Y-chromosome analysis urged for sex crimes

Quirin Schiermeier, Munich

Forensic scientists say that methods that make use of the Y chromosome will soon provide a valuable new generation of tools for investigating sex crimes and settling paternity suits.

Its male specifity and pronounced variation make the Y chromosome a useful tool for forensic geneticists. This is particularly true in difficult cases of sexual assault where the DNA samples from offenders and victims may have been mixed in a way that makes them difficult to separate for conventional DNA analysis.

At the biannual meeting of the International Society for Forensic Genetics, held in Münster, Germany, late last month, scientists announced plans to enlarge and improve existing reference databases of Y-chromosome distributions in European and US male populations. Data from Asia and South America are also to be added to the database, they said.

Unlike the gender-independent chromosomes normally used by forensic geneticists, the Y chromosome carries mutations over many generations, providing unambiguous male lineages. To differentiate chromosomes, geneticists use haplotypes, which are chunks of DNA containing closely linked genetic variations that were inherited as a unit.

A standardized European reference database was created in 1995 by geneticists at the Institute of Legal Medicine of the Humboldt University in Berlin. It is based on a set of nine highly variable markers on the Y chromosome, and allows forensic researchers to extrapolate the frequency of a given haplotype in a sufficiently homogeneous population, such as that in much of Europe.

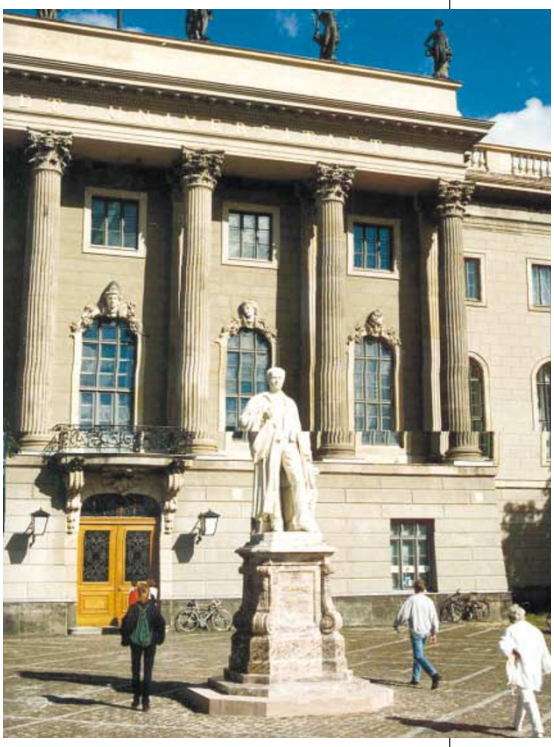
The database currently contains around 7,000 haplotypes from 51 European population samples, gathered from 40 forensic institutes across the continent.

A Y-chromosome haplotype can help to identify an offender or determine fatherhood with a probability of 99.9% or more, says Lutz Roewer, one of the database's founders. The results can be used in court as additional evidence, although they are less conclusive than conventional DNA analysis of markers on non-sex-specific chromosomes.

Y-chromosome analysis could also help to determine, or exclude, the ethnological background of male suspects — raising serious ethical and political questions about its use. As Roewer points out: "Even if forensic geneticists were at a stage to tell the police not to search for a rapist among, for example, the white European population, it would be ethically problematic."

Apart from forensic applications, scientists believe that a well-maintained and continuously growing Y-chromosome database could be valuable in many areas, such as population history, migration research and evolutionary genetics.

"The Y chromosome is extremely interesting for us because of its variability and high frequency of tolerated mutations," says Werner Schempp, an anthropologist and human geneticist at the Albert Ludwigs University in Freiburg, Germany. ■



CHARITÉ, HUMBOLDT UNIVERSITY

Humboldt University's Institute of Legal Medicine, the origin of the European Y database.

- **www.ystr.org/europe**
- **www.ystr.org/usa**

Journal boycott presses demand for free access

Jonathan Knight, San Francisco

Researchers began a boycott of scientific journals that do not allow free access to their contents on 1 September — although organizers admit that too few journals have complied for the boycott to take full effect immediately.

The organizers, members of an initiative known as the Public Library of Science (see *Nature* 410, 502; 2001), say the list of compliant journals "is not yet sufficient to accommodate all the work that we and our colleagues must publish".

In a letter to the 26,000 researchers who have pledged support on the Internet, they urged supporters not to subscribe to, publish in or review for journals — including *Nature* — that do not make their contents freely available within six months of publication on a centralized website, PubMed Central, operated by the US government. But they suggest that, if necessary, supporters should publish in journals that come closest to meeting its conditions.

At the time of the boycott deadline, 16 print journals and 60 online journals published by London-based BioMed Central met its criteria.

Print journals complying with the criteria include *Proceedings of the National Academy of Sciences* (*PNAS*), *Molecular Biology of the Cell*, *British Medical Journal*, *Bioinformatics*, *The Plant Cell* and *Breast Cancer Research*.

The letter confirms earlier reports that the organizers are trying to raise funds to start their own online journals (see *Nature* 412, 469; 2001). The journals would be produced by volunteers, and the group says their publication cost could be covered by a flat fee of about US$300 per published article.

Whether such journals will draw researchers away from mainstream journals is hard to predict, says Donald Kennedy, editor of *Science*, which makes its contents freely available on its own website after a year.

"A lot will depend on whether a large enough group of people will support it and provide all of the other things *Nature* and *Science* provide, such as commentary and news," he says.

Nicholas Cozzarelli, editor-in-chief of *PNAS*, says he strongly supports the group. "I have told them I'll be glad to pitch in, and I think you'll find they will get a tremendous number of volunteers," he says.

Jayne Marks, publishing director of the Nature Publishing Group, which does not make its full content available free, expressed confidence that its journals, which include *Nature*, would continue to receive high-quality submissions. "People judge the publication on what it publishes and the benefits it provides," she says. "We are doing a lot to enhance access to the literature through collaboration with other publishers and archives." ■