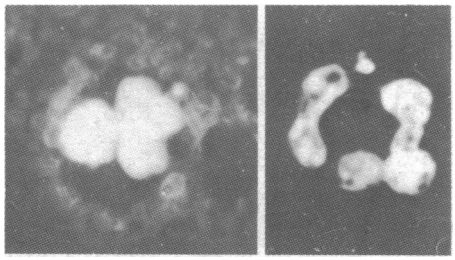
females it is generally believed to originate from one of the X chromosomes (like the Barr body). Brightly fluorescent "drumstick-like" nuclear projections (that is, structures similar to typical drumsticks in shape but generally smaller in size) in male polymorphonuclear leucocytes have also been reported and a causal relationship between these projections and the Y chromosomes has been suggested but not yet proved.[2-4] We have previously reported that the X as well as the Y chromatin body in interphase nuclei of various types of cultured and uncultured cell could be unambiguously identified by their characteristic size, location, and bright fluorescence.[5 6] We now report that a proportion of drumsticks in female polymorphonuclear leucocytes, similar to the drumstick-like nuclear appendages in male leucocytes, exhibit bright fluorescence when stained with quinacrine mustard solution.

Our preliminary fluorescent study of blood samples derived from three normal males and three normal females showed that both brightly fluorescent and very weakly fluorescent drumsticks (in females) and drumstick-like (in males) appendages existed in polymorphonuclear leucocytes of all six individuals. From 500 to 1000 cells were examined in each case. About 77-92% (varying in different individuals) out of 121 drumsticks in female leucocytes and 68-86% out of 215 drumstick-like nuclear appendages displayed distinctive bright fluorescence.



Brightly fluorescent "drumstick-like" body in male (left) and typical drumstick in female (right) polymorphonuclear leucocytes.

The remaining drumsticks and drumstick-like appendages showed very weak fluorescence. The brightly fluorescent appendage in the male and in the female leucocytes could be readily distinguished from each other by their characteristic shape and size, being much larger in females than in males (see fig.). Bright fluorescence of sessile nodules and intranuclear bodies was also seen in about 21-25% of female and 13-27% of male leucocytes. One of the females had brightly fluorescent double drumsticks in about 4% of her polymorphs. The fluorescent banding patterns and chromosome constitution of all six individuals were found to be normal.

The sex chromatin body in the interphase nucleus of various cell types of mammalian species is known to be directly formed by the condensation of the genetically inactive X chromosome. We found[6] that all the sex chromatin bodies in human cultured fibroblasts, amniotic fluid cells, and other cell types exhibit bright fluorescence. Since all drumsticks do not exhibit bright fluorescence the fluorescent property of the inactive X chromosome in polymorphonuclear leucocytes may be different from that in other types of tissues. Alternatively, the drumstick in normal females may not be formed directly by the condensation of the inactive X chromosome and thus could represent a sex-specific nuclear structure in the nature of a secondary sexual character. These and other aspects of the possible origin of drumsticks are now being investigated by the fluorescent method and will be reported later.—We are, etc.,

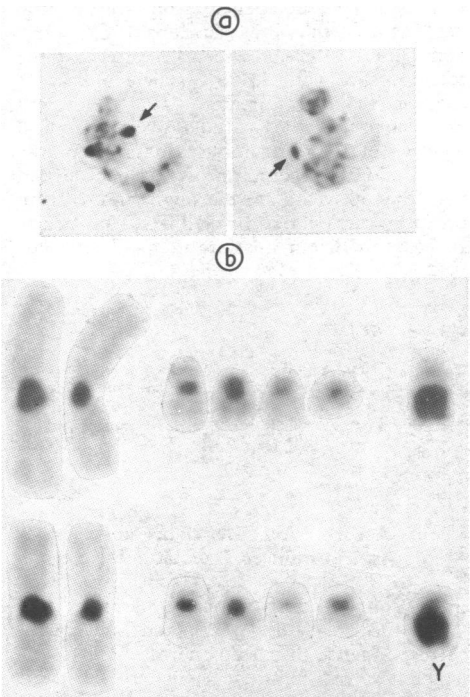
ASIT B. MUKHERJEE
JUAN SAN SEBASTIAN

Department of Biological Sciences,
Fordham University,
Bronx, New York,
U.S.A.

1 Davidson, W. M., and Smith, D. R., *British Medical Journal*, 1954, **2**, 6.
2 Lamborot-Manzur, M., Tishler, P. V., and Atkins, L., *Lancet*, 1971, **1**, 973.
3 Polani, P. E., and Mutton, D. E., *British Medical Journal*, 1971, **1**, 138
4 Ricci, N., *et al.*, *British Medical Journal*, 1971, **1**, 346.
6 Mukherjee, A. B., Moser, G. C., and Nitowsky, H. M., *Nature*, 1972, **235**, 226.
6 Mukherjee, A. B., Moser, G. C., and Nitowsky, H. M., *Cytogenetics*, 1972, **11**, 216.

Large Y Chromosome Found in Polymorphs by a C-staining Technique

SIR,—Large Y chromosomes with extended heterochromatic regions on their long arms are known to be quite common familial variants which appear to be without phenotypic effect, though an association with certain types of mental retardation has been suggested.[1] Ricci *et al.*[2] pointed out that the polymorphs of individuals with large Y chromosomes often show nuclear projections which are larger than those usually encountered in males and resemble the drumsticks of polymorphs in females. Using quinacrine, Lamborot-Manzur *et al.*[3] were able to confirm that in polymorphs the prominent fluorescent bodies due to large Y chromosomes were often situated in nuclear projections.



B.S.G. staining technique[5] for constitutive heterochromatin. A, blood smear showing large chromocentre (arrow) in polymorphs (×1815). B. lymphocyte culture. No. 1 and G group chromosomes, including the Y chromosome with an extended heterochromatin regions, from two cells. No. 1 chromosomes show a moderate degree of polymorphism (×3374).

We have recently noted[4] that in individuals with an extended heterochromatic region on one of their No. 1 chromosomes a large chromocentre was present in over 50% of polymorphs after staining with a C-banding technique.[5] This chromocentre was usually situated in contact with the nuclear membrane of one of the larger lobes (a number of smaller chromocentres presumably representing other C-staining chromosomal regions were also seen).

Using this technique we have recently screened a series of blood smears for possible heterochromatin variants. Among these we encountered one in which the large chromocentre was generally situated in a nuclear projection rather than in one of the main lobes of the polymorph (see fig. A). The patient, aged 69, was being treated for cervical and lumbar spondylosis. Chromosome studies on peripheral blood showed that a large Y chromosome was present (see fig. B).

Thus the possible usefulness of the C-staining technique for the detection of heterochromatin variants may be extended to the detection of large Y chromosomes by virtue of the situation of the large chromocentre in a projection rather than in one of the main lobes of the polymorphs.

We thank Dr. J. G. P. Williams for his help in this study and Mr. P. J. Whyer for providing the blood smears. This work was supported by a grant from the Cancer Research Campaign.—We are, etc.,

N. B. ATKIN
V. J. PICKTHALL

Department of Cancer Research,
Mount Vernon Hospital,
Northwood, Middlesex

1 Zeuthen, E., and Nielsen, J., *Acta Genetical Medicae et Gemellological*, 1973, **22**, 45.
2 Ricci, N., *et al.*, *British Medical Journal*, 1971, **1**, 346.
3 Lamborot-Manzur, M., Tishler, P. V., and Atkins, L., *Lancet*, 1971, **1**, 973.
4 Atkin, N. B., and Baker, M. C., *Journal of Medical Genetics*. In press.
5 Sumner, A. T., *Experimental Cell Research*, 1972, **75**, 304.

All Change

SIR,—Dr. H. R. Rollin's letter (9 November, p. 341) is most timely and apt, especially as it comes from a psychiatrist. I am a general practitioner and have experienced similar difficulties from the other side of the fence.

I have a patient, a young woman, for whom I needed psychotherapeutic advice. An appointment with psychiatrist Dr. X at hospital A, to which I normally refer most of my patients, was refused as the patient was said not to live within the catchment area of the hospital's psychiatric outpatient services. An appointment with psychiatrist Dr. Y at hospital B, also situated in my borough, was also refused and my patient was advised to make an appointment at hospital C, where psychiatrist Dr. Z holds outpatient sessions. Dr. X, Y, and Z are probably equally competent psychiatrists. There were, however, good medical reasons why I had chosen Dr. X and, in the second place, Dr. Y and why I did not wish to consult Dr. Z in this particular case.

In some specialties, assuming equal competence and qualifications of consultants,