ANF. (3) From 16 patients with RA, only one showed a C3 titre of 1:80. (4) Among the 56 native test sera from SLE and scleroderma patients, 52 had a titre of 1:10 or more and 4 were negative. (5) ANF-C3 binding cannot be shown with sera that have been inactivated at 56°C for 30 min. (6) No correlation could be found between ANF titre and ANF-C3 binding. (7) The demonstration of C3 binding in native test sera had the highest differential diagnostic value (see Figure). The method is simple and the reproducibility very good.

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A study of the incidence of articular chondrocalcinosis in Paget's disease of bone. By I. BOUSSINA, J. C. GERSTER, J. EPINEY, and G. H. FALLET (*Department of Medicine, Division of Rheumatology and Medical Out-Patients Clinic, University of Geneva*)

Several authors have suggested a relationship between Paget's disease and articular chondrocalcinosis (ACC), but in our opinion without sufficient proof. In order to determine whether such an association does in fact exist, ACC was systematically sought in 66 patients suffering from Paget's disease. Seventy-two subjects without Paget's disease, taken at random from a population of patients hospitalized for medical or surgical conditions, constituted the control group. They are of the same race and their age and sex distributions are similar to those of the patients suffering from Paget's disease.

Among the 66 pagetoid patients, average age (median) 76 years, 9 cases of ACC have been found. This represents an incidence of 13·6% of the group. Of the 72 control subjects, average age (median) 73 years, 7 were found to have ACC. This represents an overall incidence of 9·7% of the control group but the difference is not statistically significant.

From this study we conclude that ACC does not occur more frequently in Paget's disease than in a group of control subjects with the same age distribution.

Incidence of cathepsin D agglutinators in sera, synovial fluids, and exudate cells and synovial tissue of patients with RA and other rheumatic diseases. By K. Fehr, G. Artmann, M. Velvart, and A. Boni (*Universitats-Rehumaklinik, Zurich*)

Incidence and titre of cathepsin D agglutinators (e.g. antibodies reacting specifically with human Fab_2 produced by cathepsin D) are significantly raised in sera of patients with seropositive RA when compared with healthy blood donors, seronegative RA, SLE, ankylosing spondylitis, osteoarthritis, and trauma ($P < 0.0005$). Significantly raised levels are also found in synovial fluids of seropositive RA patients when compared with seronegative RA, other forms of arthritis, and osteoarthritis ($P < 0.0005$ to $P < 0.01$). In addition, cathepsin D agglutinators were found in the tissue culture medium of incubated synovectomy specimens from 7 out of 11 seropositive RA and 2 out of 7 seronegative RA, but not in 6 incubates of patients with other rheumatic diseases. In the sera the levels of these antibodies were positively correlated with the levels of RF if the RF were determined by IgG anti-CD Ripley coated erythrocytes, but not if the RF were determined by the Waaler-Rose or latex test.

By immunofluorescence studies using FITC-labeled Fab_2, binding of Fab_2 to synovial exudate inclusions (phagolysosomes) occurred in 100% of seropositive RA and about 80% of seronegative RA if the exudate cells showed evidence for phagocytosis of immune complexes. Preliminary results with rheumatoid synovium of both seropositive and seronegative RA patients suggest that mononuclear cells suggestive of plasma cells can bind labeled Fab_2. These findings suggest (1) that there might be a link between the production of cathepsin D agglutinators and agglutinating RF in seropositive RA; (2) that cathepsin D agglutinators may be produced in the synovium of RA patients; and (3) that cathepsin D agglutinators take part in the formation of immune complexes in the rheumatoid synovial exudate.

Frequency of the atypical gene E_1^a of serum cholinesterase among patients with ankylosing spondylitis. By A. MICHELI (*Department of Medicine, Division of Rheumatology, University of Geneva, Switzerland*)

A familiar incidence of ankylosing spondylitis (AS) has been described on several occasions. In addition, it has recently been pointed out that HL-A 27 antigen is found with a high incidence in this disease.

The present study, initiated before this relationship between HL-A 27 and AS was known, was prompted by the discovery in twin sisters, homozygotes for the atypical E_1^a gene of serum cholinesterase, of a bilateral sacroiliitis. The question was tentatively raised of a relationship between the E_1^a cholinesterase gene and AS. In a preliminary study on 10 patients with AS, three were found to have the E_1^a gene, representing an incidence of 30% as compared to 5% in a large control population.

Among 115 cases presently being investigated, 7·8% have the E_1^a cholinesterase gene. A difference is thus still apparent, although not statistically significant, if the frequency of patients bearing the E_1^a gene is considered. However, if the frequency of the gene E_1^a itself is considered, since another homozygote was found among AS patients, it raises the percentage to 9·8 and the difference compared with the control group is statistically significant ($P < 0.015$).

In order to confirm this apparent relationship between cholinesterase atypical gene and AS, further studies would be necessary on other groups of patients, and the coincidence of this gene with some particular criteria or features of this rheumatic disease should be looked for. This aspect is presently under study.

Liver function tests and liver biopsies in patients with rheumatoid arthritis. By R. RAU, K. PFENNINGER, and A. BONI (*Rheumaklinik Stadtspital Triemli und Universitats Rheumaklinik, Zurich*)

In patients with rheumatoid arthritis a total of 117 liver biopsies and liver function tests were performed. Liver

biopsy was normal in 35% of investigations, while reactive hepatitis was seen in 43% and fatty liver in 22%. Reactive hepatitis was mild in 6%, moderate in 15%, and severe in 22% of biopsies; fatty liver was mild in 11%, moderate in 7%, and severe in 4% of specimens. An abnormal BSP test was observed in 75% of investigations, raised alkaline phosphatase in about 50%, an abnormal thymol turbidity test in 24%, and diminished prothrombin (Quick) in 20%. A rise in transaminases in serum and in urobilinogen in urine was, however, very rare. A rise in bilirubin (more than 1·0 mg/100 ml) was never observed. There was a close relationship between rheumatoid arthritis activity and abnormal BSP retention, raised alkaline phosphatase, and reactive hepatitis. These tests, however, were not correlated to duration or stage of arthritis nor age of patients. These data were obtained in West Germany.

In a second series in Switzerland, liver function tests, as well as liver biopsies, were carried out in 51 patients with definite rheumatoid arthritis. BSP retention was abnormal and prothrombin in 60% of cases, alkaline phosphatase in 20%, thymol turbidity test in all 25 patients examined. Slightly raised levels of transaminases were seen in about ⅓ of patients, mostly during a relapse of RA. As in the first series there was a high correlation with disease activity, but no correlation with the age of patients, the duration, or stage of disease. Morphological changes of the liver were found in 85% of biopsies, most frequently as a reaction of Kupffer cells. In 27% of cases, mainly during a relapse of RA, a reactive hepatitis with lymphocellular, partially also plasmacellular, infiltration of periportal areas was seen. In 15 cases (27%) a specific immunofluorescence was produced by means of anti-IgG.

During a drug trial of 24 months' duration liver tests were carried out at intervals of 2–4 weeks in 30 patients with definite and active RA. Transient and slightly raised levels of SGOT were found in 21 patients, of SGPT in 11 patients, of alkaline phosphatase in 17 patients, of γ-GT in 22 patients. Pathological results were obtained in 20% of SGOT determinations, 10% of SGPT, 30% of alkaline phosphatase, and 48% of γ-GT determinations. As in the first two series we could not find any influence of anti-rheumatic or cytostatic agents or gold on the results of these liver tests. In 10 control biopsies no signs of drug-induced liver disturbance could be detected.

In summary, in a large number of patients with RA disturbance of liver function and slight morphological alterations, especially mild reactive hepatitis or fatty liver, can be observed. These alterations seem to be related to RA activity and not to therapy.

Lack of correlation of synovial histology with joint damage in rheumatoid arthritis. By D. R. F. HENDERSON, M. I. V. JAYSON, and C. R. TRIBE (*Department of Medicine, University of Bristol; Royal National Hospital for Rheumatic Diseases, Bath; Department of Pathology, Southmead Hospital, Bristol*). Published in full in the *Annals*, 1975, **34**, 7.

Radiological changes in the age group 5 to 24 years of the population of Azmoos, Switzerland. By B. ANSELL, J. SIDLER, and W. M. ZINN (*Medicinische Abteilung, Bad Ragaz*)

During the population study at Azmoos, 281 sets of *x*-rays were taken, of which 147 were from males and 134 from females between the ages of 5 to 24 years, with a completion rate of 90·0%. Films of the hands, feet, and knees were taken, as well as two films of the pelvis according to a technique reported elsewhere. In the 5- to 9-year age group, one boy had a classical avascular necrosis of the left femoral head and in another boy a similar condition of the left navicular bone in the foot was noted. In a boy aged 8 there was a definite periostitis, the exact nature of which is not certain. In the males aged 15 to 19, one boy who had suffered from poliomyelitis at the age of 6 showed marked growth anomalies of the right hand and to a lesser extent of the left foot. Other findings were minimal osteoarthrosis, bipartite patella, march fracture. One male aged 12 and two females had doubtful sacroiliac changes; when reassessed 4 to 7 years later these were still doubtful in two cases who now had slight back symptoms, and were definite in the third case, a female now under treatment.

The most interesting aspect of these *x*-rays were the minor growth anomalies present such as dense epiphyses, unequal development of the carpus, bifid epiphyses in the proximal phalanges of the feet, double epiphyses in the metatarsals, and coned epiphyses of the proximal phalanges. Also accessory ossicles and bony excrescences were noted.

Another intersting feature was the high incidence of minor growth defects of the metatarsals. These again were particularly marked in the young respondents and were often bilateral. The second metatarsal was the one most commonly affected.

The acetabulum was pathologically small in one girl and in one male aged 8 and one further female aged 9, the CE-angle being between 10 and 18°. There were three respondents with an anteversion of the femoral neck above 50°.

A preliminary investigation of stress distribution in lumbar vertebrae. By J. S. SHAH, M. I. V. JAYSON, and W. G. HAMPSON (*Departments of Physics and Medicine, University of Bristol, Bristol Royal Infirmary and the Royal National Hospital for Rheumatic Diseases, Bath*)

The techniques of stress coat analysis and photoelastic analysis were applied to study the stress distribution in isolated single cadaveric vertebrae under a simple compressive force system.

The main findings of the investigation were: (1) Upon the application of an axial compressive force to the body of a vertebra, two principle stress systems are developed, namely tensile stresses which are transverse and compressive stresses which are longitudinal. (2) The stress trajectories on the surface of the bone tend to follow the curvature of the bone in all cases and at each point on the surface the compressive stress is orthogonal to the tensile stress. (3) The rim of the vertebra, the root of the vertebral arch, and the posterior surface of the vertebral body are regions where high stresses develop. (4) The stress trajectories within the vertebral body appear to follow the principle trabecular systems of the vertebra as classified by Japoit and Callois (1925).

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