to date found methylmethacrylate cement to cause worrying problems in the anaesthetic management of total hip arthroplasty. In our experience the use of such cement in these operations is safe, but an expert appraisal of the degree of plasticity of the mixed cement and the choice of the exact moment for its introduction are, in our opinion, the important factors which ensure this freedom from complications.—We are, etc.

G. J. C. BRITTAİN
D. J. RYAN

Regional Centre for Hip Surgery,
Wrightington Hospital,
near Wigan, Lancs

- 1 Phillips, H., Cole, P. V., and Lettin, A. W. F., *British Medical Journal*, 1971, 3, 460.
- 2 Peebles, D. J., Ellis, R. H., Stride, S. D. K., and Simpson, B. R. J., *British Medical Journal*, 1972, 1, 34.
- 3 Phillips, H., and Dandy, D., *British Medical Journal*, 1972, 2, 713.
- 4 Ellis, R. H., and Mulvein, J., *British Medical Journal*, 1972, 2, 528.
- 5 Cadle, D., et al., *British Medical Journal*, 1972, 4, 107.
- 6 Charnley, J., *Acrylic Cement in Orthopaedic Surgery*, Edinburgh, Livingstone, 1970.
- 7 Cole, P., Phillips, H., Lettin, A., and Dandy, D., *British Medical Journal*, 1972, 4, 231.

Radiography of Potentially Pregnant Females

SIR,—Without wishing to deny the general desirability of minimizing the exposure of the embryo and fetus to ionizing radiation, I fear Professor G. M. Ardran and Dr. F. H. Kemp (18 November, p. 422) might be basing their proposals on shaky foundations.

They say that "... it is now universally accepted that radiation to the fetus can cause leukaemia or other neoplastic disease." In an editorial comment on a paper by Bross and Natarajan¹ MacMahon² wrote: "Implicit in the interpretation of their findings ... is the view that low-level prenatal irradiation indeed causes leukemia. Although accepted by many (at least provisionally), this interpretation is not the only explanation of the existing evidence." A very recently published report of the United Nations Scientific Committee,³ which Professor Ardran and Dr. Kemp may not have seen, contains the following: "Thus, although children born from mothers x-rayed while pregnant seem to have an increased risk of cancer after birth, a possibility still remains that the association, or at least part of it, is caused by factors other than radiation ..."

These quotations suffice to show that Professor Ardran and Dr. Kemp's claim of "universal acceptance" is unjustified. However, even if it should subsequently be established that irradiation of the fetus does not cause childhood neoplasia, other possible consequences must not be overlooked. If experiments on mice can be used as a guide (see reviews by Upton⁴ and Rugh⁵), developmental abnormalities can be expected to be a hazard of fetal irradiation in man. Some of the findings in mice are supported by follow-up studies at Hiroshima; thus all eight survivors who were exposed within 1,200m of the nuclear explosion between the 7th and 15th weeks of gestation developed microcephaly.⁶ It remains to be determined whether small doses (~1 rad) of fetal irradiation produce developmental abnormalities. They might do so and this could be used as an argument to justify the proposals advanced by Professor Ardran and Dr. Kemp.—I am, etc.,

P. R. J. BURCH

The General Infirmary,
Leeds

- 1 Bross, I. D. J., and Natarajan, N., *New England Journal of Medicine*, 1972, 287, 107.
- 2 MacMahon, B., *New England Journal of Medicine*, 1972, 287, 144.
- 3 United Nations Scientific Committee. *Ionizing Radiation, Levels and Effects*, Vol. II, p. 428, New York, United Nations, 1972.
- 4 Upton, A. C., *Radiation Injury*, Chicago and London, University of Chicago Press, 1969.
- 5 Rugh, R., *Radiology*, 1971, 99, 433.
- 6 Miller, R. W., *Pediatrics*, 1956, 18, 1.

Infectious Mononucleosis and Depression of Cellular Immunity

SIR,—We wish to present evidence of depressed cellular immunity, as measured by the tuberculin skin reaction, in 17 patients admitted to hospital with infectious mononucleosis in whom the diagnosis had been confirmed haematologically or antigenically, or both. All but one patient had received antibiotics before admission. All patients had been B.C.G.-vaccinated before they were 1 year old and in 14 the results of earlier tuberculin tests were known (see Table). The date of onset of the disease varied from 5 to 20 days before admission and the duration of fever varied from 9 to 24 days.

On admission each patient was injected intradermally on the dorsal surface of the forearm with 2 tuberculin units (TU) of purified protein derivative (P.P.D.). There were no skin reactions in any patient at 72 hours. The P.P.D. test (2 TU) was repeated in 10 of the patients at different times after recovery from infectious mononucleosis. The time after recovery when the test was made in each case and the reaction are given in the Table. Patient 9, who was non-reactive three weeks after recovery, had had only a weakly positive reaction to 2 and 5 TU of P.P.D. 28 and 35 days before the onset of infectious mononucleosis. He had therefore been revaccinated 13 days before his illness. Patient 10 was non-reactive to 2 and 5 TU of P.P.D. four months after recovery and was therefore revaccinated.

Transient depression of the tuberculin reaction has been noted in measles¹ and with viral vaccines.² During the acute stage of *Mycoplasma pneumoniae* infection the P.P.D. skin reaction is also negative (G. Sterner, personal communication). Prolonged depression of the tuberculin reaction has been noted in some diseases of unknown aetiology—for example, sarcoidosis—in which raised E.B.V. titres have been reported^{3,4} and in Hodgkin's disease. The phenomenon expresses a general depression or lack of immunological reactivity of the

delayed type. It seems from our findings that cellular immunity may be depressed for less than two months in infectious mononucleosis.

Thymus-derived (T) lymphocytes together with macrophages are considered the main effector cells in the delayed type of immune reaction. If we accept T-cell reactivity as initiating the P.P.D. skin reactions the findings suggest a disturbance in the function of T cells during infectious mononucleosis. Earlier in vitro studies⁵ have shown that lymphocytes could not be stimulated by phytohaemagglutinin (PHA), which is considered to be a T-cell stimulator. Taken together, these findings suggest either that T cells are not present in peripheral blood or that they are present but functionally defective, possibly owing to alteration by the virus. On the other hand, the function of bone-marrow derived (B) lymphocytes, as judged by increased immunoglobulin levels in infectious mononucleosis⁶⁻⁸ and also in sarcoidosis,^{4,9} seems to be undisturbed despite the fact that many of the established E.B.V.-carrying cell lines contain immunoglobulin receptors,¹⁰⁻¹³ suggesting that they are B cells. Possibly, therefore, E.B.V. primarily infects both types of lymphocytes but changes, decreases, or destroys some T-cell functions while B cells are unchanged or stimulated (producing heterophile antibodies in vivo or forming cell lines in vitro).

A virus-induced T-cell defect may also account for atypical cell-mediated immune responses against infection. The miliary form of tuberculosis after measles is well known. Sarcoid reactions and sarcoidosis may also be atypical responses against several different but less deleterious antigens—for example, B.C.G. If we accept this reasoning it was perhaps unwise of us to revaccinate patient No. 10 so early as four months after infectious mononucleosis, thus introducing B.C.G. antigen. We shall follow up the two revaccinated patients to see if they develop sarcoidosis in the future.—We are, etc.,

K. LANTORP

Danderyd Hospital

B. WAHREN

State Bacteriological Laboratory

Å. HANNGREN

Karolinska Hospital,
Stockholm, Sweden

¹ Bentzon, J. W., *Tubercle*, 1953, 34, 34.

² Brody, J. A., Overfield, T., and Hammes, L. M., *New England Journal of Medicine*, 1964, 271, 1294.

³ Hirshaut, Y., et al., *New England Journal of Medicine*, 1970, 283, 502.

Patient	Age (Years)	Atypical Cells (%)	Heterophile Antibody	Tuberculin Skin Reaction					
				Before I.M.		During I.M.	After I.M.		
				Time Before	Re-action		Time After	Re-action	Size (mm)
1	14	20	+	1 year	+	—	18 months	+	7 × 8
2	15	23	+	2 years	+	—	18 months	+	4 × 5
3	9	7	—	2 years	+	—	19 months	+	12 × 15
4	2	15	—	1 year	+	—	16 months	+	Jelly
5	17	6	+	Not known	+	—	16 months	+	17 × 25
6	17	16	+	3, 7, 10 years	+	—	2 months	+	8 × 8
7	16	38	—	6, 9 years	+	—	2 months	+	8 × 10
8	18	31	+	2 years	+	—	2 months	+	20 × 15
9	16	18	—	2, 3, 11 years	+	—	2 months	+	
10	16	16	+	28, 35 days	+	—	3 weeks	—	
11	16	26	+	6, 9 years	+	—	4 months	—	
12	10	0	+	Not known	+	—			
13	17	17	+	" "	Not known	—			
14	2	34	+	" "	Not known	—			
15	19	19	+	" "	+	—			
16	29	52	+	" "	+	—			
17	8	23	—	" "	Not known	—			