to enable a suitable cut-off point to be discerned; presenting a series of straight lines joining the points rather than an artificially produced 'curve' is more helpful in this case. A second purpose is to judge the relative merits of a series of tests and, in this case, the judgment rests upon which of the series of 'curves' lies nearest to the top left hand corner or alternatively, has the largest area under the curve. In this case, therefore, smooth curves may suitably illustrate the findings.

Readers requiring further information concerning ROC analysis will find the study by Murphy *et al* (1987) to be useful.

R. P. SNAITH
D. W. OWENS

University of Leeds
Department of Psychiatry
15 Hyde Terrace
Leeds LS2 9LT

Reference

MURPHY, J., BERWICK, D. M., WEINSTEIN, M. C. *et al* (1987) Performance of screening and diagnostic tests: application of receiver operating characteristic analysis. *Archives of General Psychiatry*, **44**, 550–555.

CT findings in schizophrenia

SIR: I would like to reply to comments by Ingraham and Crichton & Hughes (*Journal*, March 1990, **156**, 444–453) on our recent paper (*Journal*, October 1989, **155**, 444–450).

In our study, multivariate analyses were used in order to correct for age and gender because enough matched controls were not available. In these multiple discriminant analyses, the enlargement of lateral ventricle: brain ratio (VBR_1), although present, was not significant to distinguish schizophrenic patients from normal controls, nor familial patients from non-familial ones. We recently reproduced these computerised tomography (CT) findings in a magnetic resonance imaging (MRI) study (Uematsu & Kaiya, 1988, 1989) of 40 schizophrenic patients and 17 normal controls. The subjects were all males, aged under 50, and there was little overlap with those in the CT study. Student *t*-tests showed significantly higher VBR_1 in schizophrenic patients than normal controls, and in schizophrenics with horizontal transmission than non-familial patients (unpublished data). However, multiple discriminant analyses again showed that, here again, VBR_1 was not a central finding for diagnosis and heredity although VBR_3 was significant both for the diagnosis of schizophrenia and for the differentiation of familial and non-familial patients.

The idea to divide schizophrenics into three subgroups stemmed from the contagion hypothesis (Crow & Done, 1986) related to the retrovirus/transposon hypothesis (Crow, 1984). Crow & Done (1986) found a correlation of age of onset between siblings and a tendency for the disease to occur at an earlier age in the younger sibling. One of their explanations for this finding was that the disease is transmitted from those who already have it to relatives who possess the genetic predisposition. We performed our study based on this hypothesis and showed a possibility that schizophrenia with horizontal transmission is a distinctive disease.

HISANOBU KAIYA

Department of Neurology and Psychiatry
Gifu University School of Medicine
40 Tsukasamachi
500 Gifu
Japan

References

CROW, T. J. (1984) A re-evaluation of the viral hypothesis: is psychosis the result of retroviral integration at a site close to the cerebral dominance gene? *British Journal of Psychiatry*, **145**, 243–253.

—— & DONE, D. J. (1986) Age of onset of schizophrenia in siblings: a test of the contagion hypothesis. *Psychiatry Research*, **18**, 107–117.

UEMATSU, M. & KAIYA, H. (1988) The morphology of the corpus callosum in schizophrenia. An MRI study. *Schizophrenia Research*, 391–398.

— & — (1989) Midsagittal cortical pathomorphology of schizophrenia: a magnetic resonance imaging study. *Psychiatry Research*, **30**, 11–20.

Chronic psychoses in Turner's syndrome

SIR: Bamrah & MacKay (*Journal*, December 1989, **155**, 857–859) presented a case of chronic psychosis in Turner's syndrome and reviewed the literature. I would like to add the following information to their report.

Firstly, the 45, XO sex chromosome karyotype makes up 51% of Turner's syndrome (TS) while mosaics of the 45 XO/46 XX sex chromosome karyotype make up 18% and 25% carry an X chromosome abnormal in structure (Fishbain & Vilasuso, 1981). Buccal smear analysis will not necessarily identify a mosaic for which karyotypic analysis in leucocyte culture is required (Akesson & Olanders, 1969). Drs Bamrah & MacKay did not specify how their patient's karyotypic pattern was determined. If only buccal smear analysis was utilised, it is possible that their patient was a TS mosaic.

Secondly, Drs Bamrah & MacKay did not make it clear if they restricted their review to psychoses associated with all karyotypic types of TS or to 45 XO only. In addition to the seven cases they found in the literature, I am aware of three others: Beumont & Mayou (1971); Kolb & Heaton (1975); and Money & Mittenthal (1970). Two of these cases were mosaics and may not have been included for that reason.

Thirdly, the literature also contains four cases of TS associated with affective disorder of psychotic proportions: psychotic depressive reaction, endogenous depression and two cases of manic-depressive illness (Fishbain & Vilasuso, 1981). Some of these cases were also mosaics.

Finally, if psychotic reactions are uncommon among TS patients, then the prevalence of TS within schizophrenic females or females in mental institutions should be lower than that in a pool of newborn girls, where the prevalence of negative sex chromation is 0.05% (Akesson & Olanders, 1969). Two studies found *no* TS in large numbers of mental hospitals (MacLean *et al*, 1968) or chronic psychotic females (Anders *et al*, 1968). Another two studies (Akesson & Olanders, 1969; Kaplan & Cotton, 1968) found 0.03% and 0.4% prevalence of TS among mental hospital and schizophrenic women respectively. The one TS patient identified by Akesson & Olanders was an XO while all three identified by Kaplan & Cotton were mosaics. These studies indirectly support Drs Bamrah & MacKay's contention that the "absence of an X chromosome would confer some immunity from major psychiatric illness". However, it appears that immunity may not be conferred on a TS mosaic. This is the reason why the issue of mosaicism is important to this research area.

DAVID A. FISHBAIN
Comprehensive Pain and Rehabilitation Center
600 Alton Road
Miami Beach, FL
33139 USA

References

AKESSON, H. O. & OLANDERS, S. (1969) Frequency of negative sex chromation among women in mental hospitals. *Human Heredity*, **19**, 43–47.

ANDERS, J. M., JAGIELLO, G., POLANI, P. E. *et al* (1968) Chromosome findings in chronic psychotic patients. *British Journal of Psychiatry*, **114**, 1167–1174.

BEUMONT, P. J. V. & MAYOU, R. (1971) Schizophrenia and XO/XX/XXX mosaicism. *British Journal of Psychiatry*, **118**, 349–350.

FISHBAIN, D. A. & VILASUSO, A. (1981) Manic-depressive illness associated with Turner's syndrome mosaicism. *Journal of Nervous and Mental Diseases*, **169**, 459–461.

KAPLAN, A. R. & COTTON, J. E. (1968) *Journal of Nervous and Mental Diseases*, **147**, 402–417.

KOLB, J. E. & HEATON, R. K. (1975) Lateralization neurologic deficits and psychopathology in a Turner syndrome patient. *Archives of General Psychiatry*, **32**, 1198–1200.

MACLEAN, N., COURT, W. N., JACOBS, P. A. *et al* (1968) A survey of sex chromation abnormalities in mental hospitals. *Journal of Medical Genetics*, **5**, 165–172.

MONEY, J. & MITTENTHAL, S. (1970) Lack of personality pathology in Turner's syndrome: relation to cytogenetics, hormones and physique. *Behavior Genetics*, **1**, 43–56.

Aggressiveness, anxiety and drugs

SIR: The brief article by Kirov on this topic (*Journal*, December 1989, **155**, 846) draws attention to a link between aggressive behaviour and anxiety, and derives a general principle that anxiolytic drugs may be expected to have an anti-aggressive effect. An early review of the effect of drugs on violent behaviour (Goldstein, 1974) found little encouragement for the use of anxiolytic or tranquillising drugs. I have had the opportunity to review more recent literature (Conacher, 1988) in which favourable results have been reported for some classes of drugs, that are not, however, all noted to possess a direct anxiolytic effect. A hypothesis has been advanced that the effect of these drugs is mediated through a serotoninergic system (Editorial, 1987).

Paradoxical reactions to tranquillisers have long been recognised, but there is too little known about these to confidently assert that they arise out of 'an abnormal terrain' such as a previously damaged central nervous system. In institutional environments where crowded conditions prevail, benzodiazepines should probably be regarded as contra-indicated in the treatment of aggression. Clinical experience supports empirical evidence that other drugs can be more effective in selected cases.

G. N. CONACHER
Regional Treatment Centre
Kingston Penitentiary
PO Box 22
Kingston, Ontario
Canada K7L 4V7

References

CONACHER, G. N. (1988) Pharmacotherapy of the aggressive adult patient. *International Journal of Law and Psychiatry*, **11**, 205–212.

Editorial (1987) Serotonin, suicidal behaviour and impulsivity. *Lancet* **ii**, 949–950.

GOLDSTEIN, M. (1974) Brain research and violent behaviour. *Archives of Neurology*, **30**, 1–35.

Auditory hallucinations during oculogyric crises

SIR: Auditory hallucinations during oculogyric crises, reported by Chiu & Rogers (*Journal*, July 1989, **155**, 110–113 and October 1989, **155**, 569–570),