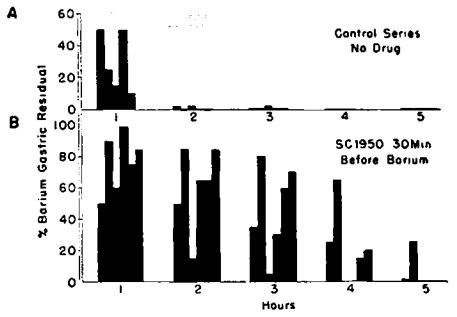

FIG. 4.

Roentgenographic study of the human gastrointestinal tract. Gastric emptying before and after 2 mg/kg SC 1950 IM.

or cecum. Barium had reached the cecum at 1, 2, 3, 3, and 4 hours respectively.

On another day SC 1950 was given to these same patients in amounts of 2 mg/kg intramuscularly, 30 minutes before ingestion of barium. Following SC 1950 and immediately after giving barium no peristaltic activity was noted by fluoroscopy in any patient. Only one demonstrated slight emptying immediately after barium. At one hour only one patient had as much as 50% emptying, and average emptying was 25%. At 2 hours there was a 40% average emptying with variations from 15% to 85% (Fig. 4B) Also at 2 hours the most distal barium was in the duodenum or jejunum in 5 patients and in the upper ileum in one. At 4 hours 2 of 6 had 100% gastric emptying and at 6 hours 4 of 6 had 100% emptying. By 4 hours barium had reached the cecum in all control patients but in only one of 6 patients after SC 1950.

C. *Effect on Gastric Secretions.* Preliminary studies have been performed on 4 patients testing effect of SC 1950 on volume and acidity of gastric secretions. Continuous gastric aspiration was employed, and samples were taken every 15 minutes. These patients all had duodenal ulcers and secreted large volumes of highly acid gastric juice. Following SC 1950 (1.5 mg/kg) intravenously, volume and acidity of gastric secretions was markedly diminished for an hour or more. Free acid was present in all specimens prior to SC 1950. Afterward there was no free acid in 2 or more specimens from 3 patients. In the fourth the total acid secreted was reduced from an average of 0.51 m eq during each 15 minute period to an average of 0.09 m eq during each 15 minute period. Although free acid never disappeared, this reduction of acidity following SC 1950 persisted 1¼ hours.

Conclusion. A new quaternary amine, 2,6, dimethyl, diethyl piperidinium bromide, described as a ganglionic blocking agent,[4] has an inhibitory or blocking action upon functions mediated by the sympathetic and parasympathetic divisions of the autonomic nervous system. In dog and in man it reduces blood pressure and prevents several vasomotor reflexes, but does not prevent the vasopressor action of epinephrine. It causes a reduction of tone of the stomach and small intestine and abolishes their motor activity, reduces gastric acidity, and causes pupillary dilatation, loss of accommodation, and dryness of mucous membranes. Urecholine causes a reversal of effect on gastric motility. Neostigmine apparently causes a reversal of all effects of the drug.

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Specificity of Differential Sheep Cell Agglutination Test in Rheumatoid Arthritis.*

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Rose and his associates[1] recently described a sheep cell agglutination test which may prove to be helpful as an aid in the differential diagnosis between rheumatoid arthritis and other diseases with arthritic manifestations. These authors found that a 16-fold difference

or greater between agglutination titers with sensitized and unsensitized sheep erythrocytes occurred almost exclusively with sera from patients with rheumatoid arthritis. The differential agglutination titer usually reflected the clinical activity of the disease. Although the serologic properties of the sera of rheumatoid arthritis patients have been extensively studied, no test of definite diagnostic value has been devised.[2-5] It therefore seemed desirable to evaluate the differential sheep cell agglutination test.

Methods and Materials. In performing the test, the procedure described by Rose and his associates[1] was followed in detail. Tests were read immediately upon removal from the refrigerator. The end point of each titration was read as the highest serum dilution showing one-plus agglutination. The titer was recorded as the reciprocal of that serum dilution. The differential agglutination titer as presented in the accompanying tables represents the difference in titers obtained in tests conducted with unsensitized and with sensitized sheep erythrocytes and is recorded as the algebraic difference between these titers.

The test was performed with serum from 43 patients with rheumatoid arthritis including 7 patients with rheumatoid spondylitis (Marie-Strümpell) and one patient with juvenile rheumatoid arthritis (Still's disease). In all but one of these patients the disease was considered clinically active. For purposes of comparison, sera from 88 individuals with a variety of other conditions including diseases with and without evidence of arthritis were examined. Also included were serum specimens from 18 presumably normal persons.

Results. The results of the differential sheep cell agglutination test performed with serum specimens from 148 individuals are summarized in Table I. It is evident from these data that serum specimens from only 17 of the 42 patients with rheumatoid arthritis showed differential agglutination titers of 16 or greater. These were all from clinically active cases. Thus, these observations confirm, in part, those of Rose and his associates.[1] There were 24 cases of active rheumatoid arthritis and one inactive case of long duration in which a differential agglutination titer of less than 16 was obtained. In this respect these observations differ from those previously recorded.[1] Of the remaining 106 serum specimens from individuals with a variety of conditions, including 18 presumably normal persons, none showed a differential sheep cell agglutination titer greater than 8 and all except 5 had titers less than 8. The serum from only one of 18 patients with acute rheumatic fever (juvenile) showed a differential titer as great as 4. Fourteen cases of lymphogranuloma venereum which had been proved by the Frei skin test and by complement-fixation with a yolk sac antigen were included because of the reported occurrence of increased titers of sheep cell agglutinins in this disease.[6†] None of the serum specimens from these patients showed a differential titer greater than 4.

Table II summarizes the results of the differential sheep cell agglutination test in the group of patients with rheumatoid arthritis exclusive of those with spondylitis. All but one of the patients showed evidence of active joint disease at the time specimens were obtained. In the tabulation, the cases are classified, without knowledge of the results of the agglutination test, according to the severity and duration of the illness. The following were taken into consideration when classify-

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† This observation, incidentally, has not been confirmed in this laboratory.

TABLE I.

Results of Differential Sheep Cell Agglutination Tests on Serum Specimens from Patients with Rheumatoid Arthritis and a Variety of Other Conditions.

Clinical diagnosis*	No. of cases	Distribution of cases according to differential agglutination titer									
		0	2	4	8	16	32	64	128	256	512
Rheumatoid arthritis	35	1	8	6	4	6	5	4			1
Rheumatoid spondylitis (Marie-Strümpell)	7		4	1	1†	1†					
Reiter's disease	1		1								
Arthralgia	1		1								
Osteo-arthritis	3	1	1		1						
Gonorrheal arthritis (?)	1		1								
Scleroderma	3		1		2						
Lupus erythematosus disseminatus	1		1								
Acute rheumatic fever	18	9	8	1							
Infectious mononucleosis	2	2									
Lymphogranuloma venereum	14		11	3							
Syphilis	17	5	10	2							
Infectious diseases without evidence of arthritis‡	18	4	9	5							
Other diseases without evidence of arthritis§	9	2	6	1							
Presumably normal persons	18	3	13	10	2						

* In all instances the clinical diagnosis was substantiated by appropriate laboratory tests when availble.

† This patient also had peripheral joint involvement.

‡ These include one case each of brucellosis, infectious hepatitis, equine encephalomyelitis (Eastern type), primary atypical pneumonia, typhus fever, pneumococcal pneumonia, and poliomyelitis, 2 cases each of psittacosis and toxoplamosis, 3 cases of lymphocytic choriomeningitis, and 4 cases of Q fever.

§ These include one case each of acute glomerulonephritis and Hodgkin's disease, 2 cases each of myelogenous leukemia, carcinoma and multiple myeloma.

TABLE II.
Results of Differential Sheep Cell Agglutination Tests on Serum Specimens from Patients with Rheumatoid Arthritis Classified According to Severity and Duration of Illness.*

Severity of disease	Duration of illness (yrs)	No. of cases	Distribution of cases according to differential agglutination titer									
			0	2	4	8	16	32	64	128	256	512
Mild	<1	2			2							
	1–5	3		2	1							
	>5	0										
Moderate	<1	3	1	1	1							
	1–5	10		2		4	2	2				
	>5	8		1	2		4		1			
Marked	<1	0										
	1–5	2						1	1			
	>5	7		2†				2	2			1

* Not including 7 cases with evidence of rheumatoid spondylitis (Marie-Strümpell).
† One of these is an inactive case of long duration, the other is a case of juvenile rheumatoid arthritis (Still's disease).

ing these patients: intensity of constitutional symptoms, speed of progression of illness, degree of disability, degree and extent of joint swelling, amount of bone atrophy and destruction, and activity evidenced by results of erythrocyte sedimentation tests.

It is evident from the data presented in Table II that none of the patients classified as having mild rheumatic arthritis and none of those with a disease of moderate severity of less than one year duration showed differential agglutination titers greater than 4. Only 2 patients with a disease of marked severity had a differential agglutination titer less than 32. One of these patients with rheumatoid arthritis for a period of 30 years was "inactive" when the blood specimen was obtained. The other was a case of juvenile rheumatoid arthritis (Still's disease). Thirteen of the 18 cases with an illness of moderate severity of more than one year duration had differential agglutination titers of 8 or greater. The distribution of cases according to the differential agglutination titer would seem to reflect the clinical severity of the disease.

Many of the patients with high differential agglutination titers also had high sedimentation rates. There was no correlation, however, between the height of the sedimentation rate and the result of the differential sheep cell agglutination test, since some patients whose serum showed a differential agglutination titer of less than 16 had high sedimentation rates. This, likewise, is in accord with observations reported previously.[1]

A second blood specimen was obtained from 5 of the patients with rheumatoid arthritis after an interval of about one month. One original differential agglutination titer of 512, one of 64, and two of 4 were found to be the same, while one titer of 16 was 8 on the second examination. Further follow-up studies are contemplated with the view to elucidating the mechanism of this phenomenon. Data thus far available indicate that the differential sheep cell agglutination test is of limited value as an aid in the diagnosis of active rheumatoid arthritis of mild severity.

Summary. 1. The differential sheep cell agglutination test of Rose and his associates was performed with serum specimens from 42 individuals with rheumatoid arthritis. Serum from 17 of these patients showed differential agglutination titers of 16 or greater. In 24 active cases of mild and moderate severity and in one inactive case of long duration a differential agglutination titer of less than 16 was obtained.

2. Sera from 88 individuals with a variety of other conditions and from 18 presumably normal persons tested in the same manner showed differential agglutination titers less than 16.

3. Although differential agglutination titers less than 16 were observed in more than half the cases of active rheumatoid arthritis, the

test appears to reflect the clinical severity of the disease.

4. These data partially confirm the observations of Rose and his associates but indicate that the differential sheep cell agglutination test is of limited value as an aid in the diagnosis of active rheumatoid arthritis of mild severity.

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IV. Ineffectiveness of Certain Essential Nutrients in Prevention of Tooth Decay in Cotton Rat Molars.

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The molar teeth of cotton rats (*Sigmondon hispidus hispidus*) have been found to be susceptible to the initiation and development of carious lesions when the rats were maintained on purified rations for 10 weeks or more after weaning.[1,2] The basal rations used in these studies were believed to be adequate in known essential nutrients in so far as the growth and maintenance of rodents were concerned. When the fat, or the protein content, or both, were increased isocalorically at the expense of sucrose, weanling cotton rats fed the resulting rations developed a much lower average number and average extent of carious lesions than the littermates fed the basal ration for the same period.[3,4] Before extensive use of this ration and its various modifications in the investigation of the effect of diet during or after tooth development on the susceptibility to tooth decay, it seemed mandatory to determine whether superabundant amounts of known essential nutrients, or the same nutrients from different sources, would alter the initiation and development of carious lesions in cotton rats when the molar teeth were fully formed and were known to be highly susceptible to dental caries at the beginning of the experimental period.

Experimental. The purified ration (100) used in most of these studies has been described in detail.[5] In a few of these studies, a slight modification (130) of the basal ration was used which was made by the isocaloric replacement of 18 of each 67 g of sucrose with 8 g of lard. Both diets were nutritionally adequate for the production of normal growth and development of the cotton rat.

The cotton rats used in these investigations were raised in our stock colony and weaned at about 21 days of age. At this time, the first and second molars of the cotton rat are fully erupted and the crowns of the third molars are largely formed but have not erupted into the oral cavity. Experimental procedure was identical with that described for previous experiments.[5]

In the first experiment, a series of 7 groups of cotton rats was fed various combinations of water-soluble and fat-soluble vitamins in superabundant amounts as described in Table I. Parallel to each experimental group, a comparable group of control littermates was maintained on ration 100, except in the seventh group where ration 100 without liver concentrates was used.

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