for normal fluctuations, counts were made at all hours of the day and night.

The normal guinea pig has been found to have a leucocytic formula peculiarly its own, especially in that an atypical mononuclear is normally present in the circulation. In our counts this will be termed the Kurlow cell, because of its inclusion, the so-called Kurlow body. Considerable evidence has been obtained upholding the belief that the Kurlow inclusion is the result of a symbiotic protozoan.

An average total leucocyte count of 9,600, and a total erythrocyte count of 5,565,000, were established. The differential count showed the following: Neutrophile, 34.9%; Lymphocyte, 49%; Monocyte, 7%; Eosinophile, 3.1%; Basophile, 0.8%; Kurlow cell, 5.0%; Unclassified cells, 0.2%.

It is believed that the above data establishes a fairly accurate means of ascertaining the normalcy of a fully matured guinea pig.

[1] Pappenheim, *Virch. Arch.*, 1899, Bd., 1575.54, Anm.

[2] Simpson, M. E., Publications in Anatomy of the University of California, i, 1-9.

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"Tutocain" as a Shock Preventative in Tuberculous Guinea Pigs Injected with Tuberculin.

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The symptoms following the rapid absorption of tuberculin in the tuberculous guinea pig, in which the subcutaneous inoculation of small amounts of tuberculin invariably prove fatal, are well known.

Fischel[1] has suggested that the severe tuberculin reaction can be mitigated by introducing tuberculin into the skin with a view to retarding absorption and slowly removing the toxic factors elaborated upon the contact of tuberculin with tuberculous tissues. It had occurred to us that if conditions could be set up subcutaneously which would retard absorption of this toxic factor, and at the same time permit the use of larger amounts of tuberculin, some therapeutic results might be developed, without the danger of fatal issue.

To produce these conditions, a local anesthetic, hydrochloride of p-amino-benzoyl-di-methyl-amino-methyl-butanol or by its trade name, the "Tutocain" brand of Butamin, which induces an edema

and at the same time renders it painless, was selected. As a rule 4 cc. of a 1% solution was injected subcutaneously. The guinea pigs had been rendered tuberculous by the subcutaneous inoculation of 1 cc. of a suspension of tubercle bacilli (virulent strain No. 427) into the inguinal region 4 weeks previous to the tests. Animals were subjected to an intracutaneous tuberculin test before they were employed in the experiments, only animals showing a strongly positive reaction being used.

One half hour after the application of the drug 0.4 cc. of old tuberculin was injected subcutaneously into the infiltrated area. Previous tests had shown that 0.2 cc. of the same tuberculin was sufficient to cause death of tuberculous guinea pigs within 24 hours.

Guinea pigs, from numbers 1 to 10, were autopsied one week after the test inoculation and the extent of the infection noted. All guinea pigs showed extensive and typical tuberculous lesions in the liver, spleen, lymph nodes, and lungs. The remainder of the guinea pigs were kept under observation for subsequent tests.

TABLE I.

Guinea Pig No.	Inoculation	Reaction
1	Drug and 30 min. later 0.4 cc. old tuberculin	None except positive intradermal
2	"	"
3	"	"
4	"	"
5	"	"
6	"	"
7	"	"
8	"	"
9	"	"
10	"	"
11	"	"
12	"	"
13	"	"
14	"	"
15	"	"
16	"	"
17	"	"
18	"	"
19	"	"
20	0.4 cc. old tuberculin	Death in 14 hours
21	"	" 24 "
22	"	" 16 "
23	"	" 22 "
24	"	" 18 "
25	"	" 18 "
26	4 cc. of drug and 0.4 cc. old tuberculin. Stood at room temperature for two hours. Inoculated simultaneously.	" 19 "

The data shown in Table I indicate that tuberculous guinea pigs previously injected with Tutocain, and later with 0.4 cc. of old tuberculin, are afforded complete protection against a fatal dose of tuberculin. On the other hand, a simultaneous injection of the drug mixed with the tuberculin was fatal. This would appear to show conclusively that the Tutocain has no destructive effect upon the active substance of the tuberculin. In this connection it should be noted that the intradermal tuberculin reaction is not interfered with, even when the skin has been previously infiltrated with the drug.

Attention may be drawn to the possibility that the protective action of "tutocain" may not be directly dependent on its anesthetic properties, and in particular its effects on the autonomic system. The protection may be due to the oedema; in the protected animals, either a local mobilization of cells and ferments destroy the nucleoproteins of the tuberculin, or, the slow absorption favors a gradual but progressive desensitization of the animal, and so protects it from a fatal reaction.

[1] Fischel, Carl, *Am. Rev. Tub.*, 1927, xvi, 210.

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Effects of Anesthetics on Osmotic Resistance of Erythrocytes: I. Ether and Chloroform.

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Widely conflicting opinion exists with regard to the effect of anesthetics on the resistance of red blood cells to hypotonic saline solutions. Since little of this is based on quantitative data, it was thought worth while to restudy the problem, using the quantitative method introduced by Simmel,[1] in which actual count is made of the number of cells remaining after uniform periods of contact with different grades of hypotonic solutions. The results are conveniently expressed as percentages of the total number of erythrocytes per cubic millimeter, where Hayem's solution has been used as the diluent. The normal variations likely to be encountered by this method have been studied by Leake and Pratt.[2]

Dogs were used in all experiments. Blood was drawn by syringe