

NIPPOSTRONGYLUS BRASILIENSIS INFECTION IN THE RAT: THE EFFECT OF IRON AND PROTEIN DEFICIENCY ON THE ANTHELMINTIC EFFICACY OF MEBENDAZOLE, PYRANTEL, PIPERAZINE AND LEVAMISOLE.

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Malnutrition is frequently associated with a high incidence of gut parasites. Worm eradication programmes undertaken within malnourished communities have met with limited success. One reason for this failure may be the effect of nutritional deficiencies on anthelmintic efficacy.

A previous experiment showed that combined iron and protein deficiency reduces the efficacy of the anthelmintics mebendazole and fenbendazole in the Nippostrongylus brasiliensis rat model. A further experiment was therefore designed to assess the effect of separate iron and protein deficiencies on mebendazole.

Wistar rats were divided into groups which were fed a synthetic diet deficient in either iron or protein or sufficient in both iron and protein. After six weeks on the diet, one protein deficient and one iron deficient group were repleted by reverting to a sufficient diet. Two days later all rats were inoculated with 1,000 larvae of N.brasiliensis, a nematode with a life cycle similar to that of hookworm in man. Six days after infection the rats were treated with mebendazole and four days later all animals were killed and total worm counts performed.

Mebendazole was significantly less effective in iron deficient and in protein deficient rats than in sufficient animals. The lowered efficacy in iron deficient rats could be overcome by iron repletion two days before infection, but protein repletion did not improve the anthelmintic efficacy.

An experiment was also carried out to determine if iron and protein deficiency affect any anthelmintics other than mebendazole and fenbendazole. Levamisole was effective in eradicating worms from both sufficient and deficient rats. Pyrantel and piperazine were effective in sufficient rats, but were significantly less effective in deficient animals ($P < 0.01$).

The finding that nutritional deficiencies reduce the efficacy of some anthelmintics may be relevant to worm eradication programmes in malnourished communities.

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