Origins of HTLV-4

SIR—The recent report[1] of the remarkable genetic similarity of human T-lymphotropic virus type-4 (HTLV-4) with certain simian immunodeficiency virus (SIV) isolates from both macaques and African green monkeys (AGMs) and the accompanying editorial[2] discussing the possibility of laboratory-acquired contamination have prompted us to outline a chronology of events as they bear on this discussion.

SIV was first isolated from macaques by us at the New England Regional Primate Research Center[3]. The first three isolates, termed 251, 220 and 239, were obtained in September and October 1984. Once it was confirmed by electron miscroscopy at the centre that these T-cell tropic virus isolates were retroviruses with lentivirus morphology (like HIV), we gave SIV-producing HUT-78 cell cultures to Drs Kanki and Essex at the Harvard School of Public Health in November–December 1984 for antigenic protein analysis. The 251 isolate was the prototype primarily used in these early studies[4]. The description of SIV-reacting antibodies in AGMs[5] and humans in West Africa[6] followed the initial isolation and characterization of macaque-SIV and led to reports of isolation of immunodeficiency viruses from AGMs[7] and West Africans[6] by the Essex laboratory. At the time the macaque-SIV producing cultures were given to Kanki and Essex, they were the only cultures in our laboratory producing monkey or human AIDS virus and were unquestionably derived from infected macaques.

The limited strain variability (0–3 restriction site polymorphisms out of 20 sites) in the four macaque-SIV isolates from our centre that we have examined to date (251, 239, 157 and 142) is not surprising. Certainly 251 and 239 should be similar as animal 239 was inoculated with infected material originating from the 251 animal[3]. Furthermore, SIV from the 157 animal was transmitted *in utero* to her offspring 142. All of our isolates have been obtained from a closed colony of macaques where infection is quite rare; only 3 of 848 macaques in our 1986 survey were SIV seropositive. It thus seems likely that a single strain of SIV introduced into our colony eight or more years ago has spread to different animals in the colony.

But remarkably isolates obtained from Central African green monkeys[7] and West African humans[6] in a single laboratory at the Harvard School of Public Health turn out to be 99 per cent homologous with the macaque-SIV isolate being carried in the same laboratory. Our analyses, similar to those reported by Kornfeld *et al.*[1], indicate that the macaque SIV prototype strain 251 is identical at greater than 20 restriction endonuclease sites with the maps now published for SIV-AGM[8] and HTLV-4[1]. It has been suggested that resolution of the problem regarding the authenticity of the SIV-AGM and HTLV-4 isolates "will probably require the isolation under stringent conditions of further examples of the viruses"[2]. It appears, however, that a considerable number of such isolates have already been compared. Kornfeld *et al.*[1] report that six AGM isolates and two HTLV-4 isolates from the Essex laboratory "were identical at 32 sites"; SIV isolates from a sooty mangabey and from a macaque at the California and Delta Regional Primate Research Centers showed considerable variation between each other and with the isolates in question. We have analysed a mangabey-SIV obtained by P. Fultz at yet another primate research centre[9] that had been passed in our laboratory for over a year and it too showed considerable differences. HIV-2 isolates obtained by the French from humans in West Africa have also shown considerable variation when compared among themselves and with the other isolates in question[10].

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Is aluminium leaching enhanced by fluoride?

SIR—Tennakone and Wickramanayake[1] have described a 1,000-fold enhancement of aluminium leaching from cooking utensils when 1 p.p.m. fluoride is present in the cooking water. This observation is of considerable concern to both proponents and opponents of water fluoridation, especially because the question of neurotoxicity of ingested aluminium in individuals with normal renal function is unresolved. The data on the amount of aluminium leached are in fact so surprising that we have repeated the experiments described by Tennakone and Wickramanayake[1]. We obtained 15 aluminium pans of different sizes, 12 of which had experienced considerable use and 3 were new. All were cleaned scrupulously before use in the leaching experiments.

We followed the experimental protocol of Tennakone and Wickramanayake[1]. We boiled 450 ml of a solution of citric acid in reverse-osmosis (RO)-treated water (2.0 mM, *p*H 3.10) for 10 min and repeated the study using the same solution containing sodium fluoride (0.024 mM, 1 p.p.m.). We continued to follow the original protocol[1] by boiling crushed fresh tomatoes (50 g in 250 ml of RO water) also in the presence and absence of sodium fluoride (0.024 mM). All solutions were analysed for aluminium content using electrothermal atomic absorption spectrometry with Zeeman background correction using a Perkin-Elmer model 5100 instrument. The method was that described earlier by us[2] and used aqueous aluminium salt solutions prepared from material certified by the National Bureau of Standards (SRM 2127-1) for calibration. The validity of the analytical method has been verified by recovery, linearity and interference studies, as well as by interlaboratory proficiency test surveys.

The result of the studies are given in the table. The citric acid solutions, before they were boiled in the aluminium pans, had an aluminium concentration of 0.081 mM without fluoride and 0.107 mM with fluoride. The solutions containing the crushed fresh tomatoes had aluminium concentrations of 0.355 mM and 0.215 mM without and with 0.024 mM sodium fluoride, respectively. The *p*H of these crushed tomatoes in water ranged from 4.43 to 4.49.

Our studies demonstrate minimal enhancement by fluoride of aluminium leaching from aluminium cooking utensils. We postulate three possible reasons for the discrepancy between our findings and those of Tennakone and Wickram-

Aluminium leaching data

	Aluminium leached without fluoride (mg)	Aluminium leached with fluoride (mg)	Ratio of aluminium leached + NaF/− NaF
	Mean ± s.d.	Mean ± s.d.	Mean ± s.d.
Citric acid solution	7.08 ± 5.11	8.19 ± 5.51	1.29 ± 0.53
Crushed tomatoes	0.98 ± 0.58	0.69 ± 0.41	0.77 ± 0.29