Protein kinase signals activate interleukin 16 encoding transcripts in rheumatoid arthritis versus osteoarthritis synovial fibroblasts

M K Schuler, S Sell, W K Aicher

Interleukin 16 (IL16) is a proinflammatory cytokine and a chemoattractant factor for CD4+ T cells. IL16 has been detected at higher concentrations in rheumatoid arthritis (RA) synovial fluid than in osteoarthritis (OA) specimens. IL16 is expressed in inflammatory infiltrates and in CD68+ synovial lining cells of patients with RA as detected by in situ hybridisation.

In this study we compared the modulation of IL16 steady state mRNA in synovial fibroblasts (SF) from six patients with RA and from three patients with OA. SF were prepared, expanded, and characterised as described previously. To examine the IL16 encoding transcript amounts, SF were incubated in complete medium for 24 or 48 hours in the presence of one of the following chemicals: 1 ng/ml phorbol-12-myristate-13-acetate (PMA), an activator of protein kinase C (PKC); 200 ng/ml ionomycin (Iono), a calcium ionophor; 10 µM of adenosine-3′,5′-cyclic monophosphate (cAMP), which stimulates protein kinase A (PKA); 10 nM okadaic acid (Oka), a phosphatase inhibitor; 10 µM MAS-7, which activates G-proteins; 100 µM H-7 dihydrochloride (H-7), an inhibitor of protein kinases; and 10 nM staurosporine (Stauro), a protein kinase inhibitor (all from Calbiochem or Biomol). Differences of IL16 encoding steady state mRNA amounts in activated cells compared with controls were detected after 33 cycles of reverse transcriptase-polymerase chain reaction (RT-PCR) amplification (Taq DNA polymerase, Roche Biochemicals). Glyceraldehyde-3-phosphate dehydrogenase (GAPDH) RT-PCR served as a control for RNA content. The PCR amplification plateau was reached after 35 cycles. This suggested that the IL16-specific RT-PCR was suitable for detecting different levels of IL16 encoding transcripts as the PCR was stopped before reaching the amplification plateau. Still, the limitations of this method are evident and we therefore consider our data as a semiquantitative enumeration of transcripts encoding IL16.

Both, early passage RA SF and OA SF spontaneously transcribed IL16 encoding mRNA. Addition of protein kinase inhibitor staurosporine enhanced the IL16 RT-PCR signals in all samples of OA SF, whereas specific protein kinase C activator PMA reduced the IL16 encoding RT-PCR signals in OA SF (fig 1). Ionomycin, cAMP, and MAS-7 had minor and variable effects in OA SF (fig 1). Addition of protein kinase inhibitor staurosporine also enhanced the IL16 encoding signal in RA SF (fig 2). Incubation of the cells with PMA and ionomycin reduced the IL16 encoding RT-PCR signal intensity in these cells (fig 2). Again, cAMP and MAS-7 produced minor and variable effects in the different samples analysed (fig 2). Application of okadaic

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**Figure 1** Modulation of IL16 transcripts in OA SF. SF of a patient with OA were expanded in culture and analysed for IL16 transcripts during the second passage. The synovial fibroblasts were incubated with phorbol ester (PMA), ionomycin (Iono), cAMP, okadaic acid (Oka), MAS-7, H-7, or staurosporine (Stauro). Untreated cells served as controls (C). OA SF transcribed IL16 encoding mRNA (C). Staurosporine and MAS–7 enhanced the RT-PCR signal to some extent, whereas in PMA, Oka, and H-7 treated cells the IL16 RT-PCR signal was reduced. A recombinant IL16 plasmid served as a positive control (+) and the RT-PCR master mix without cDNA served as a negative control (−, top). GAPDH RT-PCR served as control to show sufficient quality and quantity of the cDNA employed (bottom). A 100 bp DNA marker shows PCR product sizes (M).

**Figure 2** Regulation of IL16 transcripts in RA SF. SF of a patient with RA were expanded and analysed for IL16 transcripts in the second passage. The synovial fibroblasts were incubated with phorbol ester (PMA), ionomycin (Iono), cAMP, okadaic acid (Oka), MAS-7, H-7, or staurosporine (Stauro). Untreated cells served as controls (C). RA synovial fibroblasts spontaneously transcribed IL16 encoding mRNA (C). cAMP and staurosporine enhanced the RT-PCR signal. In PMA, Iono, Oka, and H-7 treated cells the IL16 RT-PCR signal was reduced. A recombinant IL16 plasmid served as a positive control (+) and the RT-PCR master mix without cDNA as a negative control (−, top). GAPDH RT-PCR served as control to show sufficient quality and quantity of the cDNA employed (bottom). A 100 bp DNA marker shows PCR product sizes (M).
Fatigue is a common symptom in ankylosing spondylitis (AS) occurring in 65% of patients and forms part of the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI). Fatigue has been attributed to sleep disturbance from back pain and stiffness and usually increases with increased disease activity, but can occur independently of AS activity, suggesting the possibility of other causes. One such cause in the middle aged population is sleep apnoea syndrome (SAS). SAS is defined as 10 or more episodes an hour of airflow interruption for 10 seconds during sleep. It occurs in up to 4% of middle aged people, and forms part of the criteria for SAS when 10 or more episodes an hour of airflow interruption for 10 seconds during sleep is present. SAS is characterized by intermittent obstruction of the upper airway during sleep, leading to oxygen desaturation, sleep fragmentation, and daytime sleepiness. SAS is associated with an increased risk of cardiovascular disease, stroke, and all-cause mortality.

ACKNOWLEDGEMENTS
We thank A Hack for excellent technical service. This study was supported by grants to WKA (fortune 411, in part by DFG Al 16/10–1) and by institutional funding.

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assessed by night oximetry. Both these patients had an obstructive type of SAS (table 1). 3

Compared with those without SAS, the two patients with SAS had significantly higher mean ESS scores (SAS 16.5 (0.7) v no SAS 8.6 (5.1), p<0.01), fatigue component of the BASDAI (SAS 8.0 (0.7) v no SAS 5.8 (2.5), p=0.04), and neck circumference (SAS 41.0 (4.2) v no SAS 39.2 (9.2), p=0.02). The overall BASDAI scores (SAS 5.5 (1.3) v no SAS 4.83 (1.9), p=0.59) and body mass index (SAS 32.7 (3.1) v no SAS 25.6 (4.6), p=0.13) were not significantly different between the two groups. Neither of the two patients with SAS drank alcohol, but no other significant differences were found between the two groups (table 1).

**DISCUSSION**

SAS and AS can coexist. We found a higher prevalence of SAS in patients with AS (12%) than has been reported in the general population (1–4%). However the sample size was small and a larger study would be required to determine the true prevalence. As might be expected, the patients with SAS had high subjective scores of daytime sleepiness, which was mirrored by the high scores on the fatigue component of the BASDAI. The overall BASDAI scores of the patients with SAS were not significantly different from that of the cohort, and the high fatigue component scores were rogue results reflecting the underlying SAS and not AS activity. None of the specific measurements of spinal involvement in the affected patients were significantly different from those of the cohort, suggesting that the degree of spinal involvement in AS was not a contributing factor in the development of SAS in these two subjects. The two affected patients were both obese middle aged men and had a classical restrictive pattern on pulmonary function testing, all of which are known to be risk factors for the development of SAS. Both patients were treated with continuous positive airway pressure ventilation at night, and their levels of fatigue improved subjectively, which was reflected in a fall of their ESS scores (patient 1: 17 to 9, patient 2: 22 to 12).

SAS can be a contributing factor to fatigue in AS. Patients with excessive fatigue or scoring high on the fatigue component of the BASDAI without other evidence for continuing disease activity should be assessed for other causes of fatigue. Detection and treatment of SAS can lead to improvement in fatigue symptoms in these patients and reduce the associated morbidity and mortality of SAS.

**ACKNOWLEDGEMENTS**

Many thanks to the staff of the Pulmonary Function Laboratories in the Dudley Group of Hospitals NHS Trust for carrying out the respiratory tests and sleep studies.

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Accepted 7 June 2002

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Thoracic high resolution computed tomography in patients with ankylosing spondylitis and without respiratory symptoms

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The incidence of pleuropulmonary disease in ankylosing spondylitis (AS) varies from 0 to 30% in the medical literature. The most frequently recognised manifestations are upper lobe fibrosis, mycetoma formation, and pleural thickening. The advent of high resolution computed tomography (HRCT) made it possible to examine the entire lung parenchyma and pleura in many conditions with diffuse lung disease by a non-invasive method.

Consecutive patients with a diagnosis of AS according to the modified New York criteria who attend our department during one year were included in the study. All patients had a prospective rheumatological assessment conducted by two rheumatologists (AEM and AB) using a structured questionnaire, a pulmonary function testing measurement, posteroanterior chest radiography; on the same day an HRCT of the thorax was performed using a Siemens Somatom S CT scanner with images windowed to highlight both lung and mediastinal structures. Nine HRCT slices were obtained on suspended respiration at 2 cm intervals from the lung apices to bases. The results of the chest radiographs and HRCT were assessed by a radiologist (SC) who was unaware of the clinical data of the patient. The CT scans were evaluated for the presence, distribution, and extent of airway and parenchymal abnormalities. Standard CT criteria were used to establish a diagnosis of interstitial lung disease (ILD), bronchiectasis, and emphysema.

Plain radiography was abnormal in only two patients. Twenty four patients (55%) showed abnormalities on HRCT. Table 1 lists the abnormalities detected on HRCT. Twenty (45%) patients had mild non-specific interstitial abnormalities of insufficient severity or extent to be labelled as ILD. Pulmonary function tests showed a restrictive process in eight patients, in whom three had normal chest HRCT and three had ILD. The two remaining patients had non-specific interstitial abnormalities of insufficient severity or extent to be labelled as ILD. The significance of HRCT evidence of interstitial change that was of insufficient severity or extent to be labelled as ILD.

Another study conducted by Turetschek et al showed that 15/21 (71%) patients had abnormalities on thin section CT. The most common abnormalities were thickening of the interlobular septa (7/21 patients), mild bronchial wall thickening (6/21), pleural thickening and pleuropulmonary irregularities (6/21), and linear septal thickening (6/21). The HRCT findings in our study, as was the case in the study of Casserly et al, suggest an inflammatory process rather than a mechanical cause for the interstitial disease found in patients with AS. Twenty patients (45%) in our study had non-specific interstitial abnormalities as had 11 (42%) patients in the study of Casserly et al, which implied HRCT evidence of interstitial change that was of insufficient severity or extent to be labelled as ILD. The significance of such changes is unknown and must await a prospective longitudinal study to determine their natural history.

Table 1 Results of chest HRCT in 44 patients with anklosing spondylitis

<table>
<thead>
<tr>
<th>Number (%)</th>
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<tbody>
<tr>
<td>Normal</td>
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<tr>
<td>Emphysema</td>
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<tr>
<td>Interstitial lung disease</td>
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<tr>
<td>Upper lobe fibrosis</td>
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<tr>
<td>Bronchiectasis</td>
</tr>
<tr>
<td>Ground glass attenuation</td>
</tr>
<tr>
<td>Non-specific interstitial change</td>
</tr>
<tr>
<td>Pleural thickening</td>
</tr>
<tr>
<td>Parenchymal bands</td>
</tr>
<tr>
<td>Subpleural bands</td>
</tr>
<tr>
<td>Blebs</td>
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<tr>
<td>Parenchymal micronodules</td>
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<tr>
<td>Irregular interfaces</td>
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Chest HRCT of a 37 year old patient showing ground glass aspect (black arrow) with parenchymal band (white arrow).
ACKNOWLEDGEMENT

Supported in part by a grant from Pfizer.

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Accepted 14 May 2002

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Effect of low dose weekly methotrexate on bone mineral density and bone turnover

S Patel, G Patel, D Johnson, L Ogunremi, J Barron

We report the effects of methotrexate on BMD and bone turnover at baseline and over two years in patients treated with methotrexate for psoriasis. We found that the prevalence of osteoporosis was no greater than would be expected for the age of the patient (Z scores were normal) and that for most patients, markers of bone turnover at baseline were within the normal range. Also no change in BMD was found when a subgroup of 20 patients were followed up prospectively. Bone turnover was normal and there was no change in BMD with chronic treatment. The rationale for choosing the patients studied was to avoid any confounding effects of underlying disease such as rheumatoid arthritis, which can itself cause local and systemic osteoporosis and abnormal bone turnover. None of our patients had systemic inflammatory disease and a recent study confirms that chronic psoriasis is not associated with osteoporosis.

In our study BMD was measured at the standard skeletal sites for the diagnosis of osteoporosis. We did not measure BMD at sites of stress fracture reported with methotrexate.
which typically are the metatarsals or distal tibia as reported by Wijnands and Burgers. These skeletal sites have a high cortical bone content and are under different and potentially greater mechanical strain than the spine or hip site. Thus whether methotrexate causes regional bone loss and whether mechanical strain is important in the pathogenesis of these stress fractures remains uncertain. Other limitations of our study include the relatively small sample size and short duration of follow up (21 months) which may result in type 2 errors. We also had to rely on the Lunar DPX manufacturer’s control database to act as a control group as we did not have an aged match control group at baseline. Other confounding factors are that as the longitudinal phase was some time after initiation of methotrexate, early bone loss might have been missed, although this seems unlikely, as baseline Z scores were normal. We were only able to recruit 20 of the original 30 patients who participated in the cross sectional phase of this study, but this was owing to patient preference rather than side effects or lack of efficacy of the treatment. All the patients received methotrexate continuously during follow up. Although the dose of methotrexate in the patients studied was relatively low (median weekly dose 9.8 mg), we did not find a relationship between weekly or cumulative dose and bone turnover or BMD (both baseline and longitudinally).

In summary, our findings suggest that weekly methotrexate treatment in the doses used in this study, is unlikely to increase fracture risk at the common skeletal sites for osteoporotic fractures.

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Accepted 10 June 2002

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Evaluation of a screening tool for inflammatory joint disease

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The benefit of early treatment of inflammatory joint disease (IJD) with disease modifying drugs (DMARDs) to avoid progressive irreversible joint damage is well established. The time delay from onset of symptoms to starting a DMARD is determined by a number of factors, and early synovitis clinics have been developed to facilitate speedy referral and initiation of DMARD treatment. The efficiency of these clinics is dependent on appropriate referral. Diagnosing early IJD is not easy; even specialists have been shown to disagree when the consultant’s assessment.

A simple eight point questionnaire (box 1) was devised to separate patients with and without IJD. It uses well recognised diagnostic criteria for rheumatoid arthritis (morning stiffness, rheumatoid factor, and erosions) but also includes more general markers of inflammation (erythrocyte sedimentation rate (ESR)), benefit from non-steroidal anti-inflammatory drugs (NSAIDs)/steroids, synovitis, and family history.

We prospectively studied 100 consecutive patients whom their general practitioner (GP) suspected might have IJD and had referred to one consultant for early assessment over a 10 month period. GP letters were initially screened by the consultant and then passed to the nurse practitioner who applied the questionnaire (box 1) to all patients before the consultant’s assessment.

Characteristic distribution for IJD was positive if more than one joint was affected by pain or stiffness, but negative if the pattern affected predominately the distal interphalangeal joints of the hands or the base of the thumbs. Synovitis was defined as the affected joint being tender and swollen. The most recent ESR was used, radiographs of hands and feet were used for assessment of erosions, and benefit from NSAID/steroids was taken as a reported patient global assessment. The diagnosis was taken as that made by the consultant at the first assessment. In cases where there was some doubt, it was taken as the most likely diagnosis at the subsequent review appointment. Seventy six women and 24 men not known to have IJD were included with mean ages of 55 years (women) and 50 years (men). The consultant diagnosed 31 as having IJD, of whom 30 scored 3 or more on the questionnaire (27 rheumatoid arthritis, 2 psoriatic arthritis, 1 palindromic Arthritis).

Box 1 Questionnaire.

The presence or absence of the following items was recorded.
• Early morning stiffness > 1 hour
• Characteristic distribution for IJD
• First degree relative with IJD
• Clinical evidence of synovitis
• ESR ≥ 20 mm/1st h [men], ≥ 30 mm/1st h [women]
• Positive rheumatoid factor (≥ 1/80)
• Erosions on hands or feet x ray
• Benefit from NSAID or steroids

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Anti-annexin V antibodies in patients with cerebrovascular disease

N Gašperšič, U Rot, S Ćučnik, T Kveder, B Božič, B Rozman


Annexin V (ANXV) is a protein with a high affinity for negatively charged phospholipids and shows in vitro a potent anticoagulant activity. It has been suggested that it has a significant role in the prevention of arteriovenous thromboses or fetal loss, or both. Increased levels of antibodies against ANXV (aANXV) have been reported in patients with different systemic autoimmune disorders as well as in women with recurrent fetal loss and pre-eclampsia. The presence of aANXV in patients with thromboembolic cerebrovascular disease (CVD), however, has not yet been described. We report on two patients with CVD who had evidently raised levels of IgG aANXV, whereas all the other tested antiphospholipid antibodies (aPL) were negative.

We examined 37 young patients with no evident systemic autoimmune disease (23 women, 14 men; mean age at CVD 32 years (range 18–40)) 11 months to six years after CVD: seven with transient ischaemic attack (TIA), 25 with ischaemic cerebrovascular insult, and five with venous sinus thrombosis. Diagnoses based on the history and clinical manifestations were objectively verified by computed tomography (CT), magnetic resonance imaging (MRI), and/or angiography at the time of the onset of symptoms. After prospective clinical re-examination, two blood samples were obtained from each patient eight weeks apart.

Serum samples were analysed by enzyme linked immunosorbent assay (ELISA) for the presence of aANXV, anticardiolipin, anti-β2-glycoprotein, and anti-prothrombin antibodies. Antinuclear antibodies (ANA) were determined by indirect immunofluorescence.

CASE REPORTS

Patient 1
A 36 year old woman with a history of fetal loss in 1982 became pregnant for the second time in 1998. At the 36th gestation week a caesarean section was performed owing to placental abruption. A few days after the delivery, she became somnolent with mild right sided hemiparesis. CT and an MRI scan confirmed superior sagittal sinus thrombosis and therefore treatment with warfarin was started. Three years later, her condition was stable with mild occasional headaches and mild right sided pyramidal symptomatology. Laboratory examinations showed positive ANA (up to 1/320) and persistently raised levels of IgG aANXV, while all the other tested aPL were negative. No clinical manifestations of a systemic autoimmune disease could be found. Except for a short period of smoking, no other thrombotic risk factors were identified.

Patient 2
A 24 year old woman had a TIA in 1996, two months after starting hormonal contraceptives. She experienced paraesthesia over both arms and legs and gait ataxia was found. MRI, echocardiography, and sonography of the neck vessels were normal, suggesting TIA in the vertebrobasilar region. In 2000 she became pregnant for the first time. Generalised oedema and hypertension appeared in the fifth and eighth month, respectively. A healthy child was born one month pre-term. In 2001 she was in good health except for rather frequent headaches. Clinical and special neurological examinations were completely normal. Among the tested aPL only IgG aANXV were found to be positive. Contraceptives were the only risk factor for CVD.

DISCUSSION

ANXV is one of the possible cofactors for aPL. Rand et al reported that aPL can disrupt the protective shield of ANXV on procoagulant surfaces, leaving sufficient space for the formation of coagulation complexes. aANXV were shown to induce the apoptosis of endothelial cells, creating a procoagulant environment with increased risk for thrombosis.

Two of 37 young patients after CVD had significantly raised IgG aANXV only. Besides some CVD risk factors (smoking, delivery and bleeding, oral contraceptives) both patients had pregnancy complications, which might be associated with aANXV. Our results did not show a statistically significant association between aANXV and CVD. Nevertheless it is possible that aANXV represented an additional risk factor, and together with other factors might have led to thrombosis. A study of larger groups of patients will enable firm conclusions to be drawn about the clinical significance of aANXV in CVD.
Intra-alveolar haemorrhage in temporal arteritis

Le Thi Huong, M R Andreu, P Duhaut, P Godeau, J C Piette

Temporal arteritis (TA) is the most common systemic vasculitis. We report herein a case of TA complicated with intra-alveolar haemorrhage. To our knowledge, this manifestation has not previously been reported.

CASE REPORT

A woman born in 1926 presented in 1999 with persistent dry cough and raised erythrocyte sedimentation rate at 60 mm at the first hour. C reactive protein was 14 mg/l. She had a history of pulmonary tuberculosis treated in 1951 with streptomycin and p-aminosalicylic acid. She complained of headache without fever, jaw claudication, scalp tenderness, and visual or musculoskeletal manifestations. She denied any other upper airways symptoms. Physical examination was normal. Arterial pressure was 140/70 mm Hg. Leucocyte count was 9×10^9/l with 4.2×10^9/l polynuclear neutrophils and 0.2×10^9/l eosinophils, haemoglobin 130 g/l, and platelets 9×10^9/l with 4.2×10^9/l polynuclear neutrophils, normal on bronchoalveolar lavage fluid examination, but the lung function tests were always normal. Cell count was 2.8×10^9/l with 76% lymphocytes, 3.1% eosinophils, 2.2% monocytes, 10.6% neutrophils, and histiocytes without giant cells, leading to fragmentation of the elastic lamina.

Prednisone 30 mg daily was started. The headache and cough disappeared rapidly. At the two year follow up, the patient is asymptomatic with 7 mg daily prednisone. C reactive protein is negative.

REFERENCES


patients with histologically proved TA. IgM directed against human para-influenza type 1 virus were associated with TA onset.\(^5\)

In conclusion, intra-alveolar haemorrhage may be one of the various causes of cough in TA. Further studies are necessary to ascertain whether it is the expression of a primary vasculitis or the consequence of an as yet unknown viral infection.

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Accepted 20 June 2002

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Circulating soluble CD40 ligand in patients with eosinophilic fasciitis

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Recently, some reports showed the increased expression of CD40 ligand in autoimmune diseases. CD40 ligand can be expressed in a soluble form. Soluble CD40 ligand (sCD40L) is present in supernatants of in vitro activated T cells in 15 kDa and 18 kDa forms, and these forms are the products of enzymatic cleavage at a metalloproteinase sensitive site in the membrane proximal region of the extracellular domain of the molecule. Their abnormalities have been demonstrated in various kinds of diseases such as chronic lymphocytic leukaemia or systemic lupus erythematosus. But, there has been no report demonstrating the serum levels of sCD40L in patients with eosinophilic fasciitis (EF). In this study we determined the serum levels of sCD40L in patients with EF, and investigated their clinical significance in this disease, in order to evaluate whether sCD40L might be a useful marker for this disease.

METHODS AND RESULTS

Eleven patients (disease duration 1–8 months) with a classic clinical picture of EF, who had received no treatment, were included in this study. All the patients had a recent history of increased skin induration. Skin biopsies including deep subcutaneous tissue and fascia showed markedly indulated and thickened fascia in all cases. Additionally, the thickened fascia contained accumulation of collagen and intense inflammatory cell infiltrates comprising lymphocytes, macrophages, and eosinophils. Clinical manifestations and laboratory findings of each patient were obtained from the medical records. All the laboratory findings were obtained at the time of serum sampling. We also collected control serum samples from 20 healthy volunteers matched for age and sex. Levels of sCD40L were measured with a specific enzyme linked immunosorbent assay (ELISA) kit (Bender MedSystems, Vienna, Austria), according to the manufacturer's instructions. Values greater than the mean plus 2SD for normal control subjects were regarded as raised. Additionally, serum IgG was evaluated by a turbidimetric immunoassay as described previously. Statistical analysis was carried out with Student’s t test for the comparison of means, and Fisher’s exact probability test for the analysis of frequency. Values of p<0.05 were considered significant.

Figure 1 shows the serum sCD40L levels in patients with EF and in the healthy control subjects. The serum sCD40L levels in patients with EF were significantly higher than those in the healthy controls (mean (SD) 0.29 (0.16) ng/ml v 0.13 (0.08) ng/ml, p<0.01). When the cut off value was set at 0.29 ng/ml (mean + 2SD for the controls), raised serum sCD40L levels were seen in 5/11 (45%) patients with EF.

Serum sCD40L levels correlated significantly with serum IgG levels (r=0.75, p<0.05). On the other hand, serum sCD40L levels were not significantly correlated with serum gammaglobulin, peripheral cell count of eosinophils, erythrocyte sedimentation rate, or serum levels of aldolase. Additionally, three of the five patients with raised serum
sCD40L levels were examined longitudinally before and after corticosteroid treatment for two months to three years. Their clinical manifestations and laboratory abnormalities improved with treatment. Serum sCD40L levels became normal in all three patients (fig 2).

DISCUSSION

As described above, expression of sCD40L in patients with several connective tissue diseases has already been evaluated and shown to be increased. Berner et al reported that increased expression of CD40 ligand on CD4+ T cells in rheumatoid arthritis indicated prolonged and increased activation of CD4+ T lymphocytes and was associated with active disease and, possibly, an unfavourable prognosis.1 Valentin et al found that expression of CD40 ligand in activated CD4+ T lymphocytes was increased in patients with systemic sclerosis.1 On the other hand, Vakkalanka et al reported that the mean concentration of serum sCD40L was statistically significantly higher in patients with systemic lupus erythematosus (SLE) than in disease controls or healthy subjects, and segregation of patients with SLE by severe, moderate, or mild extent of disease showed a relationship between disease severity and sCD40L concentration.3 These findings suggest that CD40 ligand or sCD40L are associated with clinical features of these diseases. In our study, serum levels of sCD40L in patients with EF were significantly higher than those in healthy controls. sCD40L is present in supernatants of in vitro activated T cells.1 In patients with EF, activated T cells were thought to be increased because of the presence of raised interleukin 5 and interleukin 10.4 Thus, our results may reflect such a condition. Additionally, serum levels of sCD40L correlated significantly with serum IgG levels in patients with EF, and serum sCD40L levels normalised after treatment in patients with raised sCD40L levels. As well as peripheral cell counts of eosinophils, erythrocyte sedimentation rate or serum levels of aldolase, hypergammaglobulinaemia is reported to be one of the markers of disease activity,5 which occurs in 75% of patients and is usually due to a polyclonal increase in IgG.4 Thus, our results suggest that sCD40L is also a good marker of EF, reflecting the effects of treatment. However, only 5/11 patients showed raised levels of sCD40L. Thus, the usefulness of sCD40L as a marker of disease activity was not completely substantiated in this study. Additionally, serum sCD40L levels did not correlate with gammaglobulin despite significant correlation with IgG, possibly owing to the small number of patients studied. Moreover, we performed the longitudinal study in only three patients with raised sCD40L levels because other serum samples were not available, so the longitudinal data may be incomplete. Additionally, there is a possibility that corticosteroid treatment, independently of disease, can reduce sCD40L levels. Further studies are needed to clarify the significance of the role of sCD40L in this disease.

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Accepted 7 June 2002
Thoracic high resolution computed tomography in patients with ankylosing spondylitis and without respiratory symptoms

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doi: 10.1136/ard.62.2.185