

LEPTOSPIROSIS IN THE HAMSTER MODEL AND CHEMOPROPHYLAXIS
IN THE ACUTE INFECTION (1 OCT. '81 - 30 SEPT. '82)

Principal Investigators : Michael R. Elwell, MAJ, VC
Pranee Hansukjariya, BSC
Markpol Tingpalapong, DVM
George S. Ward, LTC, VC

BACKGROUND : Leptospirosis is a worldwide zoonotic illness that is common in tropical areas and recently has been a cause of outbreaks of acute "flu-like" illness in troops in jungle training exercise (1). Presently the nonhuman primate is being studied in our laboratory as a model for acute leptospirosis and chemoprophylaxis. The hamster has been previously reported as a model for acute leptospirosis (2,3). A clinical, often fatal illness results in hamsters infected with some strains of leptospira (4). This animal model will be a useful addition to the primate model for testing the potential prophylactic drug treatment for leptospirosis. Also the hamster is an ideal laboratory animal for isolating strains for leptospira from samples contaminated with other bacterial or fungal organisms (5). Proposed studies on the epidemiology of leptospirosis will necessitate the use of hamsters and familiarity with this model in isolation of leptospira from infected water sources.

METHOD : Both weanling (40-50g) and young adult (70-80g) hamsters were infected with one of three serovars of leptospira (Table 1). An javanica (rodent isolate) serovar was lethal for hamsters of both weight groups. The survivors of the bataviae infection developed a chronic renal infection; the javanica infection survivors did not have a chronic infection. The patoc serovar (laboratory reference strain) was not virulent for any hamsters.

A single experiment to study the effect of doxycycline treatment on infection was done in hamsters, both males and females (Table 2). There was no difference in the virulence of the bataviae serovar for either sex and death occurred from 1 to 2 weeks after infection. All hamster treated with a daily dose of doxycycline for ten days survived the infection and none had chronic renal infection with leptospira. Leptospiral organisms were cultured from kidneys of all non treated hamsters and from the blood of two non treated hamsters at necropsy.

FUTURE OBJECTIVES :

1. The prophylactic effect of daily and single treatments with doxycycline on acute leptospira infection will be studied.
2. An infection using a series of 10 fold dilutions of *L. bataviae* will be done in hamsters to determine the optimal lethal dose and the sensitivity of hamsters to infection with very low doses (1-10 organisms) that may be found in contaminated water samples.

Table 1. Survival and chronic renal infection in hamsters injected with leptospira.

Serovar infection	# Survivors/ # Infected	# Chronic renal infection/ # Survivor
bataviae (40-50 gram)	2/6	2/2
(70-80 gram)	2/6	2/2
javanica (40-50 gram)	2/6	0/2
(70-80 gram)	2/6	0/2
patoc (40-50 gram)	6/6	ND
(70-80 gram)	6/6	ND
none (40-50 gram)	6/6	0/6

Table 2. The effect of doxycycline treatment on hamsters infected with *L. bataviae*.

Hamsters (40-50g)	Treatment	# Survivors/ # Infected	Mean day of death
Males	none	1/6	8.6 + 1.3
Females	none	0/6	9.0 + 1.7
Males	oral doxycycline ¹	6/6	-
Females	oral doxycycline ¹	6/6	-

¹ 14.4 mg/Kg/day from day-1 to day 10 after infection.

REFERENCES :

1. Anonymous, 1981. Army Fact Sheets, Leptospirosis, 24 Nov. 81 and 29 Dec., 81.
2. Millter, N.G. and Wilson, R.B. 1967. Electron microscopic study of the relationship of *L. pomona* to the renal tubules of the hamster. Am. J. Vet. Res. 28:225-235.
3. Badiola, J., Thierman, A.B., and Cheville, N.F. 1983. Pathologic features of leptospirosis in hamsters caused by *L. interrogans* serovars hardjo and szwajizak. Am. J. Vet. Res. 44:91-99.
4. Tripathy, D.N. and Hanson, L.E. 1974. Pathogenicity of *L. grippityphosa* for gerbils, hamsters, and voles. Am. J. Vet. Res. 35:547-549.
5. Hanson, L.E. 1982. Leptospirosis in domestic animals : the public health perspective. JAVMA, 181:1505-1509.