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Dr. Charles Benson (left) and Dr. Jon Palmer.

Unlike gregarious human beings, animals do not hold conventions, and are therefore spared the discomfort, and death, visited upon some of the people who convened in Philadelphia in 1976. As you probably recall, this was the infamous American Legion convention held at the stately Bellevue Stratford hotel and the disease outbreak brought about the demise of a Philadelphia landmark. Naturally, the malady was quickly labelled "Legionaires Disease." Subsequently, there have been some well publicized outbreaks of this disease in other parts of the world, and the causative organism has been identified as *Legionella pneumophilia.*

It now appears that animals may be carriers of this organism, and Dr. Charles E. Benson has begun a screening study to determine whether this is true. Dr. Benson is associate professor of microbiology in the School of Veterinary Medicine, whose laboratory is located at New Bolton Center. Dr. Benson has been involved in some basic studies on the characteristics of *L. pneumophilia* which is an organism that invades body cells. *L. pneumophilia* itself has never been isolated from animals, but, antibodies, produced in response to the organism, have been detected. Dr. Benson's work is concerned with direct isolation of the bacterium, a difficult chore. The organism can be isolated from human beings where it causes an atypical pneumonia, and Dr. Benson has it growing in cell culture in his laboratory. Dr. Benson's quest for this organism in animals is illustrative of one of his basic philosophies, to wit, "we only find what we look for." Despite some great strides, Dr. Benson points out that we are still on the frontier in our efforts to specifically identify bacteria that cause many infectious diseases in animals. There are a number of clinical syndromes in animals that appear to be of an infectious nature, but for which a causative organism has not been identified. With this in mind, Dr. Benson and various clinicians at New Bolton Center have teamed together in the hope of gaining a better understanding of the pathogenesis of certain of these perplexing syndromes. The clinicians with whom he has been working most closely are Dr. Robert Whitlock, Dr. Robert Dyer, and Dr. Jon Palmer. Prior to Dr. Benson's arrival at New Bolton Center in January 1981, this sort of cooperative effort in the study of infectious diseases had been neglected. Dr. Whitlock, who is associate professor of medicine and chief of medical services at New Bolton Center is quite enthusiastic about the future of this field.

Another major research interest of Dr. Benson is the study of the organism, *Salmonella.* This is a pathogen that has long been the plague of animals and humans. Interestingly, it was first discovered by a veterinarian, Dr. Daniel E. Salmon, who was the first Chief of the Federal Bureau of Animal Industry. One problem in any study of *Salmonella* is that there are over 1,200 strains of the organism. While certain strains have been identified as the cause of the disease in animals known as salmonellosis, it is possible that other, unidentified strains may also be involved. One of the objects of Dr. Benson's work will be to attempt to define mechanisms of pathogenesis. The particular strain now most commonly associated with colitis in horses is *Salmonella typhimurium.* The common clinical signs are hyperthermia, diarrhea, colicy pain, and occasionally a rapidly developing septicemia. One characteristic of equine salmonellosis is that it strikes horses that are in stressful situations, including transport, weaning, worming, or any other situation that lowers resistance. Surgery may predispose horses to salmonellosis, and one aspect of the work of Drs. Benson and Palmer is to examine horses post-surgically for the presence of *Salmonella.* Salmonellosis is highly contagious at the local level; it can become entrenched on a particular farm. Horses with salmonellosis at New Bolton Center are placed in isolation.

Dr. Benson states that some *Salmonella* strains have the capability of producing toxins. This is related to the genetic make-up of a particular organism. Horses with toxemia associated with salmonellosis, have been observed at New Bolton Center, and the search for strains that produce this phenomena will be part of the Benson/Palmer study.

In the past ten years there has been an increase in the incidence of *Salmonella* infections in both humans and animals. Recently there have been outbreaks of the disease in humans following the consumption of cooked beef. One problem in the spread of salmonellosis is the fact that most species, including humans, can act as carriers of the bacteria without exhibiting overt clinical signs. It is estimated that at least ten percent of the horse population are carriers of *Salmonella.*

Diagnosis of salmonellosis is based upon identification of organisms in fecal culture. This may he difficult in carrier animals, and Dr. Benson hopes to improve diagnostic methods.

A cooperative study in which Dr. Benson is involved with Dr. Dyer, concerns the etiology of "shipping fever" in cattle and horses. Dr. Benson is also conducting basic research on metabolic pathways in *Salmonella* and other organisms. While he is relatively new to the faculty of the School of Veterinary Medicine, Dr. Benson has been at the University of Pennsylvania since 1975, with the School of Allied Medical Professions. In addition to research he teaches in the core and elective portions of the veterinary curriculum, and is administrator of the clinical laboratory at New Bolton Center.

Canine Epilepsy

Epilepsy is one of the most common canine neurological complaints, yet control of seizures in dogs remains a difficult, frustrating, and often unrewarding task for veterinarian, owner, and patient. In an effort to remedy this situation, the Veterinary Hospital of the University of Pennsylvania has recently instituted an epilepsy foundation for dogs called the Canine Epilepsy Service under the directorship of Dr. George C. Farnbach, V.M.D., Ph.D., assistant professor of neurology. This canine epilepsy center has the ambitious goals of improving the control of seizures in epileptic dogs and, if possible, eliminating seizures altogether through a cooperative effort involving pets, their owners, their local veterinarians, and the facilities of the Canine Epilepsy Service (CES).

Dogs, like people, suffer from epilepsy of varying intensities and types. Like the physician, a veterinarian is generally forced to attempt to control epilepsy through the use of anticonvulsant drugs. The control of seizures in humans is more often successful than it is in dogs because considerably more information about the use and effectiveness of anticonvulsant drugs in humans is available to the physician. The process of controlling human seizures has been considerably advanced by the study of large numbers of epileptic patients on a variety of treatment regimens, which was made possible by centralized epilepsy study groups. These groups have developed a wealth of knowledge about the efficacy of specific drugs, the blood levels required to control seizures, and the toxic and long-term effects of these drugs. Modern technology now permits relatively inexpensive monitoring of serum drug levels, enabling the physician to adjust or switch anticonvulsants for maximum effect and minimum toxicity based on the knowledge of each drug and the individual patient's blood levels. No such body of knowledge exists in veterinary medicine, leaving the practitioner to determine the appropriate anticonvulsant for the patient on a limited and basically blind trial-and-error basis. This can be a costly and frustrating process.

"There are a variety of drugs and drug combinations which can be used in control protocols, yet accurate information about the effective and toxic blood levels of these drugs or about their long-term side effects in the dog does not exist," Farnbach explained. "At the CES we hope to collect this kind of information over a long period of time. Our goal is to monitor at least 1,000 dogs for at least three years."

To illustrate the importance of drug information, Farnbach cited Dilantin, a drug commonly used in both humans and dogs to control seizures. "In humans, Dilantin is effective in many patients, but to control seizures, blood levels above 10 ug/ml are required. An effective dose for an adult human is about 300 mg/day. We do not know