

## Anthelmintic Effect of Mebendazole against *Trichuris vulpis* in Dogs

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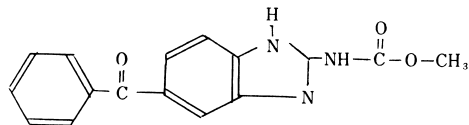
Mebendazole is a carbamate anthelmintic which was developed by Janssen Pharmaceutica in Belgium. The compound has broad spectrum anthelmintic activity on nematodes and cestodes, and is used in various countries as an anthelmintic on domestic animals and man.

We have been studying the anthelmintic efficacy of this compound on nematodes in domestic animals. We have evaluated an anthelmintic efficacy on *Trichuris vulpis* in dogs, and the results of this experiment are reported below.

This experiment was performed in order to obtain some basic and fundamental data of this drug for application to *Trichuris trichiura*.

### Materials and Methods

Mebendazole is a drug having the following chemical structure:



The chemical formula is: methyl-5(6)-benzoyl-2-benzimidazole. Its median lethal dose amounts to  $\geq 1,280$  mg/kg on rats and  $> 640$  mg/kg on dogs, and thus it is characterized by its high safety (Marsboom, 1973). Recently its application to treatment on

nematodes in man has been also reported (Brugmans *et al.*, 1971).

Twelve hybrid dogs naturally infected with *Trichuris vulpis* were treated with 10% granule of mebendazole at a dose of 100 mg per head once a day through admixture into the feed during 3 consecutive days, regardless of the body weight. The number of eggs in feces was examined at before and 7 consecutive days after administration. The number of worms expelled in feces was examined during 7 consecutive days after administration, and the sex of expelled worms was differentiated. Autopsy was made at the 15th day after the completion of treatment to observe for remaining worms in cecum and appendix. The animals treated with mebendazole were observed to incidence of any adverse effects.

### Results

#### 1. The number of eggs in feces

The number of eggs in feces before and after treatment was shown in Table 1. In all cases, a significant increase in the number of eggs in feces was observed on the 1st day of administration. All of the dogs became negative for eggs on the 3rd to the 6th day of administration.

#### 2. The number of worms expelled in feces

The results of the number of worms

Table 1 EPG of *T. vulpis* before and after mebendazole treatment in dogs

Number of animals	EPG						
	Before treatment	Days after treatment					
		1	2	3	4	5	6
1	16,500	16,500	7,000	2,200	0	0	0
2	5,000	18,000	4,200	700	0	0	0
3	14,800	39,700	5,500	3,000	600	0	0
4	4,700	23,000	940	1,000	0	0	0
5	1,600	58,000	3,900	1,700	200	0	0
6	2,300	41,000	9,700	3,300	0	0	0
7	5,500	78,000	12,000	800	0	0	0
8	6,100	46,700	1,500	300	0	0	0
9	9,400	49,000	2,400	1,400	0	100	0
10	7,100	61,000	4,600	0	0	0	0
11	4,900	51,000	1,900	640	0	0	0
12	12,000	66,300	8,400	1,600	600	0	0

Table 2 Number of adult worms expelled after treatment of mebendazole

Number of animals	Sex	Body weight (kg)	Sex of the worms	Number of adult worms expelled						
				Days after treatment						
				1	2	3	4	5	6	7
1	M	12.1	M	7	12	0	0	0	0	0
			F	6	9	2	0	0	0	0
2	F	9.3	M	2	9	4	2	0	0	0
			F	0	12	15	0	0	0	0
3	F	8.3	M	0	8	4	1	0	0	0
			F	1	14	3	0	2	0	0
4	M	8.6	M	4	12	0	0	0	0	0
			F	7	11	0	0	0	0	0
5	M	12.3	M	3	0	1	2	0	0	0
			F	2	4	1	1	1	0	0
6	F	10.6	M	0	8	4	3	0	0	0
			F	0	6	5	0	1	0	0
7	F	7.8	M	0	25	2	0	0	0	0
			F	0	29	4	0	0	0	0
8	M	14.3	M	3	5	0	0	0	0	0
			F	6	4	0	0	0	0	0
9	M	9.8	M	2	25	3	2	0	0	0
			F	1	19	7	1	1	0	0
10	F	12.6	M	0	3	0	0	0	0	0
			F	0	2	1	1	0	0	0
11	M	9.6	M	7	7	0	0	0	0	0
			F	6	18	2	0	0	0	0
12	F	13.7	M	0	21	3	0	0	0	0
			F	0	26	4	0	0	0	0

Table 3 Results of the autopsy at 15th day after the completion of treatment

Number of animals	Sex of worms expelled after treatment	Number of worms expelled	Total number of worms expelled	Number of worms found in the intestine at autopsy	Remarks	
1	M	19	36	0		
	F	17				
2	M	18	29	0		
	F	11				
3	M	13	33	0		
	F	20				
4	M	16	34	0		
	F	18				
5	M	6	14	0		
	F	8				
6	M	15	27	0		
	F	12				
7	M	27	60	0		
	F	33				
8	M	8	18	1	1 male worm was found inside the vermiform appendix	
	F	10				
9	M	31	61	0		
	F	30				
10	M	3	7	0		
	F	4				
11	M	14	40	2		2 male worms were found inside the vermiform appendix
	F	26				
12	M	24	54	0		
	F	30				

expelled in feces and their sex differentiation were shown in Table 2. In 8 cases out of 12, the worms of *T. vulpis* were expelled in feces from the next day of the 1st administration, and the largest number of expelled worms was found 2 or 3 days after the first administration. On the 5th day after the beginning of administration, only 1 or 2 worms were found in 4 cases, and no worm was found on the 6th day and thereafter.

### 3. Autopsy finding

Autopsy was done with all cases on the 15th day after the completion of administration to investigate for any remaining worms of *T. vulpis*, and the results obtained are shown in Table 3.

Of the 12 cases examined, *T. vulpis* was completely expelled in 10 cases, while remaining worms were found in 2 cases. Only

male worm was remained, 1 in No. 8 case and 2 in No. 11.

No adverse effect such as diarrhoea, vomiting and constipation was observed during the experiment.

### Discussion

Safe and effective anthelmintics against *T. vulpis* had not been available in Japan. Parbendazole which are derivatives similar to mebendazole are anthelmintics of wide spectrum known for their effect on trichuriasis (Actor *et al.*, 1967). In former days, we have reported our experiment on the anthelmintic efficacy of methyridine on *T. vulpis*, and we have experienced the need of taking into consideration of occurrences of adverse effects by methyridine treatment (Yamanouchi and Akusawa, 1972).

On the other hand, mebendazole has been

as a safety anthelmintic for human application (Davis, 1972) and many reports have been made (Gatti *et al.*, 1972; Klein, 1972., Sargent *et al.*, 1974). Since *T. vulpis* is a parasite in appendix of dogs, it is considered hardly that the worms contact directly with the drug, when it is compared with *Trichuris trichiura* in man. Despite of this fact, a satisfactory anthelmintic effect of mebendazole was observed against *T. vulpis* without any adverse effects in this experiment.

### Summary

Efficacy of mebendazole was evaluated against *T. vulpis* infection in dogs. 12 dogs naturally infected with *T. vulpis* were given mebendazole at a dose of 100 mg per head for 3 consecutive days.

Within 6 days after the treatment, all dogs became negative for eggs in feces. In order to ascertain the effect of the drug, remaining adult worms were investigated at autopsy 15th day after the completion of treatment. The result was as follows; 10 cases out of 12 showed completely negative for adult worms; while the rest two cases had 1 or 2 males each.

From these results, it may be considered that mebendazole is effective for *T. vulpis* infection in dogs and safety and accurate anthelmintic effect of mebendazole against *T. vulpis* were ascertained.

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## Medendazole によるイヌ鞭虫の駆虫効果について

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私どもは、鞭虫の駆虫剤について基礎的な検討をする  
目的で、イヌ鞭虫の寄生しているイヌに Mebendazole  
(methyl-5(6)-benzoyl-2-benzimidazole carbamate) を  
体重に関係なく 1 頭、100 mg を 3 日間投与、その駆虫

効果をしらべた。

この結果、12 例中、10 例にみとむべき副作用もなく完  
全な駆虫効果が認められ、本剤は、イヌ鞭虫に対し、安  
全にして、きわめて高い駆虫効果のあることを確めた。