Letters

Gene Transfer Between Eukaryotes

In Roger Lewin's article "Can genes jump between eukaryotic species?" (Research News, 2 July, p. 42), mention is made of several recent examples of movement of genetic elements between eukaryotic species, with special emphasis on a family of histone genes in sea urchins (*1*). Max Birnstiel and his colleagues postulate that a viral vector might be a mechanism for this transfer.

The transfer of genes between eukaryotic species is a well-documented phenomenon among endogenous retroviruses. Retroviral genes can be transferred under natural conditions between distantly related mammals, incorporated into their germ lines, and be subsequently inherited as cellular genes. The first example showed that the baboon type C viruses, which are genetically transmitted in primates, are closely related by nucleic acid sequence homology to a group of genetically transmitted type C viruses of the domestic cat and five closely related feline species from the Mediterranean Basin. *Felis* species from Southeast Asia and the New World, as well as the larger African cats, lack these viral sequences. Since the gene sequences were found in the cell DNA of all Old World monkeys but only in a few cat species, it was concluded that ancestors of the domestic cat had acquired the primate viral genes before the divergence of these closely related cat species (up to 10 million years ago) (*2*). These viruses were incorporated into the germ lines of cats, where they are present in 10 to 50 copies per haploid genome, and are inherited in the same Mendelian fashion as other cellular genes.

Several additional examples of interspecies gene transmission have subsequently been described. The other retrovirus of cats, feline leukemia virus, was also acquired, most likely from ancestors of the Old World rat (*3*). Domestic pigs and their feral relatives the bush pig and warthog have also acquired their genetically transmitted viruses from rodent endogenous viruses. Hybridization data suggest that the virus-related sequences in the pig were acquired from members of the family *Muridae* after the mouse had separated from the rat but before speciation of surviving mice had occurred (*4*). In addition, retroviral genes have also been shown to have been transferred between a New World primate (squirrel monkey) and a New World carnivore (ancestor of the skunk) (*5*). All of these transferred viral genes are now an integral part of the new host species genome and are present as moderately repetitive genes.

The RNA tumor viruses are the only group of viruses that have been shown to transfer genes among the germ lines of different mammalian species under natural conditions. These viruses are uniquely suited for this role because they must integrate into the cellular DNA in order to replicate, but they do not kill the cells that they infect. When integrated, retroviruses form a segment of DNA flanked by 0.6 kilobase direct repeats and thus resemble the structure of the moderately repetitive transposable elements Ty1 and copia described in yeast and *Drosophila*, respectively (*6*). While moving from cell to cell, retroviruses may carry with them other host cell genes and thus serve to maintain a species in contact with its ecologic as well as genetic neighbors. These viruses and other extrachromosomal elements (*7*) may provide some of the genetic plasticity that is being increasingly revealed among eukaryotes.

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Arrests in Afghanistan

As individuals whose professional lives depend upon academic freedom, we wish to register our anger and concern about the recent reports of arrests of many of our academic colleagues at the University of Kabul, Afghanistan.

According to information published here (*1*), this April eight university professors were arrested and their books and research papers confiscated because they had passively resisted the imposition of political and curriculum dictates in their work. Among those imprisoned were Hasan Kakar, a well-known historian who had published widely in Pashto, Dari, and English and who had received his doctorate in England; Fazl-e Rabi Pazhwak, once the rector of Kabul University and a political scientist who was educated in Germany; and Baryalai Tarzi, a prominent member of the Law Faculty who was educated in France. The British Embassy in Kabul, as well as the Afghan Information Service and the U.S. International Communication Agency in Peshawar, have all confirmed that these arrests have taken place and that these men have not yet been released. Unlike the situation in Poland, it has proved very difficult to obtain information from Afghan authorities concerning these reports. The chargé d'affaires at the Afghan Embassy in Washington has stated that these reports are mere propaganda and that no professors at Kabul University have been arrested in the last 2½ years. According to this official, one of those reported arrested, Kakar, was residing in the United States 4 months ago. If this is or was the case, Kakar has not made himself known to his friends and colleagues here.

The brutalities of the prior Taraki-Amin regime (April 1978 to December 1979) (*2*), which eliminated an estimated minimum of 12,000 people, have been well documented by sources with diverse political philosophies (*3*). Although these purges reached into the poorest strata of society, they fell most heavily on the educated and literate, a group which comprised less than 10 percent of a population of 15 million. Among thousands still unaccounted for are such well-known figures as Quasim Saberi, a surgeon who performed the first heart operation in Afghanistan, and Akram Parwanta, an extremely talented engineer. When the present regime took over in December 1979, it was the hope and expectation of many that such violations of human rights would end. It has not been encouraging to learn of these new arrests among an already decimated