Antiproliferation Effect of the n-Hexanal Extract of Kesum (Polygonum minus) at the Cells of the Rat Lung Cancer Effort Exploiting of Kesum as Drug of Lung Cancer

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Abstract

Kesum (Polygonum minus) is used to make typical foods by the peoples in the West Borneo, because of delicious in taste and aroma. It contains 6,7-methylenedioxy-5,3',4',5'-tetramethoxyflavone and 6,7-4',5'-dimethylene-dioxy-3,5,3'-trimethoxyflavone compounds, and high of phenolics compounds. Kesum has the potency of anticancer activity and it can be used to prevent development of cancers cells. This research has been tasted of anti proliferation activity of the n-hexane extract of kesum to the animal model of lung cancer. Confirmation of proliferation activity is conducted by PCNA staining. Results of research indicated that the extract of n-hexane can reduce proliferation activity of the lung cells of the animal models.

Key words: Kesum, Polygonum minus, anti proliferation

Introduction

Lung cancer was one of disease caused the highest death in the world because cancer disease. The data of WHO (2008) said that death caused by lung, bronhus, traches cancer were in 8th rank (2,3% of death total) at the 2004 and in the 2030 estimated will increase to be 6th rank (3,4 of death total) (WHO, 2008). Lung cancer commonly caused by environmental factor, such us cigarette smoke. In the controlling of death prevalence caused by cancer especially lung cancer, WHO recommended decreasing cigarette consumption, healthy live habit, consume fruite and vegetables and also be beneficial herbal medicine (WHO, 2002; WHO, 2003).

Kesum (Polygonum minus) was popular plan in the west Kalimantan Population and used as a spice for many kind traditional food there because it give nice aroma and make delicious. In the traditional medicine, this plan used to treat sprained, stiff, stomachache, and dandruff (wiart,2006). This plan has antimicrobial activity (Wibowo, 2007), anti fungi and anti oxidant (Hudan, Faujan 2007) and citotoxic to the HeLa cell (Mackeen, 1997). Kesum contains high phenophilic substance (Hudan, Faujan, 2007) and in the n-hexane fraction there are phenophilic and trapenoid substance (Wibowo, 2008).

Kesum have potential used to handle the prevalence of lung cancer that increase continuously until now. This estimation convince enough because kesum have antioxidant activities (Hudan, Faujan, 2007) and citotoxic to the cancer cell (Mackeen, 1997). Beside that, some plans of family Plyonaceae also show anti cancer activities such us Polygonum tinctorium (Tetsuo, 2001), polygonum Cuspidatum (Kimura, 2001), Polygonum multiflorum (Hwang, 2006), Polygonum bistorta (Manoharan, 2007), and Polygonum lapathifolium (Takasski 2001a; 2001b). We hope with the increasing of kesum using will Help decrease the death prevalence because cancer.

Materials and Methods

Herbal meterials researched was kesum leaves (Polygonum cf. Minus) collected from the garden of Kota Baru population in Pontianak city. This plan determined in the Herbarium Bogoriense and the specimen saved there. Fresh kesum leaves cleaned and aerated (received 1.345 kg). Then blended and masedater by methanol soluter for 2x24 hours, and the result (macerate) collected. Macerate gotten then be fractionated in succession by n-hexane solvent and evaporated until fraction harvested those were n-hexane 17.19 g and methanol 67.61 g.
In vivo test

Male white rat (Rattus norvegivus) Wistar furrow in age 2-3 months old with body weight about 200-250 g and adapted for 7 days. Experimental animal was divided into 3 groups, those were T0 (control health rat), T1 (cancer rat), and T2 (cancer rat in n-hexane therapeutic). T0 just gave aquadest, T2 gave benzapyrene 200mg/BW intraperitoneal way for 4 time in a day interval and incubated for 30 hours, T2 gave benzapyrene 200mg/bw intraperitoneal way for 4 time in a day interval and incubated for 30 hours, than treat with n-hexane 100mg/kg bw during a week and incubated for 14 days. Treatment for T2 accomplished by forced directly into the rat gastric by spuit 5 ml modified. At the last treatment, all of experiment rat killed in dislocatio cervicallis manner, then autopsied to collected lung. After that the lung made histological preparation with slice thickness 6µ and followed with apoptosis examination by PCNA staining and primary antibody anti Rat PCNA (Santa Cruz Biotechnology). PCNA was the sign of proliferation presence. Then observed upper light microscope in Mob 100x. Cells shown proliferation activities will see the brownish nucleus.

Data analysis

The observation result of lung tissue analyzed descriptively by compared the result of group T0, T1, and T2.

Results and Discussion

At the T0 (health rat as control) showed there were some proliferation activities of lung cells indicated by brownish nucleus, but most of cells did not proliferate indicated dark blue nucleus. From the measuring of proliferation cells per looking region unit found 2 cells indicated proliferation activities.

Observation of group T1 (cancer rat) by benzapyrene exposure showed there were increasing of proliferation activities of lung cells, it was indicated with increasing of cells expressed PCNA (17 cells/looking region unit). The proliferation increasing of group T1 signed cancer occured at the rat in the group T1.

The proliferation increasing was caused benzapyrene exposure that was carcinogenic. The presence of benzapyrene exposure would activate Arylhydrocarbon Receptor (AhR). Activated AhR with formed complex with AhR Nucler Translocator
Figure 2. Cells proliferation at lung tissue by PCNA staining. Mob 400x; A, cancer rat exposed benzapiren; B and C, control group; D and E, cancer rat in n-hexane therapeutic.
(ARNT) and Dioxine Responce Elements (DRE), then activated RNA Polymerase II (RNA pol II) to syntheses mRNA then product cytochrome P450 1A1 (CYP1A1) and Cytochrome P450 1N1 (CYP1B1) to oxidation from benzapyrene component (Sissung, 2006; Xu, 2005; Nakata, 2006; Magesh, 2007; Akilillu, 2005; Kushman, 2007; Wenzlaff, 2005).

After CYP1A1 and CYP1B1 released, benzapyrene did oxidation reaction be BP-78-diol; BP-7,8-diol ((-)benzapyrene-7,8-diol); BPDE ((±) benzapyrene-r-7, t-8-dihydrodiol t-9, 10-epoxide); and cation radical (Shimada, 2006). Species BP-7,8-epoxide; BP-7,8-diol; BPDE and cat ion radical then bound at DNA (DNA adducts) caused DNA damage (Palackal, 2002; Belous, 2007; Ariese, 1996; Leavitt, 2008). In this case occurred damaging of DNA 53 gene code (gen of apoptosis regulation) (Wiencke, 2002; Spivack, 2003). As an effect of gen p53 mutation, so cells balancing disturbed and stimulated proliferation occurring. Microscopic observation at cancer rat with n-hexane therapeutic (T2) showed that the number of cells expressed proliferation was 8 cells per looking region unit. This number signed there was decreasing of proliferation cells compared with T1, and showed the proliferation number rather higer than T0, it mean the healing proces and cells repair by n-hexane extract of kesum leaves done.

The decreasing of PCNA expression signed increasing of the proliferation cells number, cancer cells connected with n-hexane component. Wibowo (2008) said there were phenophilic and steroid group components in the n-hexane extract of kesum leaves and also reported by uron (1990) that found flavonoid group component: 6,7-methylenedioxy-5,3’4’,5’-tetramethoxyflavone and 6,7-4’,5’-dimethylenedioxy-3,5’,3’-trimethoxyflavone at etr extract (nonpolar) from kesum leaves.

The providing of components such as fenofilic, flavonoid and terpenoid anable to increase cells healing occuring and decrease proliferation of cancer cells or cells pre cancer. With used phitochemistry approached, some phenophilic group components and some family plan with kesum (family Polygonaceae) showed there was ability to inducted DNA repair occured (Lu, 2008) so PCNA expression will decrease, therefore estimated that PCNA occurring was the effect og p53 gene increasing.

Conclusions
From the result concluded that benzapyrene exposure on the lung tissue increased cells proliferation activities, it was characterized lung cancer occured n-hexane fraction of kesum leaves has anti-proliferation activities to the lung cancer, thus it was potential developed as cancer medicine base on natural materials.

References


