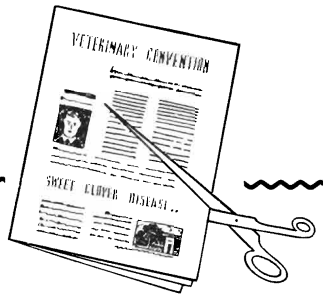
Volume 6 | Issue 4 Article 17

1944

Abstracts

ABSTRACTS



RIBOFLAVIN IN EQUINE DIET. Little work has been done on the nutritional requirements of the horse. The fact that the B vitamins are produced by the symbiotic action of microorganisms in the ruminant stomach is well established, but virtually nothing is known about dietary requirements for these factors in the horse. The occurrence of one or more physiological responses in a horse restricted to a riboflavin deficient diet affords confirmatory evidence of the dietary essentiality of this vitamin for equidae. It is well recognized that a deficiency of riboflavin in the diet is reflected in diminished urinary excretion of riboflavin.

In investigations on horses, data have been secured on the influence of the riboflavin content of the diet, on the amount excreted in urine, the amount in the blood, and the influence on the growth and general well-being of the animals. Rations contained dried beet pulp, ground corn, purified casein, brewer's yeast, and dicalcium phosphate to which was added synthetic riboflavin in mg. per 100 Gm. of ration. The total riboflavin content of ration in mg. per 100 Gm. in the 4 different rations were: IV ration 0.08, V ration 0.33, VI ration 0.36, and VI-B ration 1.18. Urine was collected quantitatively into a black bottle by means of a specially designed cage to exclude contamination by feces. The riboflavin was measured by an improved microbiological method.

Horses fed on ration IV did not consume as much feed as those that received added amounts of riboflavin and other B vitamins. A change in the amount of riboflavin ingested is reflected in the amount secreted in the urine within a period of a few weeks. One month after the horses were placed on the ration containing 80 mg. of riboflavin per 100 Gm., the daily urinary excretion was too low to measure in one animal, and in the other two it was less than 1/14 of the level of the animals when fed on stock ration. By the second month urinary excretion of riboflavin was insufficient to measure.

Urinary excretion of riboflavin of horses on ration IV was only a fraction of the intake. This is different from nicotinic acid in that the urinary excretion may exceed the intake. As previously mentioned, the urinary excretion of riboflavin by animals for which it is a dietary essential is closely correlated with the intake and clinically low urinary values are characteristic of ariboflavinosis. On the basis of this criterion, the evidence strongly indicated that riboflavin is a dietary essential for the horse just as for other simple stomach animals that have been studied. The fact that a source of some of the B vitamins including riboflavin is necessary in the ration for satisfactory growth performance of horses is further confirmatory evidence of its dietary essentiality for equidae.

The riboflavin requirements for horses are somewhat less than for dogs and probably of about the same order as for humans. It is shown that 44 gamma g. per kg. of body weight per day is adequate.

Each time urine was collected blood

was drawn and assayed for riboflavin. The riboflavin content of blood failed to show a consistent relationship to the intake.

(Pearson, P. B., Sheybani, M. K., and Schmidt, H. 1944. Riboflavin in the nutrition of the horse. Arch. Biochem. 3(3):467-474.)

ACTION OF SULFONAMIDES INHIBITED BY PROCAINE. It has been demonstrated that p-amino benzoic acid and related compounds, including procaine, exert a marked inhibiting effect on the bacteriostatic action of sulfanilamide on hemolytic streptococci *in vitro*. It has been found that sulfapyridine required 5 times as much p-amino benzoic acid as needed for sulfanilamide to produce the same degree of inhibition. It has been shown that procaine exerts an inhibiting effect on the bacteriostatic action of sulfathiazole in wounds infected with *Staphylococcus aureus*. During the course of spinal anesthesia there is no appreciable concentration of procaine in the blood stream. Once it gets in the blood stream the procaine is rapidly hydrolyzed by an enzyme and some of the free amino groups resulting from this hydrolysis are further acetylated by a less active enzyme and the products are rapidly excreted in the urine. An average of 90 percent of injected procaine is thus excreted in the urine in the form of products of detoxification.

There was found to be an inhibiting action by procaine in concentrations of 1 mg. per 100 cc. or higher on the bacteriostatic action of sulfadiazine concentrations as high as 20 mg. per 100 cc. Tests were made *in vitro* with type III pneumococci in human blood.

Procaine in concentration of 1 mg. per 100 cc. or higher permitted the free multiplication of type III pneumococci in presence of concentrations of sulfathiazole as high as 40 mg. per 100 cc. Experiments showed that if blood was taken before each procedure and again at intervals after the injection of procaine the greatest amount of inhibition was found ½ to 2 hours after injection of the procaine was completed. Experiments carried out with sulfathiazole in concentrations ranging from 2 to 4 mg. per 100 cc. and procaine totaling up to 1 Gm., showed only a slight inhibiting effect.

Experiments with procaine *in vivo* in human serum showed an inhibiting effect of the bacteriostatic action of sulfathiazole in concentrations as high as 25 mg. per 100 cc. The procaine concentration was found to be 1.7 mg. per 100 cc. The possibility of procaine being absorbed from an area of local infiltration with respect to inhibiting the bacteriostatic action of systemic sulfanilamide is clinically insignificant except in rare cases.

It is suggested that local anesthetic drugs other than p-amino benzoic acid derivatives be used for infiltrations when performing punctures into infected areas.

(Peterson, O. L., and Finland, M. 1944. The inhibition by procaine on the bacteriostatic action of the sulfonamides. Am. J. Med. Sci. 207(2):166-175.)

EFFECTS OF DELVINAL SODIUM IN CANINE ANESTHESIA. Experimentation was conducted to obtain further information on the effects of Delvinal Sodium, 5 ethyl (1-methyl 1 butenyl) barbituric acid, especially when used as a surgical anesthesia in dogs. The surgical anesthetic dose was determined and its effects upon the period of anesthesia, recovery, temperature, pulse, and respiration were observed and compared with those produced by the sodium salts of pentothal, pentobarbital, and amytal. Also studied were the effects of single and repeated doses of this drug upon these variables and upon blood cells, blood glucose, blood and urine, urea and uric acid, and the specific gravity of urine.

Male and female dogs weighing from 3.5 to 32.0 kg. were used in the experiment. Prior to the studies the dogs were hospitalized and kept under observation for at least 2 weeks. Food and water were

withheld from the dogs for 18 hours before drug administration. Each dog was rested for at least 3 weeks following each injection of a barbiturate except when drug tolerance was tested.

To determine the approximate surgical anesthetic and lethal doses a solution of Delvinal Sodium (64.8 mg. per cc.) was injected intravenously until the various reflexes were abolished. In these preliminary experiments the injections extended over a period of not more than 20 minutes.

In subsequent experiments the solutions were injected intravenously in less than 1 minute. Observations are listed as follows:

1. Intravenous injections of 48.8 mg. of Delvinal Sodium per kg. of body weight produced surgical anesthesia in most dogs, while 25 mg. per kg. produced relaxation and sleep. There was no evidence of toxic or aftereffects from the drug.

2. Delvinal Sodium produced a longer period of surgical anesthesia in dogs than either amytal or pentobarbital. This new barbiturate produced no annoying reactions or violent movements during induction and recovery periods and therefore could be administered without preliminary treatment with morphine and atropine.

3. Similar to the action of the other barbiturates, Delvinal Sodium caused depression of temperature, pulse rate, and respiratory rate during anesthesia. These rose during the recovery phase and were completely normal at the time of full recovery.

4. Dogs receiving weekly surgical anesthetic doses developed no tolerance to this barbiturate.

5. Although a reduction occurred in the hemoglobin content and in the number of erythrocytes and leucocytes during periods of anesthesia there was a complete return to normal when the animals recovered from the drug.

6. Glucose concentrations fluctuated considerably following injections of large doses of the barbiturate. However, averages showed an increase during surgical anesthesia followed by a decrease below initial value during deep sleep.

7. Weekly doses of Delvinal Sodium had no effect on the concentration of blood-urea nitrogen and uric acid and their excretion remained normal. The specific gravity of the urine increased slightly during anesthesia but always returned to normal upon recovery from the anesthesia.

(Allison, J. B., Seeley, R. D., and Morris, M. L. 1944. A study of some effects of surgical anesthetic doses of Delvinal Sodium in the dog. Am. J. Vet. Res. 5(14):62-69.)

"WRYTAIL" IN CATTLE. "Wrytail" is a malformation consisting of a distortion of the tail head, the base of the tail being set at an angle to the vertebral column instead of in line with it. This abnormality is discriminated against by purebred dairy cattle breeders. Information on the prevalence of "wrytail" among Jersey cattle was recently collected from 10 herds in Kansas, Missouri, Texas, and Colorado. One-hundred-seventeen animals were found to have "wrytail." An analysis was made of the mode of inheritance in 3 of the herds which had a total of 73 affected animals.

The fact that "wrytailed" offspring were produced when both parents appeared normal fits the assumption that the character is inherited as a recessive. An estimate was made of the gene frequency, based on the data accumulated in the 10 herds. The estimated frequency of the "wrytail" gene was 57.8 percent.

The fact that 117 or 34 percent of the 350 animals observed in the 10 herds were homozygous for the "wrytail" character, 162 or 46 percent were probably heterozygous, and 71 or only 20 percent were non-carriers indicates the degree to which the gene is disseminated through these herds. There is no evidence to indicate that the direction of tail set is controlled by any genetic factor.

The occurrence of "wrytail" in other breeds of dairy cattle was investigated. It was found in a 34 herd survey of Brown Swiss cattle that the incidence of the gene for "wrytail" was almost as high as the

Jersey herds studied. The gene frequency for "wrytail" was 44.7 percent. There is no extensive survey for the "wrytail" character in Guernseys, Holsteins, and Ayrshires. It has been definitely observed in each of these breeds of dairy cattle.

(Atkeson, F. W., Eldredge, F., and Ibsen, H. I. 1944. Prevalence of "wrytail" in cattle. J. Heredity. 35(1):11-14.)

TEST FOR RECOGNITION OF HYPERSENSITIVITY TO SULFONAMIDES. Experimentation was conducted on an intradermal test using human serum from patients receiving sulfonamides orally. Investigation included the study of 76 patients at Johns Hopkins Hospital, of which 46 were thought to be clinically hypersensitive to various sulfonamide drugs. The 30 supposedly not hypersensitive served as controls. The various sera were obtained from patients suffering from acute bacterial infection who had been treated with one or other of the drugs. More than 300 intradermal tests were performed on the patients using 40 different samples of serum as testing agents, and each of the sera used contained one of the common sulfonamide compounds, namely: sulfanilamide, sulfathiazole, sulfadiazine, and sulfamerazine at a drug level of 2 to 25 mg. percent.

The intradermal test required the injection of 0.05 cc. of control serum and 0.05 cc. of each of the sulfonamide sera intracutaneously in the forearm. The size of the wheal and the diameter of the erythema produced were measured immediately after injection and at intervals of 5 minutes for 20 minutes. The initial wheal was found to be 6 or 7 mm. in diameter and in negative tests or in controls it increased only 1 or 2 mm. in size. Positive tests in hypersensitive patients showed an immediate increase in size of the homologous wheal up to 12 to 18 mm. in diameter, with intense erythema 30 to 40 mm. in diameter. The reaction reached its height 15 minutes after injection and completely disappeared by the end of an hour and a half. A difference between the size of the control wheal and the size of the test wheal of at least 4 mm. in diameter was used as a criterion for positivity.

A summary of the experimental data showed that of 30 definitely hypersensitive patients, 18 were sensitive to sulfathiazole alone, 3 to sulfanilamide alone, 2 to sulfadiazine alone, and 4 to sulfamerazine. Three other patients were each sensitive to 2 different drugs. These results showed sulfathiazole to be the most dangerous in producing hypersensitive states.

Of 64 patients who had received one of the sulfonamides therapeutically and were tested with homologous sulfonamide serum, 30 were definitely hypersensitive. Twenty-eight of these individuals gave positive skin tests thus establishing the reliability of the test at more than 90 percent.

Intradermal tests were performed on 50 patients with a different sulfonamide than that which they received therapeutically. Of these only 3 of the 25 definitely hypersensitive individuals gave positive skin tests indicating that the test is relatively specific for the individual sulfonamide drugs. Of 11 persons having never received a sulfonamide drug in any form only one gave a positive test and that person had a family history of allergy in some form.

Several individuals gave positive skin tests many months after the occurrence of clinical hypersensitivity and 3 cases were found to be skin positive for the homologous sulfonamide from 1 to 5 years after the drug reaction. This suggests that the hypersensitivity to sulfonamides may persist for that length of time.

The consistency of positive skin tests in sensitive individuals adds evidence to the fact that drug sensitivity is an allergic reaction. It was suggested that the sensitizing antigen may be a sulfonamide-plasma-protein combination which occurs *in vivo* in the blood of patients during sulfonamide therapy, the sulfonamide probably acting as a haptene.

(Leftwich, W. B. An intradermal test for the recognition of hypersensitivity to the sulfonamide drugs. Bul. Johns Hopkins Hosp. 74(1):26-48.)