lesions. Furthermore it should be noted that addition of 15 to 20% fat diluted the diet so that protein content was reduced. This reduction in protein may be related to the acceleration of the lesions.

Lesions differed from those described in cholesterol-fed rabbits(17) or in rats made hypercholesteremic by a variety of procedures (3) or following injections of lipoprotein from serum of cholesterol-fed rabbits(4). In all these instances foam cells, cholesterol and large amounts of sudanophilic lipids were present, with the exception of some described by Malinow, *et al.*(3). The lesions here described were characterized by absence of foam cells and cholesterol, and by presence of only small amounts of lipids.

Summary. 1) The aorta and carotid arteries of rats maintained on a Vit. E-deficient diet for 280 to 450 days were characterized by presence of intimal changes. Addition of 15-20% Vit. E-free hydrogenated fat accelerated formation of lesions. A daily supplement of pure alpha-tocopherol to Vit. E-deficient diet inhibited formation of intimal changes. Addition of cholesterol to the diet had no effect on incidence or severity of the lesions. 2) Intimal alterations varied from a simple thickening of endothelium to large well formed plaques with fibrotic subendothelial tissue.

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Heparin-Latex Test in Rheumatoid and Non-Rheumatoid Serums.* (25430)

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At the first conference on serological reactions of rheumatoid arthritis, in Jan., 1957, sponsored by the Arthritis and Rheumatism Fn., "rheumatoid factor" was defined as "the substance in blood of patients with rheumatoid arthritis and some related diseases responsible for agglutination of sensitized sheep erythrocytes and latex particles in the presence of F II, etc., under appropriate conditions." This definition implies the obligatory presence of an "outside" α-globulin in serological reactions in which the rheumatoid factor participates. It was, therefore, of interest when Gofton *et al.*(1) reported that some polysaccharides, in this case heparin, chondroitin sulphate and hyaluronic acid, may be used in place of α-globulin to sensitize polystyrene latex particles in the latex fixation test. Using a slightly modified procedure, we

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TABLE I. Results of Heparin-Latex Fixation Test.

Clinical diagnosis	No. of patients	No. of positive tests	% positive tests
Definite rheum. arthritis			
Stage 1	20	11	55
" 2	48	36	75
" 3	49	43	88
" 4	4	3	75
Total	121	93	77
Possible rheum. arthritis	24	7	29
Juvenile " "	3	0	0
Diverse collagen diseases	6	1	17
Psoriasis	5	2	40
Spondylitis	8	0	0
Controls	313	20	6

were able to confirm the findings of Gofton's group concerning sensitizing effect of heparin on latex particles used with rheumatoid serums. The present report deals with some results of our work with heparin sensitized latex suspension.

Methods. Reagents and polystyrene latex suspension were prepared and treated according to standard procedure for the F II latex fixation test with the exception that a 0.5% heparin solution, or more precisely a heparin solution containing 500 international units/ml, was used in place of the F II preparation. The latex particles were sent us by the Arthritis and Rheumatism Fn and measured .81 μ in diameter.

Results. The over-all results with the heparin-latex test are given in Table I.

The 121 patients diagnosed as having definite rheumatoid arthritis were subdivided according to stage of disease. The percentage of positive tests increased up to the third stage; the number of patients in the fourth group is not large enough to allow a definite conclusion. The incidence of 77% positive tests in the series with "definite rheumatoid arthritis" compares favorably with similar agglutination tests. In the 24 patients with "possible rheumatoid arthritis," 7 or 29% had positive tests, and none of the 3 patients with juvenile rheumatoid arthritis had serums which reacted. Of the remaining diseases tested, there were no positive tests in a group of 8 spondylitics; 2 out of 5 patients with psoriasis, and 1 out of 6 patients suffering from diverse collagen diseases had positive tests.

Three hundred and thirteen control serums were tested, 20 or 6.4% gave positive tests. Most of these control serums were received from the Serological Laboratory of the Grace-New Haven Community Hospital and came, therefore, from patients with diverse diseases. Over half of the patients whose serums gave false-positive reactions were diagnosed as having some hepatic disorder—mostly cirrhosis or hepatitis. When tested by the *sensitized sheep cell test,* none of the 20 false-positive serums had positive reactions. A review of the electrophoretic patterns of these serums revealed that all 20 had elevated α-globulin levels of over 20%. 7.3% to 22.9% is considered to be the normal range in our electrophoretic studies.

It was then decided to test more high α-globulin serums by both heparin-latex and F II latex fixation tests to find out if a positive reaction is characteristic for heparin-latex only. High α-globulin serums were collected from various sources, all with concentration of α-globulin over 20% of total protein, as determined by paper electrophoresis. Ninety such serums were tested, and the results are summarized in Table II.

The heparin-latex test was positive in a much higher proportion of high α-globulin serums than the F II latex fixation test, 52% as compared with 20%. Interestingly, hepatic disorders made up less than 20% of the group. It is possible, however, that their incidence may have been a little higher, as serums were classified according to a preliminary diagnosis.

Taking the group with hepatic diseases only, 11 out of 16 serums or about 68% re-

TABLE II. Positive Latex Fixation Tests in High γ-Globulin Serums.

Clinical diagnosis	No. of patients	Heparin latex	F II latex
Cirrhosis	11	8	5
Hepatitis	5	3	2
Pneumonia	5	2	1
Colitis	4	1	0
Tuberculosis	3	2	2
Other diseases	62	31	7
Total	90	47	18
% positive		52	20

acted positively with the heparin-latex test, 7 or about 43% were positive with the F II latex fixation test.

It was interesting, however, to note that many of the rheumatoid serums reacting in the heparin-latex test had α-globulin levels well within the normal range.

Little is known about the possible mechanism of the agglutination-promoting activity of heparin. It may have no real biological meaning, but may, as Gofton and co-workers have pointed out, merely represent ability of these strongly negatively charged heparin molecules to react non-specifically with or bring together at a nidus, the patient's own α-globulin and rheumatoid factor. It has been reported that under certain conditions heparin may precipitate fibrinogen(2). In our series, however, serums were used throughout. Certain beta-lipoproteins have also been reported to be precipitated by heparin(3). In the few cases tested in our study no differences in this class of substances could be detected.

Summary. The rather high incidence of false-positive results with serums containing elevated α-globulin levels, limits the practical value of the heparin-latex test for routine testing in rheumatoid arthritis.

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Hexosamine-Collagen Ratio of Skin Biopsies in Patients Receiving Systemic Corticosteroids.* (25431)

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The basic principles which led to the study of hexosamine-collagen ratio (H/C) in human skin biopsies have been described(1). Since collagen is metabolically relatively inert and the hexosamine-containing polysaccharides of the ground substance are part of the metabolic pool, H/C decreases in starvation and after cortisone administration in the rat(2). This effect of cortisone occurs in skin, bone, lung and aorta(3). A technic has been developed for determination of H/C on small dermal punch biopsies from humans and has been applied in a study on the effects of aging(1). It was reported that log H/C falls in a linear fashion with age. This technic has now been applied to patients receiving therapeutic doses of corticosteroids.

Methods. Procedure for obtaining dermal punch biopsies and the analytical methods have been previously described(1). Subjects for the present study were male patients hospitalized on the dermatological service of Veterans Administration Center with a variety of conditions such as psoriasis, exfoliative dermatitis, atopic dermatitis, dysidrosis, etc. No patients were acutely ill nor were they suffering from known metabolic or endocrinological disturbances. The drugs used were prednisone, methyl prednisilone and triamcinalone. These were administered orally in divided doses daily for 2 weeks. The dosage varied depending on clinical requirement of the patient. The average daily dose was 15 to 20 mg for prednisone and 12 to 16 mg for methyl prednisilone and triamcinalone. Biopsies were obtained just prior to and again after 2 weeks of therapy. The area of buttocks from which biopsies were taken was not involved with the patient's skin disease.

Results. A total of 41 sets of biopsies were obtained. H/C values for 40 patients ranged from .042 to .020, initially. One patient, 67-year-old man with atopic dermatitis, had an H/C value of .053, considerably greater than

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