et al. relied on parenteral therapy more than the other physicians.

The assessment of degrees of change in heart size from serial chest x-ray films is inexact. In our cases the size of the heart was judged to have decreased significantly in 21% and increased in 14% of 224 cases. Smirk (1954) reported in 76 patients a decrease in heart size of more than 0.5 cm. in 36% and an increase in 16%.

The initial optimism of Doyle (1953) on the value of ganglion-blocking drugs in reducing left ventricular hypertrophy, as measured by electrocardiographic changes, has not been sustained. In a series of 75 cases he reported improvement in the QRS voltage in 76% and improvement in the S-T segment and T waves in 85%. Hay (1957), from the same unit, found that improvement occurred in the electrocardiogram in 47% of 143 hypertensive patients treated from two to six years on ganglion-blocking drugs and deterioration in 18%. In the present survey, with the use of similar criteria, electrocardiographic changes were less impressive, 39% of the patients showing improvement and 15% deterioration.

Summary

Results of treatment with ganglion-blocking drugs are reviewed in 284 patients with severe hypertension. In 35 cases with malignant hypertension one-, three-, and five-year survival rates were 82%, 56%, and 44% respectively. In 71 cases with premalignant hypertension (fundal haemorrhages or exudates but no papilloedema) comparable survival rates were 84%, 67%, and 57%. The remaining 171 cases with lesser degrees of retinopathy had benign hypertension. They had significant cardiac enlargement or had developed a complication from high blood-pressure. The prognosis on treatment for this group was 98%, 93%, and 81% survival at one, three, and five years. These results from a general hospital are similar to those in series reported from special units; our facilities could be provided in any general hospital.

We thank the technicians at the hypertension clinic, particularly Mrs. V. J. Taylor and Mrs. B. A. Stewart, who assisted in many ways with this review, and Dr. R. T. Marshall, who reviewed all the chest x-ray films. The hypertension clinic was supervised during 1952-4 by Dr. Dennis Hanna and by Dr. Michael Gilmour during 1954-6, and we are greatly indebted to them and to successive medical registrars who have assisted in the treatment of many patients.

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INCIDENCE OF HAEMAGGLUTINATING AND COMPLEMENT-FIXING ANTIBODIES

BY

GEOFFREY L. ASHERSON,* M.A., M.R.C.P.
M.R.C.P.Ed., D.C.H.

Rheumatism Research Unit (M.R.C.), Canadian Red Cross
Memorial Hospital, Taplow, Berkshire

AND

OVE BROBERGER, M.D.

Wenner-Gren Institute, Stockholm, and Paediatric Clinic
of the University of Göteborg

I. ULCERATIVE COLITIS

Broberger and Perlmann (1959) observed a haem-agglutinating antibody in the serum of certain patients with ulcerative colitis. This antibody agglutinated red cells coated with antigen prepared by the hot phenol-water extraction of fresh human colon and liver, and occurred in the serum of 28 out of 30 children with ulcerative colitis and in a few patients with rheumatoid arthritis, acute nephritis, and the nephrotic syndrome.

Gajdusek (1958), Mackay and Gajdusek (1958), Asherson (1959), and Deicher, Holman, and Kunkel (1960) described complement-fixing antibodies against human and animal tissue components in the serum of certain patients with systemic lupus erythematosus, parenchymal liver disease, and occasional patients with rheumatoid arthritis.

Both these antibodies have been regarded as auto-antibodies, and their occurrence in a disease allows the possibility of tissue damage being due to immune mechanisms. This communication describes the incidence of haemagglutinating and complement-fixing antibodies in the serum of 14 children and 36 adults with ulcerative colitis.

Methods

Haemagglutination was undertaken as described by Broberger and Perlmann (1959) using sheep red cells coated with colon or liver antigen prepared by hot phenol-water extraction of fresh human tissue obtained from children who died during their first day of life. The sera were titrated in M.R.C. pattern "perspex" trays, using a final volume of 0.2 ml. The test was read after shaking. We read the trays independently. On the few occasions when we differed a joint decision was reached.

In certain cases after haemagglutination reaction had been completed complement (guinea-pig serum) was added. The degree of haemolysis was noted visually after incubation at 37° C. for one hour with occasional shaking.

The complement-fixation technique of Donnelley (1951) as modified by Gajdusek (1958) was employed. Calcium magnesium veronal buffered saline (Mayer, Croft, and Gray, 1948) was used as a diluent. Because of the necessity of using fresh tissue advantage was taken of Gajdusek's (1958) observation that sera reacting with human tissue also reacted with animal tissue. Rat liver and kidney antigens were prepared by homogenization in 0.25 M sucrose followed by centrifugation to remove the nuclei. A titre of 1/16 was regarded as positive provided the 1/8 serum control was negative.

*Beit Memorial Fellow.

TABLE I.—*Titre of Haemagglutinating Antibody of Various Sera Tested with Sheep Cells Coated with Phenol-Water Extract of Human Colon and Liver*

Origin of Serum	No. of Sera	Antigen	No. of Sera Giving an End-point at a Titre of								Total No. Positive
			1/2	1/4	1/8	1/16	1/32	1/64	1/128	1/256	
Children with ulcerative colitis	14	{ Colon	0	0	0	0	0	1	8	3	12
		{ Liver	0	0	0	0	2	7	1	0	10
Adults with ulcerative colitis	36	{ Colon	0	1	3	2	3	4	0	0	13
		{ Liver	2	0	2	0	1	0	0	0	5
Controls	42	{ Colon	0	1	0	0	0	0	0	0	1
		{ Liver	0	0	0	0	0	0	0	0	0

The children with ulcerative colitis and the children with acute bacterial infections used as controls were seen at the Paediatric Clinic of Karolinska Sjukhuset, Stockholm. The adult patients were seen at St. Eriks Sjukhus, Stockholm. Seven of the children with ulcerative colitis had been included in the study of Broberger and Perlmann (1959).

Results

The sera of 12 of the 14 children with ulcerative colitis contained haemagglutinating antibodies against sheep cells coated with phenol-water extract of colon (Table I). Eleven of the sera gave a titre of 1/128 or greater, and the agglutination was usually strong. On the other hand, only 13 of the 36 adults reacted with the colon antigen. None of the titres was greater than 1/64 and the agglutination was often weak. The titres were somewhat lower when cells coated with phenol-water extract of liver were used. Only 1 of the 42 sera of patients with acute bacterial infections reacted with these antigens.

The sera of 4 of the 13 children with ulcerative colitis contained complement-fixing antibodies against rat liver and kidney (Table II). However, only two of the adult sera and one of the control sera contained these antibodies in a titre of 1/16 or greater. The incidence of positive reactions among the children with ulcerative colitis is statistically significant as compared with that among the controls, but neither the incidence among the adults nor the incidence among the total number of patients with ulcerative colitis (6 out of 49) reached the 0.05 level of significance.

TABLE II.—*Titre of Complement-fixing Antibody of Various Sera Tested with Rat Liver and Kidney*

Origin of Serum	No. of Sera	Antigen	No. of Sera Giving an End-point at a Titre of			Total No. Positive
			1/16	1/32	1/64	
Children with ulcerative colitis	13	{ Liver	2	2	0	4
		{ Kidney	2	2	0	4
Adults with ulcerative colitis	36	{ Liver	0	1	1	2
		{ Kidney	0	0	1	1
Controls	42	{ Liver	1	0	0	1
		{ Kidney	1	0	0	1

The addition of complement converted the haemagglutination reaction to a haemolytic reaction without appreciable change of titre. Nevertheless, the haemagglutinating sera gave negative complement-fixation reactions with phenol-water extract of colon and liver.

Discussion

The finding of haemagglutinating antibodies against phenol-water extract of colon and liver in the serum of patients with ulcerative colitis is in agreement with earlier observations of Broberger and Perlmann (1959). The incidence of these antibodies was much higher in

children than in adults. Haemagglutinating antibody against colon was found in 85% of the 14 children, but in only 36% of the 36 adults. The incidence in adults was similar to that seen in systemic lupus erythematosus and cirrhosis of the liver.

Complement-fixing antibodies against rat liver and kidney were also found in the patients with ulcerative colitis, and the incidence was significantly higher in the children than in the adults. The question may be raised whether the antigens of rat tissue, reacting with complement-fixing antibodies of certain human sera, are identical with those of human tissue. The observation that human sera reacting with human tissue also reacted with animal tissue (Gajdusek, 1958) will not in itself provide evidence for an identity between the antigens from different species. In this context an important observation by Gajdusek (1958) has to be taken into consideration. It was found that rabbits and guinea-pigs immunized with human liver or kidney suspensions developed complement-fixing antibodies to several human tissue antigens and to rat liver, kidney, and spleen antigens as well. As has been concluded by Gajdusek: "the antigenic stimuli which presumably evoke the serum reagents we have detected are undoubtedly common to a wide range of mammalian tissue cells."

There were many severe cases of ulcerative colitis among the children, some with extracolonic complications such as nephritis, hepatitis, and erythema nodosum. These severe complicated cases were less common among the adults. An association between severe disease and positive serological findings would offer a possible explanation of the disproportionate incidence of antibodies in the juvenile cases.

Complement-fixing antibodies against phenol-water extract of colon and liver could not be demonstrated with the method used in the present work. However, this does not necessarily exclude a fixation of complement by the haemagglutinating antibodies, as this problem has not been studied with the more sensitive quantitative complement-fixation procedure (Osler, 1958). The conversion of the haemagglutination to a haemolytic reaction by the addition of complement, which is in keeping with the work of Neter (1956) on haemagglutinating antibody against bacterial polysaccharide, may indicate a fixation of complement to the antigen-antibody complex on the erythrocyte surface. However, our knowledge of the mode of action of complement on agglutinated sensitized erythrocytes is too incomplete to permit any conclusions on the specific binding of complement to the antigen-antibody complex in the present case.

The significance of the finding of auto-antibodies in human disease is discussed in Part II. The observation that certain patients with systemic lupus erythematosus may have a colitis indistinguishable from ulcerative

colitis (Zetterström and Berglund, 1956) is in keeping with the concept that these diseases may have a common aetiological basis. However, it must be emphasized that the rat liver and kidney used for the complement-fixation test are immunologically heterogeneous and may contain a number of different antigens. At present there is no evidence that the complement-fixing antibodies of ulcerative colitis and of systemic lupus erythematosus are reacting with the same antigen of the rat liver.

Although the presence of haemagglutinating antibodies to phenol-water extract of human colon, liver, and kidney tissue and complement-fixing antibodies to rat-tissue antigens has been demonstrated, it is still open to question whether in ulcerative colitis there exists a multiple auto-antibody formation of the same type as in systemic lupus erythematosus. Recent work in this laboratory by means of absorption studies has presented some evidence that the haemagglutinating antibodies to phenol-water extract of colon, liver, or kidney may be directed against several distinct antigens, all present in the colon but only some in the liver or kidney. The recent finding of antibodies to phenol-water extract of human colon in the microsomes of regional colonic lymph nodes, but not in the ileal lymph nodes, of patients with ulcerative colitis (Perlmann and Broberger, 1961) seems to indicate that the formation of haemagglutinating antibodies is induced by antigens from the colon.

Summary

Haemagglutinating antibody against antigen prepared by the hot phenol-water extraction of fresh human colon and liver has been demonstrated in the serum of patients with ulcerative colitis. Antibodies against colon occurred in 85% of 14 children but in only 36% of 36 adults. Complement-fixing antibodies against rat liver and kidney occurred in a titre of 1/16 or greater in 4 out of 13 children and in 2 out of 36 adults.

The haemagglutination could be converted to a haemolytic reaction by the addition of complement.

II. SYSTEMIC LUPUS ERYTHEMATOSUS, RHEUMATOID ARTHRITIS, CIRRHOSIS OF LIVER, AND THE NEPHROTIC SYNDROME

Part I described the occurrence of haemagglutinating antibody against antigen obtained by hot phenol-water extraction of fresh human colon and liver, and of complement-fixing antibodies against mammalian tissues in the serum of patients with ulcerative colitis. Part II describes the incidence of these antibodies in the serum of patients with systemic lupus erythematosus, rheumatoid arthritis, rheumatoid arthritis with fibrosis of the lung, parenchymal liver disease, including lupoid hepatitis and primary biliary cirrhosis, and the nephrotic syndrome. Evidence is presented to show that the haemagglutinating and complement-fixing antibodies are directed against different antigens.

Methods

The technical methods were described in Part I. The diagnosis of systemic lupus erythematosus was based on a positive L.E.-cell test or antinuclear factor test (Holborow, Weir, and Johnson, 1957) and a compatible clinical history. Rheumatoid arthritis with a positive antinuclear factor but no other atypical features was classified as rheumatoid arthritis. In nine

patients regarded as cases of systemic lupus erythematosus the diagnosis was not in doubt. The clinical picture of the other five was palindromic rheumatism; severe Still's disease with pericarditis and epilepsy; deforming polyarthritis with purpura, with extreme leucopenia and bowel lesions; deforming polyarthritis with necrotic bowel lesions; and obscure fever, leucopenia, and flexion contractures of the fingers. Most of the cases of rheumatoid arthritis met the criteria of the American Rheumatism Association for definite or classical rheumatoid arthritis.

Cirrhosis of the liver in conjunction with a positive L.E.-cell test or antinuclear factor test, and at least one other manifestation of systemic lupus erythematosus, was called lupoid hepatitis (Mackay, Taft, and Cowling, 1959). The diagnosis of primary biliary cirrhosis (Mackay, 1958) was confirmed by biopsy. The diagnosis of fibrosis of the lung (Scadding, 1960) was made on the basis of biopsy or lung-function test.

The sera of patients with rheumatic disorders were taken from a group of specimens submitted for serological examination by the Rheumatism Unit. Five sera of patients with rheumatoid arthritis, two with lupoid hepatitis, one with primary biliary cirrhosis, and one with cirrhosis of the liver were selected because they gave a positive complement-fixation reaction with rat liver and kidney. At least one patient, and probably more, with systemic lupus erythematosus with negative complement-fixation reactions were excluded because insufficient serum was available for the haemagglutination reaction.

Results

Table III gives the titres of haemagglutinating antibody against phenol-water extract of colon and of liver in 151 patients. Five of the 14 patients with systemic lupus erythematosus agglutinated cells coated with colon extract. Haemagglutinating antibodies were also found in 4 out of 26 patients with rheumatoid arthritis, 8 out of 28 with cirrhosis of the liver, 1 out of 4 with lupoid hepatitis, 2 out of 9 children with the nephrotic syndrome, and in isolated cases of Sjögren's syndrome, Reiter's disease, rheumatic fever, and hyperparathyroidism. There was only one positive result among 42 patients with acute bacterial infections, 6 with syphilis, and 10 with miscellaneous conditions. The titres were lower than those seen in ulcerative colitis occurring in childhood, and the agglutination was less strong. Fewer positive results were obtained when liver was used as an antigen.

Table IV gives the titres of complement-fixing antibodies against rat liver and kidney. A titre of 1/16 or greater was regarded as positive. Antibodies occurred in 13 out of 14 patients with systemic lupus erythematosus, 4 out of 4 with lupoid hepatitis, 3 out of 3 with primary biliary cirrhosis, 2 out of 2 with rheumatoid arthritis and fibrosis of the lung, and 5 out of 6 with syphilis. Antibodies also occurred in 6 out of 26 patients with rheumatoid arthritis, 6 out of 28 with cirrhosis of the liver, and 3 out of 9 children with the nephrotic syndrome. If sera initially selected because of a positive complement-fixation reaction with rat liver and kidney were excluded, the sera of 2 out of 2 patients with lupoid hepatitis, 2 out of 2 with primary biliary cirrhosis, 1 out of 21 with rheumatoid arthritis, and 4 out of 27 with cirrhosis of the liver reacted with these antigens. Only one of the 52 patients with acute

bacterial infections or miscellaneous conditions had complement-fixing antibodies.

Only one patient with rheumatoid arthritis, two with cirrhosis of the liver, and one with lupoid hepatitis had both complement-fixing and haemagglutinating antibodies. Attempts to demonstrate complement fixation with phenol-water-extracted antigen using sera containing haemagglutinating antibody to this antigen or complement-fixing antibodies to rat liver and kidney antigen were unsuccessful.

Discussion

The findings showed that there was a raised incidence of haemagglutinating antibody against liver and colon extract in systemic lupus erythematosus, rheumatoid arthritis, parenchymal liver disease, and the nephrotic syndrome as compared with the control group of acute bacterial infections. There was a higher incidence of haemagglutinating antibody in systemic lupus erythematosus than in the other chronic diseases, but the difference did not reach the 0.05 level of significance. The antibody also occurred in isolated cases of rheumatic fever, Reiter's disease, and hyperparathyroidism. The wide diversity of diseases in which antibodies against antigens obtained by phenol-water extraction occurred suggested that it might arise, at times, as a result of tissue damage. This does not, however, exclude a more specific role in the pathogenesis of ulcerative colitis. It should be noted, however, that the extracts used as antigens are immunologically

heterogenous and contain a number of different tissue antigens. At present there is no evidence that the antibodies from patients with various diseases are reacting with identical antigens.

Complement-fixing antibodies against rat liver and kidney occurred in the majority of patients with systemic lupus erythematosus, rheumatoid arthritis with fibrosis of the lung, lupoid hepatitis, and primary biliary cirrhosis, and in a few patients with rheumatoid arthritis, cirrhosis of the liver, and the nephrotic syndrome. The incidence of these antibodies is known to be high in systemic lupus erythematosus, lupoid hepatitis, and primary biliary cirrhosis (Gajdusek, 1958). The corrected incidence in rheumatoid arthritis is about 5%, and it is noteworthy that complement-fixing antibodies may occur in high titres in uncomplicated cases.

There was no evidence that the haemagglutinating and complement-fixing antibodies were directed against the same antigen. Many sera containing complement-fixing antibodies against rat liver and kidney failed to agglutinate cells coated with colonic antigen while other sera containing both haemagglutinating and complement-fixing antibody failed to fix complement with antigen obtained by phenol-water extraction. Thus the haemagglutinating antibody provided another example of the multiplicity of antibodies occurring in systemic lupus erythematosus.

Now that evidence is available suggesting that patients with systemic lupus erythematosus are good antibody

TABLE III.—*Titre of Haemagglutinating Antibody of Various Sera Tested with Sheep Red Cells Coated with Phenol-Water Extract of Human Colon and of Human Liver*

Diagnosis	No. of Patients	Colon Extract						Liver Extract						
		No. of Sera giving Haemagglutination at Highest Dilution of						Total No. Positive	No. of Sera giving Haemagglutination at Highest Dilution of					Total No. Positive
		1/2	1/4	1/8	1/16	1/32	1/64		1/2	1/4	1/8	1/16	1/32	
Systemic lupus erythematosus ..	14	0	2	2	1	0	0	5	0	1	0	1	1	3
Cirrhosis of the liver	28	0	0	5	1	1	1	8	0	2	1	1	0	4
Lupoid hepatitis	4	0	0	1	0	0	0	1	0	0	0	0	0	0
Primary biliary cirrhosis ..	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephrotic syndrome	9	0	0	0	2	0	0	2	0	0	0	1	1	2
Rheumatoid arthritis	26	0	0	0	3	0	1	4	1	1	1	0	1	4
Rheumatoid arthritis with fibrosis of lung	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Sjögren's syndrome	1	0	0	0	0	1	0	1	0	0	0	0	1	1
Felty's	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Reiter's disease	1	1	0	0	0	0	0	1	0	0	0	0	0	0
Rheumatic fever	2	0	0	0	1	0	0	1	0	0	0	0	0	0
Hyperparathyroidism	1	0	0	0	1	0	0	1	0	0	0	0	1	1
Acute bacterial infections ..	42	0	1	0	0	0	0	1	0	0	0	0	0	0
Syphilis	6	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous conditions ..	10	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE IV.—*Titre of Complement-fixing Antibodies of Various Sera Tested with Rat Liver Antigen and with Rat Kidney Antigen*

Diagnosis	No. of Patients	Rat Liver						Rat Kidney					
		No. of Sera giving Complement Fixation at Highest Dilution of					Total No. Positive	No. of Sera giving Complement Fixation at Highest Dilution of					Total No. Positive
		1/16	1/32	1/64	1/128	1/256 and Greater		1/16	1/32	1/64	1/128	1/256 and Greater	
Systemic lupus erythematosus	14	4	1	4	1	3	13	2	3	1	2	5	13
Cirrhosis of the liver*	28	3	2	0	0	0	5	3	3	0	0	0	6
Lupoid hepatitis†	4	0	2	0	0	2	4	0	1	1	0	2	4
Primary biliary cirrhosis* ..	3	0	0	1	1	1	3	0	0	0	1	2	3
Nephrotic syndrome	9	2	1	0	0	0	3	1	1	0	0	0	2
Rheumatoid arthritis†	26	2	1	2	1	0	6	2	1	1	2	0	6
Rheumatoid arthritis with fibro- sis of lung	2	0	0	1	0	1	2	0	0	1	0	1	2
Sjögren's syndrome	1	0	0	0	0	0	0	0	0	0	0	0	0
Felty's	2	0	0	0	0	0	0	0	0	0	0	0	0
Reiter's disease	1	0	0	0	0	0	0	0	0	0	0	0	0
Rheumatic fever	2	0	0	0	0	0	0	0	0	0	0	0	0
Hyperparathyroidism	1	0	0	0	0	0	0	0	0	0	0	0	0
Acute bacterial infections ..	42	1	0	0	0	0	1	1	0	0	0	0	1
Syphilis	6	1	3	0	0	1	5	2	2	0	1	0	5
Miscellaneous conditions ..	10	0	0	0	0	0	0	0	0	0	0	0	0

* One, † two, ‡ five sera selected because of positive complement-fixation reaction to rat liver and to rat kidney.

producers (Leonhardt, 1959) and exhibit multiple auto-antibody formation (Kunkel, Holman, and Deicher, 1960) it may be useful to consider some aspects of auto-antibody formation which are relevant to the diseases discussed in this communication.

The formation of antibody, whether circulating or cell-bound, may depend upon the properties of the antibody-producing system or the kind of antigenic stimulus. Thus auto-antibody formation may result from abnormality of the antibody-producing system or from an abnormal or unusual antigenic stimulation, or a combination of both.

It is reasonable to assume that in certain circumstances an enhancement of the antibody response, which may be present in systemic lupus erythematosus, may lead to a detectable auto-antibody formation. It is possible that after contact with a foreign antigen, possessing determinants similar to those of some body constituent(s), a few rare molecular species of antibody are formed capable of reacting with this body constituent. If this rare molecular species of antibody is below the threshold of detection a simultaneous but causally unrelated enhancement of the antibody response may lead to an increase of the concentration of the rare molecular species above the threshold of detection.

Burnet (1959) has proposed that the action of antigen, which is necessary for the maintenance of tolerance (Smith and Bridges, 1958), is to inhibit or kill potential antibody-producing cells. Moreover, Medawar (1960) has suggested that the magnitude of the normal antibody response is limited by the inhibition or killing of some of the potential antibody-producing cells by antigen. Resistance of these cells to the action of antigen would lead to enhanced antibody production and multiple auto-antibody formation.

It is also possible that the immune tolerance to the body's own constituents is directed not only against the molecular structures which constitute the antigenic determinants, but against certain related structures. A reduction of this tolerance to related structures would lead to enhanced antibody formation to antigens similar to those of the normal body constituents. This would favour multiple auto-antibody formation but would not necessarily enhance the formation of antibodies to foreign antigens.

The kind of antigenic stimuli which might lead to auto-antibody formation includes:

(a) Access of normal tissue components, to which tolerance for some reason has not been induced during embryonic life, to the antibody-producing system. Hashimoto's disease is the auto-immune disorder which best fits with this theory.

(b) Diminished access of normal tissue components (to which tolerance has been induced during embryonic life) to the antibody-producing system. This theory postulates that the action of antigen is necessary for the maintenance of tolerance.

(c) Alteration of a normal tissue component rendering it antigenic and causing the formation of antibody cross-reacting with a body constituent.

(d) Attachment of a normal tissue component (haptene) to a carrier which renders it antigenic.

(e) Exposure to foreign antigens possessing determinants similar to those of some body constituent(s), causing the formation of antibody cross-reacting with this body constituent.

It is evident that an abnormality of the antibody-producing system will offer better opportunities for the

coexistence of multiple auto-antibody formation and an enhanced production of antibodies to foreign antigens. Systemic lupus erythematosus is therefore the condition which best fits the pattern of auto-immune disease due to abnormality of the antibody-producing system. However, it is plausible that auto-immune disease due to abnormality of the antigenic stimulus may sometimes occur as part of the clinical picture of disease due to abnormality of the antibody-producing system. This is because when the antibody-producing system is over-active, minor abnormalities of the antigenic stimulus may give rise to auto-antibody formation. The occasional finding of the clinical picture of ulcerative colitis and Hashimoto's thyroiditis in the course of systemic lupus erythematosus is compatible with this interpretation.

Summary

Haemagglutinating antibody against antigen prepared by the hot phenol-water extraction of fresh human colon and liver has been demonstrated in the serum of patients with systemic lupus erythematosus, parenchymal liver disease, rheumatoid arthritis, and the nephrotic syndrome.

Complement-fixing antibodies against rat liver and kidney occurred in a titre of 1/16 or greater in the majority of patients with systemic lupus erythematosus, rheumatoid arthritis with fibrosis of the lung, lipid hepatitis, and primary biliary cirrhosis. A lower incidence was found in rheumatoid arthritis, cirrhosis of the liver, and the nephrotic syndrome.

The influence of various abnormalities of the antibody-producing system and of the antigenic stimulus on auto-antibody formation is discussed.

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