

DNA fingerprinting of birds

Sorting out who begat whom in the animal world can be a messy affair. Using genetic techniques developed in the last two decades, scientists have been able to detect differences fairly well between species and between general populations of animals, but they have had far less success in making the finer distinctions of parentage within a given population or species.

Two papers appearing in the May 14 *NATURE*, however, show that "DNA fingerprinting" — an extraordinarily sensitive genetic technique developed for humans and used in forensic identification of individuals as well as paternity and maternity questions — can home in on genetic relations among wild sparrows as well as it does for humans. And other papers in press suggest that the technique applies to cats, dogs and mice as well.

"Its use provides an excellent means for resolving relatedness in nature, and is likely to revolutionize the study of those aspects of behavior, population genetics and biometry that require a detailed demographic knowledge of populations," write Jon H. Wetton and his co-workers at Queen's Medical Centre in Nottingham, England.

In the fingerprinting technique, scientists essentially count the number of times a particular sequence of DNA base pairs (the chemical building blocks of the DNA molecule) repeats in sections of DNA (SN: 12/21&28/85, p.390). The base-pair arrangement of these sections varies so much among individuals that even close relatives can be distinguished with this technique. And since parents pass down part of their variability patterns to their offspring, parentage can also be accurately determined.

When applied to wild sparrows, the technique enabled Wetton's group and researchers at the University of Leicester in Britain to unravel family genealogies as steamy as the most risqué soap operas: They found evidence of incestuous relationships and "extramarital" affairs.

Pterosaurs waddled when they walked?

When the dinosaurs ruled the earth, pterosaurs (winged reptiles) were masters of the sky. Once envisioned as simple reptilian gliders, pterosaurs have recently been identified as warm-blooded, energetic and proficient fliers.

But while pterosaurs may have been agile in the air, David M. Unwin of Reading University in Britain concludes in the May 7 *NATURE* that, on the ground, they "could manage only a clumsy waddle" and had neither the stance nor mobile gait of fully erect birds. Consequently, he writes in *NATURE's* News and Views section, they spent most of their lives hanging from trees and cliffs.

Unwin bases this conclusion in part on two relatively uncrushed pterosaur pelvises that were discovered recently in West Germany and Australia. In these pelvises, the acetabulum, or socket into which the tip of the femur bone fits, is oriented outward and upward, suggesting that pterosaurs' legs were splayed out, giving them a clumsy, sprawling gait, writes Unwin. Had the acetabulum pointed out and down instead, the pelvises would have supported an alternative theory, held by some since the 1970s, that pterosaurs stood erect with their hind limbs beneath their bodies and were capable of agile movement on the ground.

Unwin argues that pterosaurs were probably good climbers and, like bats, probably began their evolution to flight from the trees. However, he cautions that analogies to bats, and to birds as well, should not be extended too far, since pterosaur anatomy is quite different. Pterosaurs, he writes, "appear to have solved the problems of aerial, vertebrate existence in a very different, uniquely pterosaurian way."

Pregnancy hypertension marker found

Abnormally low levels of a specific compound in the urine early in pregnancy may precede the development of pregnancy-induced hypertension — and thus serve as a possible marker for the rise in high blood pressure seen in 7 to 10 percent of pregnancies that can threaten the life of both mother and fetus. So say scientists at Vanderbilt University in Nashville, who suggest that therapy as simple as the use of aspirin may help prevent the condition in women who are at risk. Pregnancy-induced hypertension occurs most frequently in first-time teenage mothers.

During a normal pregnancy, levels of a hormone-like substance called prostacyclin are increased. Because prostacyclin dilates blood vessels and inhibits platelet aggregation, it is thought to help keep blood pressure at safe levels during pregnancy. The Nashville group previously found that the elevation of prostacyclin is accompanied by an increase in its metabolite, 2,3-dinor-6-keto-prostaglandin $F_{1\alpha}$, in the urine of pregnant women.

However, in a recent study of 67 high-risk teenage patients, the scientists discovered that the 12 women who later developed hypertension had only a twofold to threefold increase in excretion over their nonpregnant levels, compared with an eightfold increase in women with normal blood pressure and a sevenfold increase in those with chronic hypertension. The difference was apparent at fewer than 20 weeks gestation; pregnancy-induced hypertension usually appears after 22 to 24 weeks of gestation, disappearing after birth.

The study, which was reported in the May *CIRCULATION*, suggests that the determination of urinary 2,3-dinor-6-keto-prostaglandin $F_{1\alpha}$ concentrations be used to alert physicians to a pregnant patient who may develop high blood pressure.

Controversial 'blood doping' revisited

Injecting red blood cells to enhance aerobic capacity has been both accepted and rejected in various studies as a viable way to improve athletic performance. But admissions by world-class athletes — including members of the victorious U.S. bicycling team in the 1984 Olympics — that they used the so-called "blood doping" to shave seconds or minutes off race times continue to stimulate questions about both sports ethics and whether the procedure actually works. In the May 22/29 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*, researchers from the University of New Mexico in Albuquerque report that 400-milliliter infusions of red blood cells prior to running a 10-kilometer race can significantly increase performance.

The researchers tested six male, long-distance runners, using the runners' own red blood cells that had been drawn and frozen 11 weeks before the exercise study. Subjects ran three races: before the blood cells were injected, after a 100-ml saline infusion as a placebo, and after infusion of the 400 ml of blood cells. In addition to the races, treadmill tests and blood chemistry analyses were done. The authors of the report say the time to run the race (approximately 33 minutes before treatment) was shortened by about one minute, an improvement that persisted for at least 13 days. Also, the relative concentration of red blood cells, which carry oxygen, increased by more than 5 percent after infusion of cells and remained elevated during the test period.

According to Harvey Klein, chief of transfusion medicine at the National Institutes of Health in Bethesda, Md., the collective evidence from a number of studies is "very convincing" that blood doping really does improve performance in endurance events. But, he cautions, that does not eliminate questions of ethics or of possible negative effects on an athlete's health.