

# Getting personal

The commercialization of personal genomics is moving with dizzying speed and scientists need to find innovative ways of discussing the implications with consumers.

As the first conference on personal genomes opened earlier this month at Cold Spring Harbor Laboratory in New York, some present were wondering whether the event was a little premature. After all, only four people's genomes have so far been fully sequenced and assembled, and it's still quite difficult to interpret the genetic variation found in them (see page 1014). But the participants soon began to realize that, in one sense, the meeting was overdue. Increasingly, private companies are offering personal genome scans and genetic tests for sale — and consumers are buying them. Meanwhile, some scientists earlier this week made public parts of their genetic and medical data through the Personal Genome Project, spearheaded by George Church, a geneticist at Harvard University. In this context, the ethical, legal and social issues usually sidelined at such gatherings kept intruding with uncommon urgency.

The day before the meeting began, for instance, deCODE Genetics of Reykjavik, Iceland, began selling a US\$1,625 risk-assessment test for breast cancer, which surveys seven of the single-point genetic variations known as single nucleotide polymorphisms (SNPs). The company says that the test will help identify women with a significantly elevated risk of the disease.

But the test is worrying some oncologists and geneticists. Mary-Claire King of the University of Washington in Seattle told the meeting that the SNPs included in the test are present at slightly different background frequencies in different populations across Europe. She raised the possibility that rather than predicting breast-cancer risk, the test might instead be detecting population differences between the control and test groups included in the studies that linked the SNPs to disease.

Regulation of such tests is patchy at best, so women have little official

guidance when it comes to balancing the potentially confusing scientific and medical facts about a product against their fear of breast cancer. But, as *New York Times* reporter Amy Harmon told the meeting, the public desperately wants help in making such decisions.

Part of the problem is the information overload provided by the Internet. Consumers can point their browsers to a slew of content, which can come from both trusted sources and charlatans. And in the age of e-mail whisper campaigns, lies can proliferate, opinions can replace facts, and experts are no longer trusted to know the truth.

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Scientists can and should help the public sift through this information, interacting through blogs, newspaper articles or science cafes, for example. And if researchers are surprised at how quickly genome-wide association studies have become consumer products, they need to realize that things will only move faster in the future, with findings moving from the lab to Internet chat rooms and people's lives with astonishing rapidity.

The issue was articulated at the meeting by Robert Cook-Deegan, an ethicist at Duke University in Durham, North Carolina, who pointed out that scientists cannot put the genie back in the bottle. Anyone can now access his or her genome information through a personal genomics scan. And if people can get that information, they will — with or without the advice of genetic counsellors, doctors or expert scientists. It is impossible to guess what issues this will raise as the science matures, although new discoveries will no doubt trigger a fresh and more complicated set of societal discussions. Scientists need to get creative about how they participate in these discussions, because they won't have the luxury of opting out. ■

## A look within

A series of Essays examines what science has to say about being human.

Some 2,500 years ago, legend has it, visitors to the Oracle at Delphi in Ancient Greece had to pass by an inscription bearing the words *gnothi seauton* — know thyself.

That advice is as wise today as it was then — and as hard to follow. Modern science can help, but using it to uncover truths about ourselves can also be fraught with difficulty. Consider, for example, that an important first step towards understanding contemporary human behaviour — establishing the evolutionary context in which it emerged — means piecing together odd scraps of evidence left by our hunter-gatherer ancestors tens of thousands of years ago. The paucity of data makes it all too easy to come up with untested,

and even untestable, Darwinian versions of Rudyard Kipling's *Just So Stories*.

Another major challenge for researchers is being objective about a topic as philosophically, politically and ethically charged as human nature. Take the sociobiology wars of the 1970s and 1980s. Left-wing scholars rejected biological explanations for phenomena such as gender roles, religion, homosexuality and xenophobia, largely because they feared such explanations would be used to justify a continuation of existing inequalities on genetic grounds. The resulting debates became hugely political.

The combustibility of the interface between science and society is one major reason for the extraordinary fragmentation of research that tackles human behaviour. In part because of the sociobiology battle, most social scientists still steer clear of using evolutionary hypotheses. And even researchers who do work under the unifying framework of evolution tend to fall into distinct camps such as gene-culture co-evolution or human behavioural ecology — their practitioners

divided by differences of opinion on, say, the relative importance of culture versus genes.

Given that humans are such a complicated species, it is no surprise that researchers from fields such as economics, political science, anthropology and biology are driven to pursue similar questions using their own distinct tools and approaches. But the lack of cross-talk between disciplines and subdisciplines means that efforts are too often duplicated, and opportunities to exchange insights lost. Much of the ethnographic data on hunter-gatherers collected by anthropologists, for instance, are largely unknown to modellers interested in the emergence of particular human traits. Similarly, evolutionary biologists constantly accuse social scientists of either ignoring evolution or invoking outdated versions of evolutionary theory.

It doesn't have to be this way. In other domains, such as the study of complex systems, scientists from biological, physical and social sciences are increasingly sharing information. Now is a particularly opportune moment for those studying human behaviour to follow suit. Genomics is beginning to provide a window onto many thousands of years of human history. Advances in mathematical analyses have greatly clarified our picture of the evolutionary process. And, because of the rapid assimilation of nomadic hunter-gatherer populations into modern societies, researchers have collected

most of the ethnographic data on these groups they are ever likely to obtain.

In the spirit of fostering dialogue between disparate fields of research, *Nature* has commissioned a series of Essays that asks how discoveries in psychology, anthropology, genetics, neuroscience, game theory and network engineering are altering our understanding of particular human characteristics, or of issues that are central to human life. Starting this week with religion (see page 1038), and appearing every two weeks for the next five months, these Essays move from human prehistory to look at how we operate within self-made highly interconnected cities and communication networks.

Cumulatively, the series indicates that the interface between science and society is no less thorny now than it's ever been; revelations about our appetite for warfare in an Essay on conflict, for example, will make for uncomfortable reading. But overall, practitioners from diverse areas of research deliver an optimistic message about how we may learn to manage ourselves more effectively as a result of knowing ourselves better. ■

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## Fair trade?

Europe needs to find a responsible way out of its climate-regulation impasse.

Is the worst financial storm in nearly 80 years having a deleterious effect on climate policy? It seemed that way last week, when European Union (EU) leaders failed to agree on a new set of market-based tools to cut the bloc's greenhouse-gas emissions by at least 20% from 1990 levels by 2020. Proponents could not overcome resistance from a group of countries, led by Poland, that argued that the plan would harm their national economies — an argument apparently given extra weight by the near-collapse of worldwide financial markets and the prospect of a deep economic downturn.

At issue was a set of amendments to the EU's mandatory carbon emissions trading system. In the first phase of this scheme, implemented in 2005, emissions allowances were given to industry for free — and, in retrospect, in far too great an abundance. The resulting oversupply led to a very low price, and a corresponding failure to deliver the desired emissions reductions. The proposed amendments would require large facilities to bid for 100% of their emissions allowances at auction.

Countries such as Poland, whose industries and energy systems are heavily based on coal, worry that this would put them at a serious competitive disadvantage. The proposed reforms do require nations such as Britain and Germany to contribute substantially more to the overall reduction target than economically less powerful countries. Nonetheless, Poland has threatened to block the amendments unless its energy-intensive heavy industries, such as cement and steel, can continue to use the free allowances.

The French government, which currently holds the EU presidency, is trying to broker a compromise before its term expires at the end of the year. But meeting that deadline will be difficult. Some concessions to eastern member countries may be inevitable, and even justifiable. Their overall emissions are comparatively low, so the system as a whole would not be greatly compromised by a temporary respite. But for the scheme to work in the long run, special provisions must be limited to industry sectors that would otherwise face intolerable competitive disadvantages. Moreover, those sectors should be identified by a thorough, data-driven analysis of their competitive situation, energy intensity and emissions-reduction potential — not on the basis of which country has the most political clout. And, perhaps most importantly, free allowances must be granted for only a limited time, and their allocation phased out quickly. Otherwise the worst polluters could be granted a free pass indefinitely.

Striking the right deal may take longer than the two months left to the French presidency. But a well-weighted set of rules is far preferable to a rushed political compromise that would substantially water down the EU's ambitious climate plan.

Meanwhile, the current economic turbulence cannot be allowed to serve as a pretext for lessening climate-protection efforts. And there are signs that governments are getting that message, both in Europe and elsewhere. The British commitment, announced last week, to cut domestic greenhouse-gas emissions by 80% of 1990 levels by 2050, is a courageous example. If the British plan sets the tone for the upcoming negotiations, then the EU's ambitious climate goals are not at risk, even if some eastern member states cannot quite keep pace. And if the next US administration puts into action what both leading presidential candidates are promising in terms of climate policies, this economically woeful time could mark the move into a greener future. ■