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Icelandic Health Records

Recent News of the Week articles by Martin Enserink (14 Aug., p. 890 and 30 Oct., p. 859) and an editorial by Henry T. Greely (*Science*'s Compass, 23 Oct., p. 625) clearly describe the discord over plans by the government of Iceland to create a central health record database and give a private company, deCODE Genetics, exclusive rights to analyze and market the data.

It needs to be emphasized that the proposed bill allows deCODE to bypass review by human subjects committees and seeks to strip patients of rights that are considered fundamental in Westernized societies.

First, while the bill provides an "opt-out" clause, no informed consent will be obtained from individuals whose data will be included in this database that targets insurance companies and HMOs as prospective buyers.

Second, and even more troublesome, is a provision in the bill that would give deCODE exclusive rights to market the data for 12 years, preventing patients from participating in studies and databases that might be created in the future by competing entities. Thus, this provision limits a patient's ability to use health records, including genetic information, even when the patient's intent may be to seek understanding and solution of their affliction. Furthermore, such legalized monopoly of genetic research threatens academic freedom in Iceland.

The Icelandic government, which is skilled at managing fisheries, seems to be inclined to treat our health records and genetic information like a seafood product. Although similar plans would not be taken seriously in other Western cultures, the proposed bill could motivate others to encroach on academic freedom and to trample on a patient's rights for monetary gain in different parts of the world. Therefore, it is of paramount importance that leaders in the international scientific community, especially those concerned about ethical aspects of genetic research, join patient advocates, physicians, and scientists in Iceland in condemning these plans.

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Protein Data Bank Deposits

Since the Protein Data Bank (PDB) inaugurated the "Layered Release Protocol" on 9 July 1998 (F. E. Bloom, "Policy Change," *Science*'s Compass, 10 July, p. 175) (www.pdb.bnl.gov/ and www2.ebi.ac.uk/pdb), results have exceeded our highest expectations. Specifically, since July we have received 931 new entries, of which 813 were submitted by means of our latest data deposition software (AutoDep 2.1), which allows for "release on publication." For less than 22% of these, "on-hold" is requested, and the rest have been either immediately released or held until publication (see table above for details). This is in sharp contrast to the situation just a year ago, when more than 75% of new entries were requested to be put "on-hold" for 1 year.

AUTODEP 2.1 ENTRIES (FROM 9 JULY 1998 TO 28 NOVEMBER 1998)

Category	No.	%
Request immediate release	245	30.1
Waiting for publication	393	48.3
Request on-hold	175	21.5

This is an enormous tribute to the journals that have set the new policy requiring "Release on Publication," as well as to the PDB, which instituted the "Layered Release Protocol," making it possible to access data concurrently with publication.

It is clear that there has been a profound change in the attitude of the vast majority of experimental crystallographers and nuclear magnetic resonance spectroscopists toward releasing their data either immediately or at the time of publication. This is an exciting development for structural biology that will have a positive impact on other scientific disciplines, industrial research, and education.

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The Handy-Dandy Kitchen Device

In gray tree frogs, the duration of males' mating calls is correlated with enhanced genetic fitness among offspring (A. M. Welch *et al.*, Reports, 19 June, p. 1928). Perhaps the same genes that enable some frogs to sustain longer calls also confer a survival advantage to their young (E. Pennisi, Research News, 19 June, p. 1837). If so, this may be an example of a more general, but underappreciated, evolutionary process, in which fitness is increased through the combined effect of multiple inherited characteristics. In the case of gray tree frogs, a characteristic with little if any apparent adaptive significance (longer calls) may be associated with oth-

er traits that improve overall fitness by a possible instance of genetic covariation.

But covariation is not the only genetic mechanism that can lead to the evolutionary preservation of seemingly maladaptive or nonoptimal traits. For example, a particular trait (or associated genes) may serve multiple functions and may maximize overall fitness without maximizing fitness on any single function. We refer to this as the "Handy-Dandy" evolutionary mechanism, by analogy to the celebrated Handy-Dandy kitchen device, without which no kitchen is complete. The Handy-Dandy slices, dices, and peels, plus opens cans and bottles. It thus performs multiple functions, although none, one might argue, especially well. The value of the device lies in the combined utility of its various functions. So long as this utility is sufficiently great, the device remains useful, even if it loses some of its original functions (for example, in time, the can-opener might break).

Similarly, a trait that subserves multiple functions need not be optimal on any one function to permit the trait to persist in the face of natural selection pressures. Indeed, it might serve some functions quite poorly, with a negligible or even adverse effect on reproductive fitness. Long mating calls, which appear to be of limited survival value, may represent but one of several Handy-Dandy functions that combine to enhance overall fitness. The solution to many evolutionary anomalies requires acknowledging the complexities of genetic interactions. The Handy-Dandy model provides an intuitive framework for examining the nature of such interactions.

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Response

We agree with Abramson and Pinkerton's assessment of the evolutionary implications of a common genetic basis for distinct traits or of a single trait with multiple "functions." Nonetheless, their "Handy-Dandy" evolutionary mechanism is, in our opinion, just a new label for the venerable concepts of indirect selection and trade-offs among fitness components. When traits are genetically correlated by means of pleiotropy (a common genetic basis) or linkage disequilibrium (nonindependence of loci within a genome or population), selection acting directly on one trait will also act indirectly on the correlated trait (*1*). Thus, a trait can evolve or be maintained in a population not because it is valuable in itself, but because of its genetic association with a beneficial trait.

Furthermore, fitness—the ultimate target of selection—has many components, including growth, survival, and reproduction. A single trait may have opposite effects on different fitness components, so that optimizing total fitness is unlikely to maximize any one component of fitness [see (2) for a review].

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Proprioception and the McGurk Effect

The report "Sensorimotor adaptation in speech production" by J. F. Houde and M. I. Jordan (20 Feb., p. 1213) demonstrates