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THE EFFECT OF IRON DEFICIENCY AND PROTEIN DEFICIENCY UPON WORM INFESTATION IN THE SMALL INTESTINE OF THE RAT

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Protein and iron deficiency commonly coexist with heavy worm infestations and it may be that these nutrient deficiencies potentiate the infestation, thus explaining the lack of success of some worm eradication programmes. The relationship between iron deficiency and protein deficiency and infestation of the rat with the nematode Nippostrongylus brasiliensis has been investigated. Normally this nematode is rejected from the small intestine within three weeks in control animals.

Wistar rats were fed a synthetic diet which was either iron deficient, protein deficient, or had a combined deficiency of iron and protein from the age of four weeks. The animals were infected at ten weeks of age and total worm counts carried out at the time of killing, 9, 15, 21 and 28 days after infestation.

Iron deficient animals had a significant delay in the expulsion of worms from the small intestine. Furthermore the worms were spread throughout the small intestine in contrast to the control animals where worms were confined to the upper jejunum. A further experiment was carried out to determine whether this was a consequence of iron deficiency per se or a consequence of anaemia. Iron deficient animals were iron repleted with 5 mg of iron dextran two days prior to infestation. The iron repleted animals now behaved in a similar fashon to the control animals and confirm that N.brasiliensis infestation of the rat is potentiated by iron deficiency and this effect is overcome by iron repletion.

Protein deficiency had a similar effect of delaying the expulsion of N.brasiliensis. When both iron and protein deficiency were present there was an increased worm burden suggesting that the deficiencies had an additive effect.

Extrapolation from these results to the clinical situation would suggest that both iron and protein deficiency may play an important role in the perpetuation of helminth infestations and thus anti-helminth therapy should be accompanied by iron and protein supplementation.

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