thrombocytopenia, false-positive VDRL test, cryoglobulins, positive Coombs' test, antinuclear antibody, or anti-native DNA antibody. Total and high-density lipoprotein cholesterol, triglycerides, antithrombin III, protein C, and protein S were normal in all patients. Lupus anticoagulant and ACA determination were done within 3 days of the ischaemic event and repeated after 3–6 months. Upper limits for either IgG or IgM ACA were set as the mean normal values plus 5 SD of normal children's values, corresponding to 8 arbitrary units (AU) for IgG and 6 AU for IgM. According to proposed criteria for antiphospholipid syndrome,[2] to be defined as positive, patients had to have other positive lupus anticoagulant test or positive IgG and/or IgM ACA at moderate/high values (≥15 AU) in both determinations. Computed tomographic scanning and/or magnetic resonance imaging findings were abnormal and consistent with the clinical index events in all patients with stroke or transient ischaemic attack. Ophthalmological examination and visual evoked potentials were consistent with ischaemic involvement of the anterior optic pathway in the 2 patients with ocular ischaemia (amaurosis fugax). None of the patients had a history of vascular thrombotic events affecting other sites of the body.

10 (76%) of the 13 patients were positive for either lupus anticoagulant or ACA. 2 were positive for lupus anticoagulant, 1 for IgM ACA, and 7 for IgG ACA. No differences were found between APA-positive and APA-negative patients with respect to clinical or radiological features. 6 patients (46%) (5 APA-positive and 1 APA-negative) had a history of multiple ischaemic events. None of 20 healthy age-matched controls had a positive lupus anticoagulant test. Previous studies in our laboratory have shown a prevalence of zero for IgG ACA and 5% for IgM ACA (all <15 AU) in 42 healthy children aged 2–16 years.

The strong association between ACA and primary cerebral ischaemia seen in our patients does not necessarily mean a cause-effect relation. However, it strongly suggests that the contribution of ACA to cerebral ischaemia is relevant in childhood, in which other stroke risk factors such as cigarette smoking, oral contraceptive use, and atherosclerosis have no impact.

Lucia Angelini, Angelo Ravelli, Roberto Caporali, Alberto Martini

Istituto Nazionale Neurologico Carlo Besta, 20100 Milano, Italy; and Clinica Pediatrica and Istituto di Patologia Medica, Università di Pavia, Istituto di Ricovero e Cura a Carattere Scientifico S Matteo, Pavia

1 Angelini L, Ravelli A, Caporali R, Rumi V, Nardocci M, Martini A. High prevalence of antiphospholipid antibodies in children with idiopathic cerebral ischemia. *Pediatrics* (in press).

2 Harris EN, Khamashta MA, Hughes GRV. Antiphospholipid antibody syndrome: In: McCarthy DJ, Koopman WJ, eds. Arthritis and allied conditions. 12th ed. Philadelphia: Lea & Febiger, 1991: 1201–12.

Borna disease virus antibodies among workers exposed to infected ostriches

SIR—Borna disease virus (BDV) is an RNA virus that causes a progressive immune-mediated encephalopathy in various animal species.[1,2] Natural infections of horses and sheep are enzootic in parts of Germany and Switzerland, whereas experimental infection in a wide range of animals, including birds, rodents, ruminants, and non-human primates, is well documented.[1] Antibodies to BDV have been found in normal persons (0–3%) and in higher rates in neuropsychiatric patients, suggesting the occurrence of human infection.[3,4] However, a causal relation between the virus and a specific human disease has never been shown. To our knowledge, transmission of the virus from infected animals to exposed human beings has not been reported. Recently, spastic paraparesis and excessive mortality of young birds *(Struthio camelus)* were encountered in several large ostrich farms in Israel.[4] Virological studies showed that BDV was the causative agent, based upon the detection of BDV antibodies in sick birds, neuropathological findings, and animal-to-animal transmission experiments.[4] To study the possible animal-to-human transmission of BDV, we tested 41 workers exposed to infected ostriches and a matched control group of voluntary blood donors.

	No of serum samples		p		
	Tested	Positive (%)	a	b	c
Study group	41	19 (46)			
Heavily exposed	10	9 (90)	0·002	<0·0001	<0·0001
Moderately exposed	22	9 (40)			
Mildly exposed	9	1 (11)			
Control group	41	4 (10)			

a=Mantel-Haenszel, χ^2=11·74, df=1. b=Mantel-Haenszel, χ^2=24·5, df=1. c=χ^2=13·6.

Table: **BDV serology**

The study group included 8 veterinarians, 3 laboratory technicians, and 30 farm workers (male to female ratio 9:1; mean age 38 years, range 14–65 years). The intensity of exposure to infected ostriches was graded according to a scoring system. With an ELISA system based on recombinant viral proteins p40 and gp18, antibodies to BDV were found in 46% of workers versus 10% of controls (p<0·0001). There was a strong correlation between the intensity of exposure and rate of seropositivity (p<0·0001), as shown in the table. None of the individuals in the study group had reported any neurological or behavioural symptoms. Transmission of ornithoses from birds to human beings is well known, the best example being psittacosis.[5] Our findings suggest that ostriches may serve as reservoirs for human infection with BDV.

The significance and epidemiology of BDV infection in people are still unknown. There is a broad variation in rates of immunoreactivity in different studies which may be attributed to the differences in assay methods. Methods employed for detection of BDV antibodies in human beings have included immunohistochemistry, western blotting, and immunoprecipitation. In our study, recombinant BDV proteins were used to establish a sensitive ELISA for the detection of antibodies to the virus. The specificity of the ELISA was augmented by the designation of the sera as positive only if they reacted with two viral proteins. The high rate of seropositivity among our controls may be due to the high sensitivity of our method.

Our findings support the hypothesis that Borna disease is a zoonotic infection transmitted from infected animals to exposed people. At present, none of those with antibodies to BDV has neurological symptoms, but continued observation will be necessary to determine the clinical significance of immunoreactivity in this population.

Yoram Weisman, David Huminer, Mertyn Malkinson, Rosie Meir, Stefanie Kliche, W Ian Lipkin, Silvio Pitlik

Division of Avian Diseases, Kimron Veterinary Institute, Bet Dagan, Israel; Department of Internal Medicine "C" and Infectious Diseases, Beilinson Medical Center, Petah Tikva 49100, Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel; and Laboratory of Neurovirology, Department of Neurology, University of California, Irvine, California, USA

1 Richt JA, Herzog S, Pyper J, et al. Infection with Borna disease virus: molecular and immunological characterization of the agent. *Clin Infect Dis* 1992; 14: 1240–50.

2 Briese T, Schneemann A, Lewis AJ, et al. Genomic organization of Borna disease virus. *Proc Natl Acad Sci USA* 1994; 91: 4362–66.

3 Rott R, Herzog S, Fleischer B, et al. Detection of serum antibodies to Borna disease virus in patients with psychiatric disorders. *Science* 1985; 22: 755–63.

4 Malkinson M, Weisman Y, Perl S, et al. A Borna-like disease of the ostrich in Israel. In: Lipkin WI, Koprowski H, eds. Borna disease. Heidelberg: Springer-Verlag (in press).

5 Huminer D, Samra Z, Weisman Y, Pitlik S. Family outbreaks of psittacosis in Israel. *Lancet* 1988; ii: 615–18.

Grey platelet syndrome

SIR—Patients with inherited disorders of platelet granule secretion have mild haemorrhagic symptoms, familial occurrence, associated moderate thrombocytopenia, and morphological abnormalities.[1] These entities are heterogeneous and include a variant characterised by distinctive grey staining with the Romanowsky dyes, and absence or paucity of granules on ultrastructural studies,[2] with impaired aggregation and defective dense-body secretion in response to thrombin and collagen.[1] Despite the quarter of a century that has elapsed since the first description, misdiagnosis is common.

A 46-year-old female, who presented with a low-grade lymphoma, was incidentally noted to have a lifelong history of a primary bleeding disorder. This had been diagnosed as immunological and a splenectomy was carried out at the age of 7 years, without improvement in the haemostatic defect or the platelet count, which continued to vary between 10 and 80×10⁹/L. Family history revealed only a parental aunt who had heavy menses and easy bruising. Over the years, many haematological investigations were unsuccessful in elucidating the cause of her prolonged bleeding times, thrombocytopenia, and impaired aggregometry. In 1991, her platelet count was again 48×10⁹/L and a peripheral smear showed many large forms, often having an irregular shape and a prominent grey hue, with either fine azurophilic or no granules at all present. Ultrastructurally, cytoplasmic contents were restricted to occasional dense bodies without α-granules; mitochondria and elements of the dense tubular system were also present, together with a striking number of dilated vacuoles (figure). A trephine biopsy specimen was markedly panhypercellular, with loss of fat spaces and prominent fibrosis.

Inherited thrombocytopenias are well recognised and have been subdivided into those with deficiency of storage organelles or defects in secretory mechanisms.[1] A particular

Figure: **Electronmicrograph of platelet from this patient**
Dense bodies, mitochondria, and dilated vacuoles are evident, but α-granules cannot be recognised.