carrying human malignancy, nasopharyngeal carcinoma (NPC). This tumour is notorious for its dense lymphocytic infiltration. Since only B lymphocytes were found to carry the viral genome in previous studies *in vitro*, it has been widely assumed that it is the lymphocytes that carry EBV in NPC. H. Zur Hausen's (University of Erlangen) *in situ* hybridisation data suggest, however, that the genome is associated with the epithelial cells. Nucleic acid hybridisation data on separated epithelial and lymphoid cells corroborated this conclusion. Klein, Giovanella and Lindahl showed, furthermore, that biopsy derived, nude mouse passaged NPC lines lost the human lymphocytes but maintained the viral genome. The EBNA antigen was also present, clearly localised in the large carcinoma cells. These surprising findings will obviously reopen the whole question of the part played by EBV in the aetiology of NPC. All available studies concur in suggesting that the genome is associated with the anaplastic or poorly differentiated NPC, but not with well differentiated squamous cell carcinomas at the same or other sites. This raises important questions about the susceptibility of the normal epithelial progenitor to EBV infection and about the part played by the virus in the genesis of the tumour.

In Burkitt's lymphoma, the striking time–space clustering of the disease in the high endemic areas gives clear evidence for environmental factors. In NPC, genetic factors may be more important. It is the most common tumour in certain ethnic groups of Chinese men but is very infrequent in Western populations. In Macao and in Thailand, intermediate incidences were reported for the offspring from intermarriages between the Chinese and non-Chinese populations. In Nürnberg, Simmons presented some new evidence suggesting that NPC patients differ from controls with regard to their HL-A constitution, in line with a postulated genetic risk.

Transformation *in vitro*

In the area of EBV-induced transformation *in vitro*, there is now firm evidence that different virus strains can differ in their biological characteristics. Y. Hinuma (Kumamoto University) reported differences in the growth, morphological and marker characteristics between lines transformed by the B95-8 and WIL strains. It was not clear whether the differences were determined by the resident viral genomes or reflected a slight difference in the affinity of the two virus strains for different types of lymphoid target cells. Independent comparisons by Menezes (University of Montreal), by Miller (Yale University) and by Klein *et al.* showed differences between the P3HR-1 and the B95-8 virus strains. The strains both induce EBNA in comparable numbers of cells, but the unique P3HR-1 virus is unable to transform cord blood or BJAB cells, instead inducing an abortive viral cycle leading to the appearance of early antigen and to irreversible cell damage. In contrast, B95-8 virus has a regularly high transforming activity but fails to induce early antigen. This might suggest that the P3HR-1 line releases a non-transforming mutant virus, but E. Kieff (University of Chicago) reported that it has about 15% more DNA than B95-8 virus.

This has led to an interesting discussion between the herpes simplex workers, E. Kieff and B. Roizman (University of Chicago) in particular, and the EBV workers. Which is the wild type virus and which is defective? Looking at it from the lytic herpesvirus field, the transforming virus tends to be regarded as defective. But 'wild' EB virus recovered from the throat washings of IM patients has excellent transforming ability. It is clear, moreover, that the P3HR-1 virus does not induce a full lytic cycle in either the cord blood cell or the BJAB target, only short, abortive and suicidal stretches. It is also puzzling that the difference between the two virus strains is only apparent in relation to these target cells while in their own home strain both viruses seem to behave similarly. Both the B958 and the P3HR-1 cell lines have a proliferating, non-producer stemline, with occasional activation of the cycle in comparable, small numbers of cells. This is reminiscent of the lysogenic condition. Together with other evidence, for example differences in the producer status of foetal, newborn, adult and simian lines transformed by the same virus strain, this suggests that different lymphoid cells may vary in the degree of the restrictive control they can exert on a given virus strain. On the other hand, the P3HR-1–B958 virus comparison clearly shows that different virus strains may differ in the degree to which they obey the restrictions imposed by a given host cell. Somatic cell hybridisation experiments indicate that at least two different host cell controls are involved, one influencing the EA producing part and the other the late (viral DNA and viral capsid antigen producing) part of the cycle. Dominance of the more permissive character in the somatic hybrids suggests that both controls are of a positive nature.

The state of the viral genome in the transformed cells is of considerable interest. Nonoyama (University of Chicago) has reaffirmed his previous conclusion that at least a large part of the viral genomes carried by non-producer cells exist in a free, plasmid-like form, although he could not exclude that some of the approximately 50 genomes could be covalently integrated with the host (Raji) cell genome. A. Adams Lindahl (Karolinska Institute) presented evidence for covalent integration, while she also confirmed that part of the genomes were free. The latter may be present in a circular form. Nonoyama also reported that he could reduce the multiple genome load of the Raji cell by cycloheximide

The Oklo phenomenon

from Peter J. Smith

In June 1972 a team of scientists from the French Atomic Energy Commission found that uranium samples from a mine at Oklo in the Republic of Gabon were depleted in uranium-235. In the first samples studied, the ^{235}U content was only 0.003% down from the normal average natural abundance of 0.720%; but more extensive work revealed that, in some samples, ^{235}U accounted for only 0.40% of the total. Taking into account the total mass of the Oklo deposit, this meant that about 200 kg of ^{325}U had apparently 'disappeared'—enough to produce about 10^8 megawatt-hours of energy in a nuclear power station and thus to power a moderate-size town for over 100 years.

The comparison with a power station is apt, for at a conference in Paris in September 1972 the French team proposed that the missing ^{235}U had gone to fuel a natural reactor which had operated for a period of about 500,000 years some 1,800 million years ago. At that time, the ^{235}U would have been more than four times as abundant as it is now. Neutrons produced by fission would be slowed down by environmental water, thus making them more effective in maintaining a chain reaction. Ultimately, however, the natural reactor would grind to a halt as the ^{235}U burned up and as the surrounding water evaporated.

The reactor hypothesis is still unproven. But the issue may soon be resolved, for the French AEC has decided to release some samples of the Gabon uranium and its surrounding soil to the international scientific community. Some of the material has now been received by Dr S. A. Durrani of the University of Birmingham who plans to investigate the 'Oklo phenomenon' using thermoluminescence and fission track analysis techniques developed in connection with his study of lunar samples.