Garcinielliptone FC: Antiparasitic activity without cytotoxicity to mammalian cells

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Keywords: Garcinielliptone FC; Schistosoma; Antiparasitic activity; Cytotoxicity; Confocal laser scanning microscopy; Antischistosomal drug.

Introduction

Garcinielliptone FC (GFC) is a natural prenylated benzophenone found in the seeds of Platonia insignis Mart. (Clusiaceae), a native Brazilian plant (Costa Junior et al., 2011). It has been chemically characterized and it is known that GFC has several biological activities such as antiparasitic (Marti et al., 2010), activities such as antioxidant and vasorelaxant properties. (Costa Junior et al., 2011 and Arcanjo et al., 2014). In this study, we report the in vitro effect of GFC against the blood fluke Schistosoma mansoni, the parasite responsible for schistosomiasis mansoni. The anti-S. mansoni activity and cytotoxicity toward mammalian cells were determined for the compound. GFC > 6.25 μM showed antischistosomal activity and confocal laser scanning microscopy analysis demonstrated several morphological alterations on the tegument of worms, and a correlation between viability and tegumental damage was observed.

Results e Discussion

First, GFC was isolated from seeds of P. insignis and was identified by 1D and 2D NMR spectroscopic analysis and mass spectrometry. Subsequently, the in vitro antischistosomal effects of GFC against adult S. mansoni were evaluated at concentrations of 0.78, 1.56, 3.12, 6.25, 12.5, 25 and 50 μM. The control worms were assayed in RPMI 1640 medium and RPMI 1640 with 0.5% DMSO (negative control groups) and in 3 μM praziquantel (positive control group). The effect of the drug was assessed with emphasis on changes in worm motor activity, viability, oviposition, and morphological alterations on S. mansoni tegument. Figure 1. Confocal laser scanning microscopy observations of Schistosoma mansoni male worm after in vitro incubation. In these experiments, pairs of adult worms were incubated in 24-well culture plates containing RPMI 1640 medium and treated with different concentrations of GFC. (A) General view of the anterior worm region showing the dorsal surface where tegument was analyzed (arrow). (B) Control after 120 h, showing tubercles (T). (C) Worm treated with 12.5 μM GFC, showing some tubercles intact (T). (D) Worm treated with 25 μM GFC, showing tubercles shrunken (sh) disintegrate (di). (E) Worm treated with 50 μM GFC; dorsal tegumental surface showing sloughing (sl) and tubercles disintegrate (di). Scale bars = 50 μm.

Conclusion

The present results suggest that GFC, a prenylated benzophenone isolated from seeds of P. insignis, has antischistosomal activities against S. mansoni adult worms. Additionally, confocal laser scanning microscopy of in vitro-treated worms indicated that GFC was able to cause morphological changes in the tegument. Similar to praziquantel, GFC showed an in vitro antischistosomal effect at low concentrations. Furthermore, in contrast to praziquantel, which has only a lethal effect, GFC at sub-lethal concentrations interfered with the reproductive fitness of the worms and the number of eggs was significantly reduced.

Acknowledgement

acknowledgement to Butantan Institute, São Paulo, SP, Brazil, for expert assistance with confocal microscopy (FAPESP, Grant Number 00/11624-5) and CNPq.