

Gancidin W, a potential low-toxicity antimalarial agent isolated from an endophytic Streptomyces SUK10

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Abstract

Endophytic Streptomyces strains are potential sources for novel bioactive molecules. In this study, the diketopiperazine gancidin W (GW) was isolated from the endophytic actinobacterial genus Streptomyces, SUK10, obtained from the bark of Shorea ovalis tree, and it was tested in vivo against Plasmodium berghei PZZ1/100. GW exhibited an inhibition rate of nearly 80% at 6.25 and 3.125 mu g kg(-1) body weight on day four using the 4-day suppression test method on male ICR strain mice. Comparing GW at both concentrations with quinine hydrochloride and normal saline as positive and negative controls, respectively, 50% of the mice treated with 3.125 mu g kg-1 body weight managed to survive for more than 11 months after infection, which almost reached the life span of normal mice. Biochemical tests of selected enzymes and proteins in blood samples of mice treated with GW were also within normal levels; in addition, no abnormalities or injuries were found on internal vital organs. These findings indicated that this isolated bioactive compound from Streptomyces SUK10 exhibits very low toxicity and is a good candidate for potential use as an antimalarial agent in an animal model.

Keywords

Author Keywords: antimalarial; Shorea ovalis; in vivo; endophytic; Streptomyces; gancidin W
KeyWords Plus: PLASMODIUM-FALCIPARUM MALARIA; ANTIMICROBIAL ACTIVITY; ESSENTIAL OIL; MICE; DRUG; CHLOROQUINE; RESISTANCE; QUININE; IDENTIFICATION; PURIFICATION

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1.	In Vivo Anti-malarial Tests of Nigella sativa (Black Seed) Different Extracts By: Abdulelah, H.A.A.; Zainal-Abidin, B.A.H. Am. J. Pharmacol. Toxicol. Volume: 2 Pages: 46-50 Published: 2007	Times Cited: 28
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3.	GANCIDIN, AN ANTITUMOR SUBSTANCE DERIVED FROM STREPTOMYCES SP .1. By: AISO, K; ARAI, T; SUZUKI, M; et al. JOURNAL OF ANTIBIOTICS Volume: 9 Issue: 3 Pages: 97-101 Published: 1956	Times Cited: 15
4.	Plasmodium vivax resistance to chloroquine (R2) and mefloquine (R3) in Brazilian Amazon region. By: Alecrim M das, G; Alecrim, W; Macedo, V Revista da Sociedade Brasileira de Medicina Tropical Volume: 32 Issue: 1 Pages: 67-8 Published: 1999 Jan-Feb	Times Cited: 75
5.	A Murine Model of falciparum-Malaria by In Vivo Selection of Competent Strains in Non-Myelodepleted Mice Engrafted with Human Erythrocytes By: Angulo-Barturen, Inigo; Belen Jimenez-Diaz, Maria; Mulet, Teresa; et al. PLOS ONE Volume: 3 Issue: 5 Article Number: e2252 Published: MAY 21 2008	Times Cited: 83
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8.	Isolation and structure determination of nigellicine, a novel alkaloid from seeds of Nigella sativa By: Ata-ur-Rehman, S; Malik, H; Cun, H; et al. Tetrahedron Lett. Volume: 26 Issue: 2 Pages: 2759-2762 Published: 1995 [Show additional data]	Times Cited: 1
9.	Purification and structure elucidation of two biologically active molecules from a new isolated Streptomyces sp. US24 strain By: Ben-Ameur-Mehdi, R; Mellouli, L; Chabchoub, F. Chem Nat Compd. Volume: 40 Issue: 5 Pages: 510-513 Published: 2004	Times Cited: 4