series cells. These latter markers have recently been reviewed by Crocker and Burnett.² The preparations usually bind to "X-hapten"—that is, 3-fucosyl-N-acetyl-lactosamine (3fNa) and include Leu M1, 3C4, VEP8 and 9, and AGF 4-48.² The epitopes labelled by these antibodies, however, are widespread in many tissues, including those of epithelial type.² It is dangerous to presume that shared epitopes imply a common ontogeny, but, it would be interesting to speculate on a common ancestry between granulocytes and Reed-Sternberg and Hodgkin's cells.

Accordingly, we applied two antisera to cathepsin G³ and leucocyte elastase⁴ to a series of 35 cases of confirmed Hodgkin's disease. These comprised seven each of: lymphocyte predominant, nodular sclerosing type 1 and type 2, mixed cellularity, and lymphocyte depletion Rye subtypes. The antibodies have been shown to be highly specific for granulocyte series cells of maturation stages from promyelocytes onwards, including some myeloblasts.^{3,4} Activity of cathepsin G has not been observed in other tissue types, and leucocyte elastase has only otherwise been seen in ileal epithelium.³

The antisera were applied to paraffin sections using standard indirect peroxidase, streptavidin-biotin, and immunogold-silver (IGSS) labelling methods.⁵ Mature granulocytes were intensely and consistently stained, but only very occasional Reed-Sternberg and Hodgkin's cells reacted; when this occurred, the staining was very weak, even with the IGSS method.

In view of the high specificity of the antisera for granulocyte series cells and the high sensitivity of the IGSS method the findings suggested that if indeed Reed-Sternberg and Hodgkin's cells are related to granulocytes, then they share features only in terms of minor epitopes such as 3fNa, which, themselves, are expressed only on cells from the promyelocytic stage of differentiation.

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Aplastic crisis in haemolytic anaemias not associated with human parvovirus infection

Human parvovirus (HPV) infection causes aplastic crises in children with chronic haemolytic anaemia,¹ but cases of transient erythroblastopenia not associated with HPV infection in previously healthy children have also been described.² The aetiological agent is not thought to be the same in transient erythroblastopenia of childhood and aplastic crises in haemolytic anaemias.

During a period of 23 months from March 1984 to January 1986, we saw 24 patients with haemolytic anaemias presenting with an aplastic crisis (nine with hereditary spherocytosis, six sickle cell anaemias, five thalassaemias, one haemolytic anaemia with dyserythropoiesis, and three autoimmune haemolytic anaemias. HPV was isolated by counterimmunoelectrophoresis in one patient with sickle cell anaemia, and serological evidence of recent HPV infection was confirmed by the presence of specific anti-HPV IgM (radioimmunoassay)³ in 18 others. In the remaining five patients (three with sickle cell disease, two with autoimmune haemolytic anaemia), no marker of HPV infection was found. Other infections excluded were infectious mononucleosis, cytomegalovirus, toxoplasmosis, hepatitis A and B, mumps and rubella. Folic acid concentration was normal in all five.

Our experience confirms that HPV is the major aetiological agent of aplastic crises in patients with chronic haemolytic anaemias (79.2% of our series). The absence of a previous crisis in all 24 patients superficially suggests that the virus might be the only one responsible for such events, but failure to find HPV or specific IgM in five patients

implicates other agents as well. Of course, we do not know if the aetiological agent in transient erythroblastopenia of childhood and in aplastic crisis of haemolytic anaemias not associated with HPV infection is the same.

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Immune thrombocytopenia induced by cephalosporins specific for thiomethyltetrazole side chain

Cephalosporins have only rarely been reported as a cause of thrombocytopenia, previous reports having been associated with cephalothin¹⁻³; in only one of these was the presence of antibody associated with the drug shown directly.¹ Specific structures with a role in the antigen-antibody interaction have not been identified previously. No report has been found selectively implicating second and third generation cephalosporins as a cause of immune thrombocytopenia.

A 69 year old man was admitted to hospital in November 1984 with chronic staphylococcal cellulitis of the leg of three months duration. He had long standing rheumatoid arthritis and ischaemic heart disease. Previous adverse drug effects included nephrotic syndrome following penicillamine and gastritis after naproxen and indomethacin. The cellulitis had persisted despite treatment with erythromycin, sodium fucidate, clindamycin, rifampicin, flucloxacillin and gentamycin.

In December 1984, the flucloxacillin and gentamycin were stopped and cephalamandole started intravenously 1g five times

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a day. At this time the platelet count was $256 \times 10^9/l$. Over the next nine days the cellulitis improved slightly, but on the ninth day a few purpuric lesions were seen on the lower limbs. These extended within 24 hours and the platelet count on the tenth day was $3 \times 10^9/l$ with a normal haemoglobin and white cell count. A bone marrow aspirate taken at this time showed hypercellularity and increased megakaryocytes, consistent with accelerated platelet destruction. Cephamandole was then stopped, four units of platelet concentrates were given, and cephalixin was started in an oral dose of 1g five times a day 12 hours later. The platelet count increased steadily thereafter and returned to normal within four days. Cephalixin was continued at the same doses during the subsequent three months and the platelet count remained normal throughout.

Drug dependent platelet antibodies were shown using an immunofluorescence procedure⁴ with about 5 mg of cephamandole added to the incubation mixture of patient's serum and platelets. Patient's serum and the antibiotic solution were tested separately as controls.

Other drugs given at the same time as cephamandole were frusemide, Slow K, sulindac, ibuprofen, panadeine, anginine, palfium, isosorbide dinitrate and rifampicin. All of these had been given for lengthy periods prior to the onset of thrombocytopenia, and with the exception of rifampicin, were continued subsequently without any adverse effects.

The table shows the results of the platelet antibody immunofluorescence test (PIFT) performed in the presence of various cephalosporins and rifampicin, which was included as this was the only other drug discontinued at the same time as cephamandole. Platelet bound antibody was shown in the presence of cefaperazone and moxalactam, as well as cephamandole, but not in the presence of cefoxitin, cephalothin,

cephalexin or rifampicin. The former three antibiotics possess a common thiomethyltetrazole group on the R2 side chain that is absent from the latter drugs.

The patient had had no known previous exposure to cephalosporins or any other drug possessing a thiomethyltetrazole group. Cephalixin, however, which he had been previously given in a single dose, possesses a similar tetrazole group on the R1 side chain. Unfortunately, insufficient serum was available to perform the PIFT in the presence of cephalixin, or a similar side chain structure isolated from the antibiotics, but it is possible that this antibiotic, given 18 months earlier induced an initial immune response.

This seems to be the first reported case of cephalosporin sensitivity selectively involving only those drugs with a thiomethyltetrazole group on the R2 side chain. The apparent rarity of this occurrence would not seem to justify changing prescribing habits for cephalosporins.

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Rapid diagnosis of *Campylobacter pyloridis* infection

A characteristic feature of *Campylobacter pyloridis*, an organism implicated as the aetiological agent of gastritis and possibly gastric ulcers also, is the production of large quantity of extracellular urease.¹ Hazell and Lee² postulated a role for this enzyme in the pathogenesis of these diseases. Other investigators used this property to facilitate rapid diagnosis of *C pyloridis* infection by testing for the presence of preformed urease in biopsy specimens taken at endoscopy.^{3,4}

We report here our findings from two separate studies, one done in London and one in Belo Horizonte, Brazil, on the reliability of the urease test as a rapid diagnostic test for infection associated with *C pyloridis*. In both studies mucosal biopsy specimens were taken from the gastric antrum, duodenum, and oesophagus from patients attending the endoscopy clinic for investigation of upper gastrointestinal symptoms.

In the study at St Charles's Hospital, London 199 biopsy specimens were available from 111 patients. Specimens were processed immediately or kept at 4°C for not longer than two hours before processing in the laboratory. The same specimen was used for all the tests. It was crushed before being first inoculated on to blood agar and *C pyloridis* selective media for culture at 37°C in microaerophilic conditions for up to six days, then used to make a smear for Gram staining, and finally placed in 0.5 ml of Christensen's 2% urea broth and left at room temperature for up to 24 hours to detect preformed urease. A colour change from brown to pink indicated a positive test.

In the Brazilian study 67 sets of biopsy specimens were taken from 51 patients for analysis. Each set consisted of three specimens, one for culture, one for Gram stain, and one for the urease test. The previously crushed and ground specimens were processed fresh in the endoscopy unit. The media used and the method of reading the results were the same as those in the London study.

Detection of *C pyloridis* by culture or Gram stain, or both, was taken as the standard with which the urease test had to be compared. Table 1 shows that the urease test has a specificity of 88% and a sensitivity of 74%, when applied to biopsy specimens from the gastric antrum. These contrast with figures of 100% and 88%, respectively, reported by McNulty and Wise.^{3,5}

When oesophageal and duodenal biopsy specimens are also included in the analysis, the specificity of the urease test is found to be 86% while the sensitivity is only 59%, with a false positive rate of 28% (table 2). These are almost identical with the figures of

Table Platelet antibody immunofluorescence test using patient's serum and pooled normal platelets

In the presence of:	Result
No drug	—
Cephamandole*	+++
Cefoperazone	+++
Moxalactam	+++
Cefoxitin	—
Cephalothin	—
Cephalexin†	—
Rifampicin	—

*Associated with thrombocytopenia in patient.

†Used to treat patient without adverse effects.

Table 1 Detection of *C pyloridis* in gastric antrum

Urease	Culture or Gram stain for <i>C pyloridis</i>		
	Positive	Negative	Total
Positive	37	4	41
Negative	13	29	42
Total	50	33	83