Attenuation of Hyperplasia in Lung Parenchymal and Colonic Epithelial Cells in DMBA-Induced Cancer Model by Administering Andrographis paniculata Nees Extract

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Introduction

• Cancer is a disorder that characterized by uncontrollable cellular growth, local tissue invasion, and distant metastase. The goals of cancer treatments depend on cancer stage and patient’s factor, such as comorbidities[1]. For this reason, inhibition of abnormal cell growth at the hyperplasia stage becomes critical in reducing the rate of cancer development and the incidence of death.

• Telomerase is a component that has an important role in cell proliferation. Inhibition to telomerase activity can induce apoptosis[2]. In addition, caspase-3 has also been known as a key protease that activates and mediates apoptosis through a cascade of protein cleavage[3].

• Andrographolide in A. paniculata are expected to be able to prevent the development of hyperplasia leading to uncontrolled cell proliferation by triggering apoptosis through P53-induced caspase 3 activation and inhibiting the activation of telomerase[4,5].

Objectives

This study was designed to evaluate the potential of andrographolide in A. paniculata ethanolic extract to inhibit the increase in proliferation and induction of abnormal cell death.

Materials & Method

Female Sprague Dawley rats, 30-40 days of ages, were acquired from Research and Testing Laboratory of Gajahmada University.

The hyperplasia stage was induced by oral administration of 20 mg/kgBW DMBA to SD rats twice a week for 5 weeks. There were 5 groups in this study include negative control, positive control, and treatment groups of DMBA induction followed by administration of 10, 30 or 100 mg/KgBW andrographolide in ethanolic extract once per day for 6 consecutive weeks. On the last day, mice were sacrificed, lung and colon tissue were collected. Histological examination by HE staining for 6 consecutive weeks. On the last day, mice were sacrificed, lung and colon tissue were collected. Histological examination by HE staining using p53, telomerase, and caspase-3 antibodies were aimed at observing hyperplasia state in these tissues.

Conclusion

A. paniculata ethanolic extract can inhibit the development of cancer at the hyperplasia stage by reducing cell proliferation and increasing apoptosis, marked by a decrease of telomerase expressions and an increase of caspase 3 expressions, consecutively.

References


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