This Week's Citation Classic

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Epstein M A, Achong B G & Barr Y M. Virus particles in cultured lymphoblasts from Burkitt's lymphoma. *Lancet* **1**:702-3, 1964.

This paper reported the first finding of a virus in a continuous cell line cultured from Burkitt's lymphoma. Electron microscopy of thin sections showed that a small percentage of the cells contained immature and mature virus particles with the characteristic morphology of the herpes virus group. [The *SCI*® indicates that this paper has been cited over 490 times since 1964.]

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"By the early 1960s many viruses causing tumours in animals were known, but there was no such agent with an aetiological link to human cancer A fortunate chance took me in 1961 to a talk in London by Denis Burkitt, on the African childhood tumour which now bears his name — Burkitt's lymphoma (BL). For the first time outside Africa, Burkitt described climatic factors determining the tumour's distribution which suggested that it might be caused by a vector-borne virus.

"Having worked for several years with animal tumour viruses, this exciting possibility led me immediately to the decision to investigate BL for causative viruses. Despite practical difficulties, and obstruction stemming from scientific politics, the then British Empire Cancer Campaign generously financed a trip to East Africa which ensured a supply of BL material to my laboratory at the Middlesex Hospital Medical School in London. For two years, standard virological isolation techniques and electron microscopy gave depressingly negative results. Two good things followed this period: 1) A US National Cancer Institute grant of $45,000 which allowed Yvonne Barr and Bert Achong to join me; 2) The realization that success might be achieved if BL cells could be grown *in vitro,* away from host defences so that an inapparent oncogenic virus might replicate. The prospects for establishing cells of a lymphoid tumour in culture were unpromising since this had not been accomplished with any human lymphocytic cell. Nevertheless, the first BL-derived cell line (EBI) was indeed established and when examined in the electron microscope a cell in the first grid square contained particles of obvious herpes virus morphology.

"Biological tests demonstrated that this was a new human herpes virus, and immunological and biochemical investigations confirmed this: The virus came to be known as Epstein-Barr (EB) virus after the cell line in which it was discovered.[1] At this stage, Yvonne Barr married an Australian and left to bring up a family outside Melbourne; Bert Achong still works with me.

"An immense body of information has now been accumulated on EB virus by many laboratories. !n man the virus gives widespread inapparent infections, is also the cause of infectious mononucleosis, and has an astonishing association with two human cancers — nasopharyngeal carcinoma, as well as BL. Thus 14 years after its discovery EB virus, found by electron microscopy and at such small initial financial cost, has come to be the only convincing candidate for a human cancer virus, and work on it and the type of cell culture in which it was found has led in addition to great progress in many different disciplines. It is doubtless for these reasons that the paper describing the original finding of EB virus has been cited so frequently."

Reference

1. **Epstein M A, Henle G, Achong B G & Barr Y M.** Morphological and biological studies on a virus in cultured lymphoblasts from Burkitt's lymphoma. *J. Exper. Med.* **121:**761-70, 1965.