 278 µg/mL dan 5-FU sebesar 88 µg/mL. Pemeriksaan viabilitas sel menunjukkan persentase sel HT-29 hidup menurun seiring dengan bertambahnya konsentrasi dan persentase terendah di konsentrasi 2 x dari cytotoxicity concentration 50 (CC50) setelah pemberian ekstrak etanol daun sirsak (40,4±1,3%) dibandingkan dengan 5-FU (52,8±4,3%), kontrol pelarut (97,2±1,4%) dan kontrol sel (100%). Analisis penambatan molekuler terhadap protein siklin D1 didapatkan molekul N-hexadecanoic acid dan phytol yang mempunyai energi bebas (G) terendah, yaitu 9,7755 kkal/mol dan -7,2147 kkal/mol.
Kesimpulan: Konsentrasi 5-FU memiliki CC50 tiga kali lebih rendah dibandingkan ekstrak etanol daun sirsak. Molekul N-hexadecanoic acid dan phytol mempunyai kemampuan berikatan dengan protein siklin D1.
.....
Introduction: Colorectal cancer is a pathological transformation of normal colon and rectum epithelial that becomes an abnormal tissue mass, due to the overexpression of cyclin D1 protein that inducing the high/excessive proliferation of colorectal cell. It accounted for about 1 million new cancer cases in 2002 (9.4% of the world total). The treatment and prevention of colorectal cancer could be done naturally by consuming leave extract of Annona muricata L. (soursop). Soursop is known for many phytochemical components that serve as an anti-cancer such as alkaloid, annonaceous acetogenin, megastigman, flavonoid glycosides, phenolic, and cyclopeptide.
Methods: The study was used HT-29 colorectal cancer cell that treated with ethanolic leave extract of soursop and 5-Fluorourasil (5-FU) as positive control to find the cytotoxicity concentration that can inhibit

50% of HT-29 cell population (CC50) and the ½ x CC50,1 x CC50, and 2 x CC50 concentrations of them were treated for next treatment with MTT assay. Analysis of molecular docking of ethanolic leave extract of soursop to cyclin D1 protein used molecular operating environment (MOE) 2013.08 software.
Results : Optimum concentration (CC50) of ethanolic leave extract of soursop is 278 g/mL dan 5-FU is 88 g/mL. Percentage of viable HT-29 cell line decrease in accordance with increasing concentration and the lowest percentage of viable cell is 2 x cytotoxicity concentration 50 (CC50) after ethanolic leave extract of soursop treatment (40,4±1,3%) was compared to 5-FU (30,68±0,93%), solvent control (97,2±1,4%), and cells control (100%). Analysis of molecular docking to cyclin D1 protein was obtained N-hexadecanoic acid and phytol molecules that have the lowest free energy (G), that are 9,7755 kkal/mol and -7,2147 kkal/mol.
Conclusions 5-FU concentration is 3-fold lower than ethanolic leave extract of soursop. N-hexadecanoic acid and phytol molecules have ability to inhibit cyclin D1 protein.