ABSTRAK

EFEKTIVITAS GEL NANOTRANSFERSOME EKSTRAK JAMUR LINGZHI *(Ganoderma lucidum)* TERHADAP JUMLAH ANGIOGENESIS PADA TERAPI *ORAL SQUAMOUS CELL CARCINOMA*
(Studi *In Vivo* pada Tikus Wistar)

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Latar Belakang. *Oral squamous cell carcinoma* (OSCC) merupakan kanker mulut dengan prognosis buruk yang ditandai oleh peningkatan proses angiogenesis. *Ganoderma lucidum* diketahui memiliki potensi antikanker dan antiangiogenik, namun pemanfaatannya masih terbatas akibat rendahnya bioavailabilitas senyawa aktif. Oleh karena itu, pengembangan gel nanotransfersome *G. lucidum* dilakukan untuk meningkatkan efektivitas penghantaran senyawa aktif dalam menghambat angiogenesis pada OSCC. **Tujuan.** Penelitian ini bertujuan untuk mengetahui efektivitas gel nanotrasnfersome *G. lucidum* terhadap jumlah angiogenesis pada terapi OSCC. **Metode.** Penelitian ini merupakan *true experimental* laboratoris secara *in vivo* dengan rancangan *post-test only control group design.* Penelitian ini menggunakan 30 sampel tikus dalam 6 kelompok yaitu 3 kelompok perlakuan gel nanotransfersome *G. lucidum* konsentrasi 155 μg/mL, 310 μg/mL, dan 465 μg/mL, kontrol negatif dengan aplikasi gel plasebo, kontrol sehat, serta kontrol sakit. Seluruh kelompok, kecuali kelompok kontrol sehat diinduksi DMBA sebanyak 4x selama 2 minggu dengan dosis 20 mg/kg BB untuk membentuk model OSCC. Gel diaplikasikan 1x sehari selama 7 hari sesuai kelompok perlakuan. Jaringan mukosa bukal kanan diambil dan dibuat sediaan histologi dengan pewarnaan HE. Jumlah angiogenesis diamati pada 5 lapang pandang oleh 2 pengamat menggunakan mikroskop pada perbesaran 400x kemudian di rata-rata. Data dianalisis menggunakan uji Kruskal-Wallis dan dilanjutkan *post-hoc* Mann-Whitney. **Hasil.** Hasil penelitian menunjukkan bahwa pemberian gel nanotransfersome *G. lucidum* menurunkan jumlah angiogenesis dibandingkan dengan kelompok kontrol negatif dan kontrol sakit. Terdapat perbedaan yang signifikan antara kelompok perlakuan dan kelompok kontrol ($p < 0.05$). Konsentrasi 465 μg/mL menunjukkan penurunan jumlah angiogenesis paling besar dibandingkan konsentrasi lainnya dalam rentang konsentrasi yang diuji. **Simpulan.** Gel nanotransfersome *G. lucidum* efektif dalam menurunkan jumlah angiogenesis pada model OSCC, dengan konsentrasi 465 μg/mL memberikan efek paling besar dalam penelitian ini.

Kata kunci: angiogenesis, *ganoderma lucidum,* gel, nanotransfersome, OSCC

ABSTRACT

EFFECTIVENESS OF NANOTRANSFERSOME GEL OF LINGZHI MUSHROOM EXTRACT (GANODERMA LUCIDUM) ON THE AMOUNT OF ANGIOGENESIS IN ORAL SQUAMOUS CELL CARCINOMA THERAPY

(In Vivo Study on Wistar Rats)

Keisha Amanda Syadina Shafa

Background. *Oral squamous cell carcinoma* (OSCC) *is a malignant oral cancer with poor prognosis, characterized by increased angiogenesis, which plays a crucial role in tumor growth and progression. Ganoderma lucidum has been reported to possess anticancer and anti-angiogenic properties; however, its application is limited by the low bioavailability of its active compounds. Therefore, the development of a nanotransfersome gel containing G. lucidum was conducted to enhance the delivery effectiveness of active compounds in inhibiting angiogenesis in* OSCC. **Objective.** *This study aimed to evaluate the effectiveness of G. lucidum nanotransfersome gel on angiogenesis in the treatment of* OSCC. **Methods**. *This study was a true experimental in vivo laboratory study using a post-test only control group design. A total of 30 rats were divided into six groups: three treatment groups receiving G. lucidum nanotransfersome gel at concentrations of 155 µg/mL, 310 µg/mL, and 465 µg/mL; a negative control group treated with placebo gel; a healthy control group and a disease control group without treatment. All groups, except the healthy control group, were induced with DMBA four times over a period of two weeks at a dose of 20 mg/kg body weight to establish the OSCC model. The gel was applied once daily for seven consecutive days according to the respective treatment groups. Right buccal mucosal tissues were collected and processed for histological examination using Hematoxylin–Eosin* (HE) *staining. The number of angiogenic blood vessels was evaluated in five fields of view by two observers using a light microscope at 400× magnification, and the mean values were calculated. Data were analyzed using the Kruskal–Wallis test followed by the Mann–Whitney post hoc test.* **Results**. *The results demonstrated that administration of G. lucidum nanotransfersome gel significantly reduced the number of angiogenic blood vessels compared to the control groups (p<0,05). The concentration of 465 µg/mL showed the greatest reduction in angiogenesis among the tested concentrations.* **Conclusion.** *Ganoderma lucidum nanotransfersome gel is effective in reducing angiogenesis in an* OSCC *model, with the concentration of 465 µg/mL showing the most pronounced effect within the tested range.*

Keywords: *angiogenesis, ganoderma lucidum, gel, nanotransfersome,* OSCC