

TABLE I.

Organism	Mucin			Saline		
	No. Mice Inoc.	Dead	Av. Time Hr.	No. Mice Inoc.	Dead	Av. Time Hr.
Pneumo. 1:10	6	6	17	6	6	35
1:100	8	8	20	6	6	97
1:1000	4	4	20	4	4	63
1:10,000	2	2	32	2	0	—
1:1,000,000	2	0	—	2	0	—
Strept. 1:10	31	30	21	31	18	58
Staph. 1:10	12	7	16	12	0	—

of a mouse the effect of the mucin is not apparent. Of 6 mice injected intravenously with 0.5 cc. of streptococcus in mucin but 2 died and these in 120 hours. Similar results were obtained when the organisms were injected in saline whereas the same dose in mucin injected intraperitoneally killed 5 out of 5 mice in 17 hours and 4 out of 5 mice in 69 hours when the organisms were suspended in saline. Subcutaneous inoculations of mucin suspended inoculum appear to be no more lethal than similar doses of the organisms suspended in saline.

We have determined that agar, starch or gelatin which may offer a similar temporary protecting coat to the organism against the defensive mechanism of the host also tend to increase the virulence of the bacteria but not nearly as effectively as mucin. Acidulated gelatin (pH 3.0) was used as a means of irritating the peritoneum but did not hasten the invasion of the bacteria. Mice injected first with India ink to block the fixed phagocytic cells did not increase the susceptibility of the animals. If 1 cc. of 4% mucin is injected not longer than 5 or 6 hours before the introduction of 1:10 cc. of streptococcus culture into the peritoneal cavity of the mouse, the effect of mucin on the virulence of the organism is obtained.

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Peripheral Blood Chemistry Changes After Unilateral Lumbar Sympathectomy.

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Few studies have been reported on peripheral blood chemistry changes subsequent to sympathectomy. Fontaine and Jung¹ did

¹ Fontaine, R., and Jung, A., *La Presse Med.*, 1928, **36**, 1079.

unilateral cervical sympathectomies on rabbits and then produced experimental wounds of both ears. They found a higher pH in the exudate from the wound on the sympathectomized side compared to the "normal". Beattie, *et al.*,² studied chemical changes in hind leg muscles after unilateral lumbar sympathectomy. They found within 6 weeks of operation, (1) a rise in the water content, (2) a slight swing in the reaction to the alkaline side and (3) a lower lactic acid value on the sympathectomized side. Büttner,³ doing similar work, found an increase in glycogen, lactic acid and ammonia and a decrease in phosphorus. Britton,⁴ however, found a decreased glycogen content in the muscles while Dworken⁵ and coworkers found no essential differences in muscle glycogen.

In the work reported here studies were made on the return blood flow from the hind legs after unilateral lumbar sympathectomy, which included at least 3 ganglia and intervening chain. Dogs were used and aseptic technique employed throughout. Blood examinations were made from 2 days to 7 months post-operative. The blood was drawn simultaneously from both femoral veins at the same level, when the dogs were perfectly quiet and relaxed.

Thirteen dogs were used and 33 CO₂ determinations were made. In CO₂ estimations made 2 days after operation, no essential changes were noted in the 2 sides. Twenty-three determinations were made from one week to 5 months after operation and the average CO₂ content on the sympathectomized side was 2.1 volumes % lower than the non-sympathectomized side. These differences varied from 1.5 to 5.2 volumes %. This difference in CO₂ disappeared after 5 months, although one dog showed no changes after 6 weeks. One, examined at 6 and 7 months after operation, has shown no CO₂ differences, although marked changes were present previously.

Five oxygen determinations were made at post-operative intervals of 10 days to 4 months. There was in each case a greater O₂ content on the sympathectomized side ranging as high as 1.77 volumes % and averaging 0.96. One examination made 2 days after operation showed no difference.

Lactic acid and sugar determinations were made but no differences were found on the 2 sides even when definite CO₂ changes were present.

Hematocrit readings made simultaneously when drawing blood

² Beattie, F. J. R., Beattie, M. K., and Milroy, T. H., *J. Phys.*, 1930, **69**, 364.

³ Büttner, H. E., *Ab.*, *Am. J. Phys.*, 1929, **90**, 304.

⁴ Britton, S. W., *Am. J. Phys.*, 1930, **93**, 213.

⁵ Dworkin, S., Baeq, Z. M., and Dill, D. B., *Am. J. Phys.*, 1931, **96**, 308.

for CO_2 were higher on the sympathectomized side although red blood cell counts showed no essential differences on the 2 sides.

As the lactic acid and sugar estimations showed no differences, the changes in blood gas volumes are probably not of metabolic origin. Following lumbar sympathectomy there is a release of normal vascular tonicity. As this tonicity offers some resistance to blood flow normally, the removal, by sympathectomy, of this factor would permit a greater blood flow through the extremity. This has been demonstrated by Britton. Hence with a greater blood flow through the extremity, each unit volume of blood would have to carry less CO_2 and give off less O_2 . Physiological readjustments apparently take place after a few months, restoring the sympathectomized side to an essentially normal condition.

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Effect of Sympathectomy on Bone Repair.

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The effect of unilateral lumbar sympathectomy on the healing of bone defect has been studied experimentally in the following manner. Dogs were used throughout. A left lumbar sympathectomy, including at least 3 ganglia, sometimes 4, and the intervening chains, were excised from the sacral promontory upwards. Immediately following this procedure, equal fragments, approximately 1.5 mm. in length, were resected subperiosteally from the upper end of both fibulae. This method for studying bone repair was chosen in preference to simply fracturing the bones, as repair can be studied more satisfactorily by roentgenograms. Also the fibulae were chosen as they are not essential to weight bearing, hence splints and casts were not used. Healing was determined by roentgenograms and was considered complete when callus had completely bridged the gap between the bone ends.

Seventeen dogs were used. Seven developed infection of the fibular wounds and were sacrificed. Six of the remaining 10 presented an unexpected complication of fibular bone absorption rather than healing, and will not be discussed in this paper.

Of the remaining 4 one dog died of pneumonia 7 weeks after