

pigs can be maintained for at least 6 weeks on a normal diet if salt drinking fluid is offered.

Desoxycorticosterone acetate subcutaneously administered in daily doses of 0.5 to 1.0 mg produces normal growth in adrenalectomized guinea pigs.

Even though adrenalectomized guinea pigs had been maintained for over 5 months by salt and hormone therapy, they died on an average of 4.6 days after discontinuing this therapy.

11957

Effect of Obstructive Jaundice on Polyarthritis in Rats.*

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Hench¹ reported that marked and generally complete remissions from various rheumatic symptoms occur in patients with the onset of spontaneous jaundice. Later² he reported further confirmatory observations and stressed the fact that the phenomenon seemed to depend upon the severity of jaundice as measured by the concentration of serum bilirubin rather than upon the type of jaundice.

Because of these clinical observations it seemed of interest to investigate the effect of obstructive jaundice on arthritis in an experimental animal. Collier³ first described a spontaneous polyarthritis in rats. Findlay, Mackenzie, MacCallum and Klieneberger⁴ reported a somewhat similar disease in rats and were able to cultivate a pleuropneumonia-like organism from affected joints which, upon inoculation into rats, reproduced the disease. A culture of Findlay's organism, designated L_r, was obtained.

Methods. Young albino rats (average age, 6 weeks; weight, 100 g) were used. For culturing the L_r organisms 20% horse serum nutrient broth was employed, 48-hour cultures showing distinct turbidity or growth. The size of the infective dose of

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¹ Hench, P. S., *Proc. Staff Meet., Mayo Clinic*, 1933, **8**, 430.

² Hench, P. S., *Arch. Int. Med.*, 1938, **61**, 451.

³ Collier, W. A., *Geneesk. Tijdschr. Ned.-Ind.*, 1938, **78**, 2845.

⁴ Findlay, G. M., Mackenzie, R. D., MacCallum, F. O., and Klieneberger, E., *Lancet*, 1939, **2**, 7.

organisms was determined by the individual body weight of the animal (0.3 cc 48-hour culture per 50 g of body weight). Injections were made by the intravenous route and littermate controls were simultaneously injected for each series of experimental animals. The first symptoms of developing arthritis appeared in the control animals approximately 48 hours after injection. Ligation of the common bile duct of the experimental animals was performed under anesthesia at intervals before and after the injection of the organisms. Serum bilirubin determinations were made on several of the experimental animals at various intervals after duct ligation. Since Tang and coworkers⁵ have reported the bile-soluble property of pleuropneumonia organisms, it seemed of interest to determine whether jaundiced rat blood would affect the growth of *L₇* organisms. Pour plates with a concentration of 20% whole blood in nutrient agar were made. It was found that blood removed from rats 2 to 12 days after bile duct ligation inhibited the growth of *L₇* organisms, whereas normal rat blood supported abundant growth. It also seemed advisable later in the course of the work to use an organism which is not bile-soluble for an additional series of experimental animals. For this purpose a streptococcus of the "matt" variety, Group A, was obtained, which produced arthritis in rats.[†] The inoculating dose was 0.3 cc 24-hour broth culture per 50 g body weight. The resulting arthritis was not as severe as that induced by the *L₇* organisms which, in contrast to the streptococci, were passed serially in rats at frequent intervals in order to maintain a maximum virulence.

The extent of arthritic involvement was estimated by the number of joints involved and the degree of tenderness and oedema. The knee and ankle joints were most frequently affected, with the wrist, then tarsal and carpal interphalangeal joints next in frequency.

Results. In Table I the degree of arthritic involvement is recorded as: 1+, 1 or 2 joints tender without noticeable oedema; 2+, 2 or 3 joints involved with slight oedema; 3+, 3 or 4 joints involved with moderate to marked oedema; 4+, animal incapacitated with 5 or more joints showing marked oedema. The table indicates the time of bile duct ligation with respect to the injection of infective organisms. It shows the time of onset and progressive degree of arthritic involvement up to 12 days about which time the control animals

⁵ Tang, F. F., Wei, H., McWirtter, D. L., and Edgar, J., *J. Path. Bact.*, 1935, **40**, 391.

[†] This organism was obtained from Dr. Sidney Rothbard of the Department of Pathology, Cornell University Medical College, New York City.

TABLE I.

No. of rats	Series	Time of duct ligation with respect to injection of organisms	Avg degree of arthritic involvement days after injection									
			1	2	3	4	5	6	8	10	12	
3	I	6 days prior to injection of L ₇	0	0	0	0	1+	2+	2+	2+	2+	
3		Non-ligated controls	0	1+	3+	4+	4+	4+	4+	4+	3+	
3	II	24 hr prior to injection of L ₇	0	0	0	1+	2+	2+	2+	2+	2+	
3		Non-ligated controls	0	1+	3+	4+	4+	4+	4+	4+	4+	
2	III	20 hr after injection of L ₇	0	0	0	1+	2+	2+	2+	2+	2+	
2		Non-ligated controls	0	1+	2+	4+	4+	4+	4+	3+	3+	
2	IV	48 hr after injection of L ₇	0	1+	3+	4+	4+	4+	4+	4+	3+	
2		Non-ligated controls	0	1+	3+	4+	4+	4+	4+	4+	3+	
3	V	6 days after injection of L ₇	0	1+	3+	4+	4+	4+	4+	4+	3+	
3		Non-ligated controls	0	1+	3+	4+	4+	4+	4+	4+	3+	
3	VI	24 hr prior to injection of Strep.	0	1+	2+	3+	3+	3+	3+	2+	2+	
3		Non-ligated controls	0	1+	2+	3+	3+	3+	3+	2+	2+	
Avg conc. of bilirubin per 100 cc blood												
Days after ligation			0	1	3	6	9	12				
Mg			1	6.3	8.8	13.4	10.2	9.9				

usually begin to show spontaneous recovery and the ligated animals begin to show the adverse effects of jaundice. The average concentration of serum bilirubin as determined on several of the experimental animals at intervals after bile duct ligation is also recorded.

Summary. Ligation of the common bile duct of rats prior to or 20 hours after the injection of L₇ organisms delayed the onset of arthritis, and the subsequent degree of joint involvement up to 12 days' time was markedly diminished. However, when duct ligation was performed after the onset of arthritis there was no effect upon the course of the disease. Since rat arthritis induced by the injection of hemolytic streptococci was not influenced by bile duct ligation, it seems probable that the effect of obstructive jaundice on the development and severity of L₇ arthritis in rats was due to the bile solubility of the L₇ organisms.