approximately 300 observations on 200 patients who sought treatment at the Arthritic Clinic of the Presbyterian Hospital.

Our results suggest that in this limited group of patients the determination of the sedimentation rate of the red blood cells is of distinct value. Our findings may be summarized as follows:

(1) In active cases of rheumatoid (chronic infectious) arthritis the sedimentation rate is greatly increased, usually attaining values above 40 mm. in one hour.

(2) In cases of osteo (hypertrophic) arthritis the sedimentation rate, while, as a rule, slightly elevated, rarely attains values greater than 30 mm. in one hour.

(3) Cases of so-called myositis, fibrositis and neuritis have almost invariably shown a normal sedimentation rate.

(4) In cases of rheumatoid (chronic infectious) arthritis the sedimentation rate parallels to an extraordinary degree the activity of the process.

The test as applied solely to arthritic patients is therefore of considerable value: (1) In differentiating the two great groups of arthritic patients—the rheumatoid or chronic infectious and the osteo or hypertrophic variety. (2) In differentiating between chronic multiple arthritis on the one hand and fibrositis, myositis and neuritis on the other hand. (3) In following the course of the disease and evaluating the results of therapeutic measures instituted.

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Effect of Feeding Specific Polysaccharide on Resistance to Pneumococcus.*

VICTOR ROSS.

From the Bureau of Laboratories, Department of Health, New York City.

The author has demonstrated that feeding the pneumococcus to white rats produces an increased resistance to the living organism. The acid killed intact cell,[1] the bile salt dissolved organism[2] and the mechanically disrupted pneumococcus[2] have been found effective as immunizing agents when administered by mouth. With the object of determining, if possible, the particular component of the pneu-

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1 Ross, Victor, *J. Lab. and Clin. Med.*, 1927, xii, 566.

2 Ross, Victor, *J. Exp. Med.*, 1930, li, 585.

mococcus cell responsible for the observed effect, a degraded avirulent form of the pneumococcus, presumably producing no soluble carbohydrate,† was fed and it was shown[2] that comparatively little increased resistance was developed.

Recently, a carefully prepared sample of the specific polysaccharide of Type I pneumococcus was obtained through the courtesy of Dr. Harry Sobotka.‡ Experiments have been performed in which this material was dissolved in N/15 HCl, mixed with cracker meal, and fed to white rats. When subsequently examined these animals were found to possess an increased tolerance to intraperitoneal injection of the virulent organism.

Several facts had previously been shown to characterize the immunity produced by feeding the bacteria, either whole or dissolved, and offered a means by which one might determine to what extent the results obtained by feeding the specific polysaccharide resembled those gotten when the bacteria were administered. These were: (1) the immunity is produced by a single feeding, (2) it is present 48 hours following such ingestion, (3) in extent it is usually equivalent to 1,000 to 10,000 fatal doses (Type I), (4) when exhausted it can be made to reappear by a new feeding.

Of a group of 13 rats fed one dose of 0.5 mgm. of soluble polysaccharide (per rat), 5 survived when tested 48 hours later. Among them were animals which received 1, 10, 100 and 1,000 fatal doses of pneumococci. It has also been demonstrated that when the effect of a first immunization has worn off, a new feeding of the specific substance will cause it to reappear. It is thus seen that with regard to time of appearance, the need for but one dose, and renewability, the immunity produced by feeding the carbohydrate resembles that produced by the ingestion of the bacteria. The proportion of animals protected by a single administration of 0.5 mgm. of the former is, however, less than when the pneumococci from 5 cc. culture (containing less soluble specific substance) are used. It is possible

† The degraded avirulent pneumococcus failed to kill mice when 1 cc. of a 24 hour culture was injected. The organism was agglutinated by antipneumococcus serum regardless of type. No capsule could be demonstrated and the precipitin reaction carried out on the culture filtrate was negative.

‡ He found it to contain 5.0% nitrogen. The writer examined the sample for the presence of protein. The xanthroproteic and Millon tests were negative. The biuret was very faintly positive when done on a relatively large sample of dry material; with smaller quantities it was so faint as to cause a difference of opinion among observers. It was readily detectable in a dilution of 1 to 4,000,000. Dr. Frances Krasnow of the College of Physicians and Surgeons, Columbia University, kindly analyzed a sample and found by the Pregl micro method 41.7% C, 5.6% H.

that some alternation in the internal structure of the molecule of the polysaccharide takes place in the process of isolation, causing a partial loss of immunizing action. Greater uniformity follows the use of 2 or 3 such feedings. The degree of protection approaches that obtained with the organisms. The experiments indicate that the specific polysaccharide of pneumococcus, Type I, can act as an antigen when administered by mouth to rats. Schiemann and Caspar[3] found that mice become more resistant to pneumococcus following injection of a protein free solution prepared from pneumococci and containing the specific substance. It is still too early to say whether the specific substance is the only constituent of the pneumococcus which acts as an immunizing agent when the whole organism is ingested; the data, however, show that it plays a prominent part.

TABLE I.

Resistance of Rats Fed "Soluble Specific Substance," to Pneumococcus Type I. Test done 48 hours after second of 2 consecutive daily feedings, each equal to 0.5 mgm. per rat. Test dose injected intraperitoneally in 0.2 cc.

C—Control. E—Treated Rat. D—died—days. S—Survived.

Weight	Dose	Result	Weight	Dose	Result
gm.	cc.		gm.	cc.	
C 90	10^{-9}	S	E 90	10^{-8}	D 4†
C 83	10^{-9}	S *	E 92	10^{-8}	S
C 97	10^{-8}	D 2	E 94	10^{-7}	S
C 95	10^{-8}	D 3	E 95	10^{-7}	D 4
C 98	10^{-7}	D 2	E 97	10^{-6}	S
C 98	10^{-7}	D 3	E 95	10^{-6}	D 2
C 105	10^{-6}	D 4	E 101	10^{-6}	S
C 117	10^{-5}	D 2	E 108	10^{-5}	S
			E 107	10^{-5}	S
			E 100	10^{-5}	D 2
			E 114	10^{-4}	D 2

* Sick, but recovered. † Ill before injection.

The accompanying table gives the results obtained in an experiment in which 0.5 mgm. of the specific polysaccharide was fed on each of 2 consecutive days.

[3] Schiemann, O., and Caspar, W., *Z. f. Hyg. u. Infektionskr.*, 1927, cviii, 220.