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Title	THE MECHANISM OF HEMOLYTIC ANEMIA INDUCED BY EXCESSIVE METHIONINE INTAKE CATS
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Citation	Japanese Journal of Veterinary Research, 35(2), 127-127
Issue Date	1987-04-30
Doc URL	<a href="https://hdl.handle.net/2115/3044">https://hdl.handle.net/2115/3044</a>
Type	departmental bulletin paper
File Information	KJ00002374486.pdf



THE MECHANISM OF HEMOLYTIC ANEMIA INDUCED BY  
EXCESSIVE METHIONINE INTAKE CATS

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Effects of excessive methionine (Met) administration to cats were examined. The results were as follows. Cats fed excessive Met (1g per kg of body weight per day) for 7 days contracted severe hemolytic anemia with marked increases of methemoglobin concentration and Heinz-body formation in erythrocytes at 8–10 days.

In contrast, cats fed 0.5g/kg of Met for 52 days showed moderate Heinz-body hemolytic anemia at 24–38 days but thereafter recovered from the anemia, despite the continuation of the feeding of Met, indicating an adaptation of the cats to the excessive Met (0.5g/kg) intake.

In an *in vitro* experiment, significant increases of methemoglobin concentration and Heinz-body formation in cat erythrocytes were observed when the cells were incubated with the plasma from cats fed excessive Met (1g/kg), but there were no increases observed when the cells were incubated with 10mM Met and/or 10mM 3-methylthiopropionate (MTP), a product of Met catabolism.

Although a large amount of Met was found in the plasma from cats fed excessive Met (1g/kg), the MTP was scarcely detected by high-performance liquid chromatography.

These results indicate that the development of methionine toxicity depended on the amount of methionine administered, and that the limit at which cats were able to resist methionine toxicity was less than 0.5g/kg. The result also suggests that excessive methionine intake leads to the production of an intermediate of methionine catabolism, except MTP, which may directly affect erythrocytes as an intensive oxidizing agent, resulting in the excessive oxidation of hemoglobin to methemoglobin and Heinz-body formation.