

plates and tubes. Successful primary plates were obtained in 23 instances out of 29 cases of human infection, and from all of 21 experimentally infected guinea pigs. Eleven strains of spirochetes have been isolated and subcultured in a short period with little difficulty.

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Comparative Amino Acid Content of Serum Proteins in Normal Humans and in Patients with Rheumatoid Arthritis.

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The existence of a disturbance in sulfur metabolism in patients with chronic rheumatoid arthritis has been emphasized by Wheeldon.¹ Race² has extended this concept of disturbed sulfur metabolism to include an alteration in the cystine content of serum proteins. In order to test the validity of this finding the determination of several amino acids, as well as the elemental analyses of total serum protein, were carried out in 11 patients with chronic rheumatoid arthritis and compared with the findings in 6 normal control subjects.

Procedure. Fifty cc of venous blood were withdrawn from each subject (150 cc in the cases of control No. 6 and arthritic No. 11). The serum was separated and the total serum protein precipitated with 2 volumes of alcohol. The precipitate was dialyzed until it was sulfate and chloride free. It was then washed several times with 95% alcohol, once with absolute alcohol and several times with ether, and dried in a vacuum desiccator over sulfuric acid for several days. The analytical methods for total nitrogen, total sulfur and the various amino acids were those previously employed by Block and Lewis.³ The values for serum protein were corrected for ash and moisture

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¹ Wheeldon, T., *J. Bone and Joint Surg.*, 1935, **17**, 693.

² Race, J., *Reports on Chronic Rheumatic Diseases*, H. K. Lewis & Co., Ltd., London, 1935, **1**, 55.

³ Block, W. D., and Lewis, H. B., *J. Biol. Chem.*, 1938, **125**, 561.

TABLE I.
Analyses of Normal Human and Arthritic Total Serum Protein.

Subjects	Age, years	Sex	Nitrogen %	Sulfur %	Cystine %	Tyrosine %	Tryptophane %
Normal Controls:							
1	23	F	15.08	1.46	3.33	4.84	1.06
2	22	F	15.38	1.23	3.29	4.63	1.42
3	35	M	15.32	1.36	3.36	4.49	1.32
4	28	F	15.88	1.29		4.28	1.34
5	35	M	15.45	1.18	3.26	4.50	1.30
6	22	M	15.28	1.51	3.86	4.56	1.47
Avg	27		15.40	1.34	3.42	4.55	1.32
Rheumatoid Arthritics:							
1	35	M	15.08	1.17	3.36	4.86	1.46
2	55	F	15.14	1.41	3.13	4.93	1.42
3	42	M	15.24	1.50	3.67	5.15	1.42
4	29	M	14.12	1.32	3.51	5.27	1.42
5	56	F	15.38	1.24	3.37	4.83	1.46
6	28	F	15.33	1.29	3.42	4.99	1.23
7	30	M	15.38	1.18	3.16	4.82	1.45
8	51	M	15.10	1.61	3.41	4.94	1.41
9	46	F	15.05	1.42	3.51	4.80	1.40
10	53	M	15.11	1.21	3.30	4.83	1.43
11	26	F	15.38	1.39	3.28	5.15	1.40
Avg	41		15.18	1.34	3.37	4.96	1.41

All values except the total nitrogen are corrected for ash and moisture as described in the text.

by the following procedure. Assuming 16% as the average nitrogen content for serum protein corrected for ash and moisture, our various analytical values were multiplied by the ratio of 16 over the determined nitrogen content.

Results. The results are summarized in Table I. Both the individual and average values for nitrogen and sulfur as well as for the individual amino acids are essentially the same for the arthritic and control subjects. These results, especially in regard to total sulfur and cystine content are contrary to the suggested findings of Race² and indicate no alteration in the composition of the serum proteins of arthritic patients. This is well demonstrated by the average cystine content of 3.42% in the serum protein of normal controls as compared with average value of 3.37% in the arthritic subjects. The values of 5.2% arginine, 2.5% histidine, and 9.6% lysine obtained from the total serum proteins of normal controls likewise were not appreciably different from values of 4.9%, 2.1% and 8.4% for the corresponding basic amino acids of the total serum protein secured from arthritic subjects. Furthermore, the average values for the other amino acids in the total serum protein of arthritics

show no essential deviation from those found in the total serum protein of normal individuals.

Conclusions. The total sulfur, total nitrogen and the amino acid content of total serum proteins from normal and arthritic subjects were compared. No essential difference in values between the two groups could be found, invalidating any suggestion that an altered composition of the total serum protein of arthritic patients reflects a disturbed sulfur metabolism.

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Inositol in Chick Nutrition.*

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Eastwood¹ showed inositol to be one of the bios factors required by certain yeasts. Recently Woolley^{2, 3} has demonstrated that the mouse requires inositol for normal growth and the prevention of alopecia. Pavcek and Baum⁴ have also found inositol to be effective in preventing lack of growth and "spectacled eye" in rats maintained on certain purified diets. These results together with the isolation of phytic acid from chicken blood by Rapoport⁵ suggested that the chick might also require inositol.

Growth responses varying from 18 to 52 g in 4 weeks have been obtained upon the addition of inositol[†] to several different simplified chick rations (Table I). It is clear that inositol has a definite growth-promoting action although the response varies with the amount of inositol in the ration and the adequacy of the supplement used to supply unidentified growth factors.

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² Woolley, D. W., *Science*, 1940, **92**, 384.

³ Woolley, D. W., *Proc. Soc. Exp. Biol. and Med.*, 1941, **46**, 565.

⁴ Pavcek, P. L., and Baum, H. M., *Abst. of Papers, St. Louis Meeting, Am. Chem. Soc.*, April, 1941.

⁵ Rapoport, S., *J. Biol. Chem.*, 1940, **135**, 403.

[†] i-inositol, C.P., Pfanstiehl.