Adult triclabendazole-resistant Fasciola hepatica: morphological changes in the tegument and gut following in vivo treatment with artemether in the rat model

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A study has been carried out to determine the morphological changes to the adult liver fluke, Fasciola hepatica after treatment in vivo with artemether. Rats were infected with the triclabendazole-resistant Sligo isolate of F. hepatica, dosed orally with artemether at a concentration of 200 mg/kg and flukes recovered at 24, 48 and 72 h post-treatment (p.t.). Surface changes were monitored by scanning electron microscopy and fine structural changes to the tegument and gut by transmission electron microscopy. Twenty-four hours p.t., the external surface showed minor disruption, in the form of mild swelling of the tegument. The tegumental syncytium and sub-tegumental tissues appeared relatively normal. Forty-eight and seventy-two hours p.t., disruption to the tegumental system increased, with isolated patches of surface blebbing and reduced production of secretory bodies by the tegumental cells being the main changes seen. The gastrodermal cells showed a relatively normal morphology 24 h p.t. By 48 h, large numbers of autophagic vacuoles and lipid droplets were present. Autophagy increased in magnitude by 72 h p.t. and substantial disruption to the granular endoplasmic reticulum was observed. Results from this study show that flukes treated in vivo with artemether display progressive and time-dependent alterations to the tegument and gut. Disruption to the gut was consistently and substantially more severe than that to the tegument, suggesting that an oral route of uptake for this compound predominates. This is the first study providing ultrastructural information on the effect of an artemisinin compound against liver fluke
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