CORRESPONDENCE

Data bank

SIR — The news item "Nucleotide sequences: Too many banks" (*Nature* 15 January, p.112) implied that we do not yet have a nucleic acid sequence data bank: in fact our data base system contains the largest collection of nucleotide sequences in the world, updated on a regular basis and accessed through a sophisticated computer retrieval system.

The data bank was first made available to the scientific community by telephone link to our computer on 15 September 1980, when the information base contained over 227,000 residues of DNA and RNA sequences published before 1 August 1980. During a three month demonstration project, the collection was updated monthly with material published mainly between August and October. The final total on 12 December 1980 was 350,000 residues.

We are continuing to update the data base and to make it available on a subscription basis. We are now processing more than 40,000 residues a month, and a book is being prepared which will include the information in the collection and describe the retrieval system and its uses.

The data bank is supported by the Institute for General Medical Science of the US National Institutes of Health, the National Aeronautics and Space Administration, and contributions and subscriptions from foundations and industrial concerns. The expense involved in maintaining a complete, critically reviewed and up-to-date data base is too great for it to be operated on a voluntary basis, so other means of support must be sought. Our data base is available on a subscription basis (for the use of the subscriber in his own institution, not for redistribution). The collection will be made available on this basis to the European Molecular Biology Organization for use at Heidelberg, under the direction of Dr Greg Hamm, so that the interests of the European non-commercial research community can be considered.

The cost of such a data base is usually justified by the resulting benefit to a research area. If all those organizations that could benefit from a nucleotide sequence data base were to contribute some support, there would be sufficient money to establish a continuing project.

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Antipodean 2,4,5-T

SIR — There is continuing concern in Australia regarding the possible deleterious effects of the herbicide 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) on animal life, especially human beings. The question of a link between 2,4,5-T usage and congenital abnormalities has been raised on several occasions[1-3]. Concerns of this nature were major reasons for withdrawing 2,4,5-T-based defoliants (such as Agent Orange) from use in the Vietnam war during the early 1970s. Many batches of defoliant contained high quantities of the extremely toxic contaminant 2,3,7,8-tetrachloro-cyclodibenzo-*p*-dioxin, suspected of being a teratogen. International sale of the unused defoliant was apparently considered by the US government[4] and some of this defoliant may have been imported into Australia[5].

On 18 August 1971 the Australian government initiated enquiries under the provisions of the Customs Tariff (Dumping and Subsidies) Act regarding the importation of "salts of 2,4,5-trichlorophenol". Two years later, dumping duties were imposed on goods based on the esters and salts of 2,4,5-T, *retrospective* to 4 January 1971. It seems likely that large quantities of such goods were bought very cheaply overseas and sold on the Australian market in the late 1960s or early 1970s.

The chemicals 2,4,5-T and 2,4-dichloro-phenoxyacetic acid which make up the defoliant Agent Orange would normally be classified as pesticides in trade statistics. However, they could be given a chemical classification and assigned the 1972–3 SITC code number 512.28.09 ("other phenol derivatives, halogenated etc."). In the financial years 1969–70 and 1970–71 over 300 tonnes of chemicals with this SITC code are recorded in Australian trade statistics as imports from Singapore (the "country of production"). None of this material is listed as an export or re-export of Singapore in that country's *External Trade Statistics,* and there have been no subsequent imports from Singapore. (A small import from Singapore is recorded in 1968–69, but there is nothing before this.) The Australian Bureau of Customs has declined to be of any assistance in determining the true nature or origins of these goods.

With the help of the Australian Bureau of Statistics we have ascertained that in 1970–71, 290,000 lb of these imports entered Australia through Queensland, and another 22,400 lb through Western Australia. The *Australian Chemicals Guide (Industry Study)* shows a very limited number of companies involved in the processing of halogenated phenols. With the assistance of the *Guide* and the reference *Who owns Whom* it is possible to obtain a very short list of potential importers.

The Australian government has access to the records which would permit a thorough investigation of this matter. The results of such as investigation could have a vital influence on a multi-million dollar epidemiological study at present being undertaken by the Australian government on the effects of defoliants on Vietnam veterans. The study envisages a comparison of veterans exposed to defoliants with those "unexposed" veterans who did not serve in Vietnam.

Further details of this matter appear in a forthcoming paper[6].

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Cell contamination

SIR — The editorial, "Responsibility for trust in research" (*Nature* 22 January 1981, p.211) was excellent. Our group sends various human cell lines to laboratories all over the world. We caution scientists about the dangers of cell–cell contamination and if we read an article with strange conclusions that involved one of our many hundreds of cell lines, we offer to re-authenticate its identity without cost. Often the cell line in question has been passed from one laboratory to another. We have been discouraged to detect publications in which the scientists have continued to use a contaminated cell line even after the error has been pointed out to them. Biochemists in particular seem loath to seek biological advice. One chemist replied that the kind of cells that he used wasn't really important.

Actually there are other serious contaminations which affect research with cells. Most cell lines are cultured in media supplemented with antibiotics and often the cultures are contaminated with slow-growing bacteria and mycoplasma. It is difficult to detect minimal numbers of these organisms. Electron microscopy of a pellet of centrifuged media may reveal them.

We do not agree that the responsibility for monitoring the validity of research rests with the department head. Departments are too complex and even the division heads may not have the competence to evaluate a specific "bench" operation. The scientist himself and his associates in a "specialty" must exert the self discipline of avoiding, acknowledging and correcting errors.

As the use of enzyme profiles and new techniques of cytogenetics and the detection of "specific" antigens and cell products evolve, it will be easier to detect cell–cell contamination — perhaps even hybridization. Our methods for authenticating cells are still relatively primitive. The establishment of authorities to referee cell–cell contamination is premature. The donor and recipient of a cell line share the responsibility of the authenticity of the cell line.

Identification of a cell line should include: (1) data about the original collection of tissue and pathological diagnosis, (2) serial numerical records of all subcultures, (3) electron microscopy — preferably of both the tissue of origin and the cultured cells, using special stains if critical, (4) isoenzyme profiles, (5) karyotype analysis of chromosome morphology after banding, (6) cell products, (7) studies of growth in immunosuppressed animals such as nude mice, and (8) growth characteristics in various media.

The errors associated with cell lines have probably had an infinitesimal effect on the fabric of scientific progress in comparison with other ridiculous and shameful pronouncements. For example, governmental carcinogens, the clinical effectiveness of interferon, and numberless epidemiological studies such as telephone surveys of complex disease states.

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