

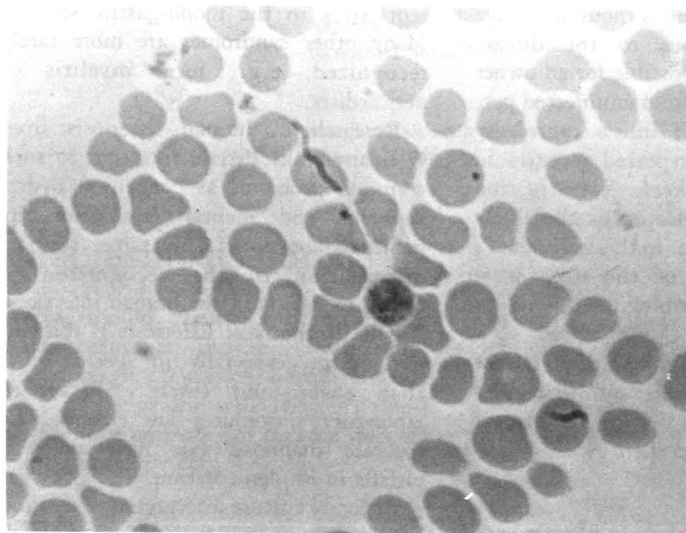


VETERINARY MEDICAL REVIEW

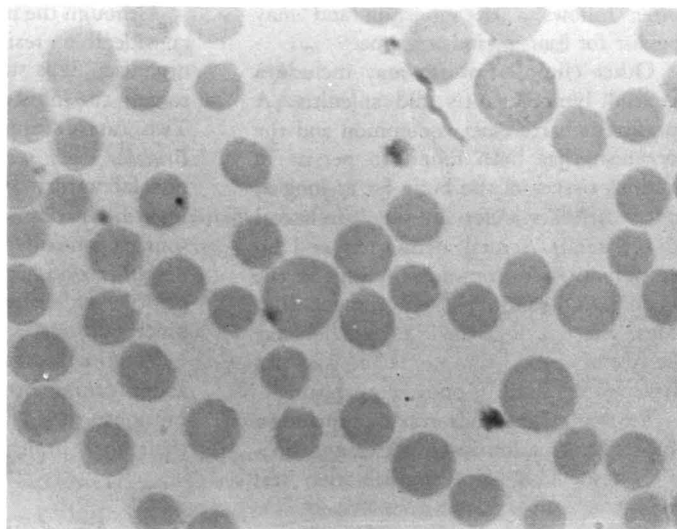
College of Veterinary Medicine

University of Missouri-Columbia

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Photomicrograph of a Giemsa stained peripheral blood smear from a cow during the developmental stage of anaplasmosis shows marginal anaplasma bodies in some of the erythrocytes.



Photomicrograph of a Giemsa stained peripheral blood smear from a cow during the convalescent stage of anaplasmosis shows marginal anaplasma bodies, large immature erythrocytes.

Diagnosing and treating anaplasmosis

by Dr. Gerald Buening, Department of Veterinary Microbiology

Anaplasmosis is an infectious disease, primarily of cattle, which is estimated to induce a loss of \$100 million annually in the United States. The prevalence of the disease in Missouri, based on a 1973 statistical sampling of mature slaughter cattle, was 13%.

The etiological agent *Anaplasma marginale* is an intraerythrocytic parasite which induces clinical disease in adult cattle; calves are relatively resistant. Ticks are the only proven biological vectors, and horseflies and eye gnats are implicated as mechanical vectors. In addition blood contaminated instruments such as needles and dehorning can transmit the organism from one animal to another.

Clinical disease is characterized by anemia, icterus and fever. Researchers have described four stages of the disease

and established methods of differentiating the stages (see Table 1). The choice of treatment and prevention measures is based upon the stage of the disease (see Table 2). Serological tests available for use as an aid to diagnosis include a complement fixation (CF) and anaplasmosis card test.

After acute anaplasmosis has been diagnosed in a herd, various treatment and control options are available to the veterinarian and herd owner. These include (1) treatment of clinical disease only, (2) parenteral antibiotic treatment of herd members at 28-day intervals throughout the vector season, (3) simultaneous vaccination and antibiotic treatment of herd, or (4) serological test with subsequent vaccination and antibiotic treatment or serological test with subsequent antibiotic treatment.

Blood Smears

Blood slides should be stained with Giemsa stain or Wrights. One to five days after the appearance of reticulocytes other immature RBC's such as polychromatophils and normoblasts will be observed.

Anaplasma Vaccination

An inactivated vaccine is available but the program must be completed at least two weeks before the vector season. One dose is administered followed by a second dose four weeks later, so a total of six weeks is needed before protection. Duration of immunity is approximately six months and annual revaccination is recommended. The

(continued on page 3)

Canine abortion? Don't overlook brucellosis

When abortions occur late in gestation in the bitch or if pregnancy fails to develop in apparently successful matings, canine brucellosis should be suspected.

Overt abortions may occur 50 to 55 days after gestation, as well as early undetectable embryonic deaths in the first few weeks of pregnancy. The early embryonic deaths go unnoticed as there is usually no detectable vaginal discharge present. A prolonged vaginal discharge often follows a late abortion and may persist for long periods of time.

Other clinical features may include a general lymphadenitis and splenitis. A persistent bacteremia is common and the organism has been found to persist in various tissues of the body for as long as one year. Testicular atrophy (unilateral or bilateral), scrotal dermatitis and an epididymitis are common findings in the male. The male may also become sterile. Most affected dogs (male or female) may be free of clinical symptoms and may not have an elevation in body temperature.

Serological methods available include a tube agglutination and a plate agglutination test. The plate agglutination test

serves as a rapid screening diagnostic aid. Positive or suspicious serological tests should always be followed by attempts to isolate the organism from blood or aborted material.

There is still no completely satisfactory treatment available but most veterinarians use tetracycline, streptomycin and sulfa drugs in therapy regimens. There also is no immunization agent currently available for use.

Although the human is thought to have considerable resistance to the disease organism, it is still possible for an owner to gain the infection from an infected pet. Two cases of human illness caused by *Brucella canis* were reported recently in non-laboratory workers. Investigation identified a household pet as the likely source of one infection. In this individual's neighborhood 30% of the dogs were positive on either serological studies or blood cultures.

Veterinarians should tell their clients about canine brucellosis and what precautions they should take to protect their dogs' health and their own.

Unwanted animals cause problems

Recent publicized accounts have pointed up the increased magnitude of problems caused by unwanted or uncontrolled animals.

In August 1975 the Center for Disease Control reported that a 17-year-old Ohio girl was attacked by a 3-year-old Great Dane. A similar incident occurred in Ohio in 1974.

Washington State University "Animal Health Notes" reports an account of a pet monkey killing a 4-year-old New Jersey boy in July, 1975.

The St. Louis Globe Democrat, Sept. 10, 1975 describes a hunting dog mauling a 2½-year-old boy.

The surplus dog and cat problem has become major enough to warrant a national conference. In May 1974, American Humane Association, American Kennel Club, American Veterinary Medical Association, Humane Society of the U.S. and the Pet Food Institute co-sponsored the National Conference on the Ecology of the Surplus Dog and Cat Problem in Chicago. (continued on page 4)

Vet. Med. Review changes

The *Veterinary Medical Review* is in a state of healthy transition. The next issue (March, 1976) will be larger and serve purposes which, in the past, have been served by two publications; the *Veterinary Medical Review* and ASCAPI Life-Long Learning newsletter.

The purposes for the new *Veterinary Medical Review* are two-fold. The publication will serve as a medium for continuing professional education and will distribute news of professional interest.

The continuing education section will emphasize single concept features, complete with self-assessment questions. Each issue will contain a section of interest to food animal or companion animal practitioners, or both. Also included will be shorter items of seasonal or current interest, practice tips, announcements of important continuing education events, etc.

The news section will be informative and focus on the College of Veterinary Medicine and its role in the state of Missouri.

We hope you will enjoy and be motivated by this new format. Should you have suggestions on input please

Listeriosis time has arrived

Listeriosis is usually felt to be a highly seasonal problem, occurring mostly in late winter and early spring. It is mostly recognized in cattle and sheep. However, such species as swine, dogs, birds and human beings are known to be infected on occasion.

The disease is usually manifest by meningo-encephalitis in ruminants and septicemia in the mono-gastric species. Many other syndromes are more rarely recognized; e.g., focal myelitis or pericarditis.

Research in human listeriosis from Germany links listeria infection to such common problems as congenital hydrocephalus and mental retardation, or habitual abortion. The same seasonal distribution to the recognition of listeriosis occurs in the human infection.

The diagnosis of listeriosis is difficult to confirm, especially in species other than sheep and cattle. Specialized laboratory procedures are essential for accurate diagnosis but have practical pitfalls in implementation.

Accurate culture interpretation requires up to three years of "cold enrichment" processing; impractical, but true. No routine diagnostic laboratory can carry this out, and yet we do not get accurate answers unless it is done. Studies in Holland using these time consuming laboratory methods show that up to 70% of randomly selected human beings are fecal carriers. The same may be true for various species of animals.

There is reason to believe that listeric infection may have a true latent phase, such as occurs in herpes simplex infections, or "cold sores." Only the dedicated laboratory with that specific mission can really begin to answer the questions of the real impact of listeriosis.

How many problems are being caused by listeriosis which we do not now recognize? Is it possible that the "seasonal" distribution in sheep, cattle and man are simply the easiest forms to recognize? When did you last see an encephalitis or septicemic disorder, never specifically diagnosed, but which could have been listeriosis — even in small animals?

contact the Continuing Education Office, 23 Veterinary Sciences Bldg., College of Veterinary Medicine, Columbia, MO 65201.

Table 1. Stages of Anaplasmosis Infection

Stage of Disease	Description	Length	Clinical Signs	Serology	Identification
Unexposed	—	—	—	neg	Serology during non-vector season
Incubation	Time of infection until 1% of RBC's contain marginal bodies	3-8 weeks — depends upon dose	none	neg	Difficult
Developmental	Time from when 1% RBC's contain marginal bodies until reticulocytes appear in peripheral circulation	4-9 days	Fever, anemia, icterus	pos	Blood smear — marginal anaplasma bodies and serology
Convalescent	Time from appearance of reticulocytes to return to normal blood value	Few weeks to several months	Varies with animal	pos	Blood smear — marginal bodies, immature RBC's and serology
Carrier	Time of disappearance of marginal bodies to end of animal's life	Life of recovered animal (untreated)	none	pos	Serology

Anaplasmosis con't

vaccine should be used with caution in cows because an incidence of neonatal isoerythrolysis has been noted in some herds. Vaccination will reduce clinical disease, but animals can become infected and become carriers.

Drug Therapy

Parenteral injection of tetracycline 3-5 mg/pound body weight is effective in reducing the severity of disease in the incubation and developmental stages.

The injection of tetracycline .2 gm/animal, repeated at 28-day intervals or feeding 0.25-0.50 mg of tetracycline per pound daily during the vector season, has been reported to provide protection.

The carrier state can be eliminated by parenteral injection of tetracycline 5 mg/pound daily for 10 days or oral tetracycline 5 mg/pound daily for 60 days.

Serological Test

The complement fixation test is done at approved diagnostic laboratories such as the Veterinary Medical Diagnostic Laboratory at the College of Veterinary Medicine. The anaplasmosis card test, which can be done in the field, has not been released for general use at this time.

The Missouri State Diagnostic Laboratory, Springfield, MO, has been conducting CF and card tests simultaneously and finds corresponding results 98% of the time. While the CF test is most reliable

Table 2. Treatment and Prevention of Anaplasmosis Related to Stages of Disease

Stage of Disease	Treatment	Control
Unexposed	none	Parenteral tetracyclines 3-5 mg/lb, repeat at 28-day intervals; vaccinate; or low level feeding of tetracyclines
Incubation	Parenteral tetracyclines 3-5 mg/lb — may reduce incidence of clinical anemia	Treatment at 28-day intervals; serological testing with vaccination and treatment; or serological testing with treatment at 28-day intervals
Developmental	Parenteral tetracycline 3-5 mg/lb	Treatment and segregation
Convalescent	No treatment, evaluate each case, use whole blood	Segregation
Carrier	Tetracycline for clearing of carrier state only (parenteral, 5 mg/lb daily for 10 days; oral, 5 mg/lb daily for 60 days)	Segregation or treatment

for diagnosing acute cases, the reliability of both tests is greatly lessened on serum of animals which have been vaccinated or have received antibiotic treatment within the past six months.

Self-assessment Questions

- The prevalence of anaplasmosis in Missouri is approximately
 - 5%
 - 25%
 - 13%
 - 7%
- Biological vectors for anaplasmosis are
 - ticks
 - horseflies
 - eye gnats
 - all of the above
- The treatment of choice for early developmental state of anaplasmosis is
 - parenteral penicillin-streptomycin
 - parenteral tetracycline 3-5 mg/pound body weight
 - oral tetracycline .25-.50 mg/pound body weight
 - none
- Clinical anaplasmosis can be prevented by
 - vaccination
 - oral tetracycline
 - parenteral tetracycline at 28-day intervals
 - all of the above

Answers: c, a, b, d

Faculty Notes

Dr. L. D. Olson, professor of veterinary pathology, attended the North Central Technical Meeting of Research Workers on Respiratory Diseases of Poultry and presented a report on fowl cholera research. Nov. 28-Dec. 2 in Chicago.

Dr. J. N. Berg, assistant professor of veterinary microbiology, presented "Endotoxic and Leukotoxic Activity of Three Strains of *Fusobacterium necrophorum*" at the Conference of Research Workers in Animal Diseases in Chicago, Nov. 29-Dec. 2.

Dr. J. E. Wagner, professor of veterinary pathology, presented a paper entitled "Studies of Cytauxzoonosis in Domesticated Cats" at the Conference for Research Workers in Animal Diseases in Chicago, Dec. 1-3.

Dr. L. D. Olson, professor of veterinary pathology, presented "What You Can Do If You Have Fowl Cholera in Your Turkeys" at Iowa Turkey Day in Altoona, IA, Dec. 3.

Dr. F. E. South, professor of veterinary anatomy-physiology, presented a seminar on interaction of sleep and thermoregulation at St. John's Memorial University of Newfoundland Dec. 9-10.

Dr. C. J. Bierschwal, professor of veterinary medicine and surgery, presented "Management of the Dairy Cow Following Abortion, Dystocia and Induced Parturition" at the Bovine Practitioners' annual meeting in Atlanta, GA, Dec. 10-Dec. 13.

Dr. J. E. Wagner, professor of veterinary pathology, attended scientific sessions at the 26th Annual American Association for Laboratory Animal Science meeting in Boston Nov. 14-21. He also moderated a session and chaired the meeting of the Laboratory Animal Science Editorial Board.

Dr. J. E. Harkness, research associate in veterinary pathology, attended the 26th Annual American Association for Laboratory Animal Science meeting in Boston Nov. 14-21 and presented the paper, "What is your diagnosis?". He was also autotutorial chairman for the convention.

Dr. R. Zumwalt, assistant professor of veterinary anatomy-physiology, presented a talk entitled "The Application of Analytical Methods from the Lunar Program to Biomedical Problems" to the St. Louis Section of the American Cereal Chemists Nov. 24.

Dr. R. W. Loan, professor and chairman of veterinary microbiology, attended the Conference of Research Workers in Animal Diseases and presided at the meeting of the American College of Veterinary Microbiologists in Chicago Nov. 29-Dec. 1.

Dr. L. D. Olson, professor of veterinary pathology, attended the Conference of Research Workers in Animal Diseases in Chicago, Nov. 29-Dec. 1 and presented two papers; "Induction of Swine Dysentery by the Intravenous Injection of Filtered Spirochetes" and "An Apparent Excitation of Swine Dysentery in Carrier Swine Fed Sodium Arsanilate."

Dr. J. H. Johnson, *Dr. J. Coffman*, associate professors of veterinary medicine and surgery, and *Dr. H. E. Garner*, professor of veterinary medicine and surgery, presented one-hour seminars on surgical management of subacute laminitis at the American Association of Equine Practitioners in Boston Nov. 30-Dec. 3.

Unwanted con't

Participants of the conference reached the conclusions that previously owned, presently unwanted animals, rather than feral dogs and cats are the primary problem.

There is a real need for determining the reason for rejection and disposal of pets, the characteristics of an "adoptable" animal which will not soon join the ranks of the rejected, and the reasons people allow wanted pets to be uncontrolled.

Educational efforts at all levels directed to the responsibilities of pet ownership are essential as the problem is growing larger.

Dr. Dewhirst resigns

Dr. Leonard W. Dewhirst, Assistant Dean for Student Affairs in the College of Veterinary Medicine, has resigned.

Dr. Dewhirst has accepted a position at the University of Arizona as Associate Director of Agricultural Experiment Station. Dr. Dewhirst's address will be: College of Agriculture, University of Arizona, Tucson, AZ 85721.

College of Veterinary Medicine

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University of Missouri-Columbia

Columbia, Missouri 65201

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