Study points to gene's role in hypertension

Genetic testing has provided the first direct evidence for a long-suspected inheritable predisposition toward hypertension, which afflicts more than 50 million Americans and is a major factor in cardiovascuiar disease, kidney failure, and stroke.

Although the specific cause of hypertension remains unknown in most cases, scientists believe the onset of the disease involves heredity, diet, exercise habits, and stress. The new finding is an important step toward understanding the genetic basis of the disease, says Jean-Marc Lalouel of the Howard Hughes Medical Institute at the University of Utah in Salt Lake City.

"This certainly opens the way ultimately toward identifying people that carry specific risk factors," comments Lalouel, who led the U.S. portion of the study. A French research team conducted a parallel, concurrent study. The two groups pooled their data and reported their results jointly in the Oct. 2 CELL.

In the long run, a genetic test for susceptibility to hypertension would enable physicians to shift emphasis to preventive therapies, perhaps blocking the irreversible onset of the disease later in life. Further genetic studies, says Lalouel, might also lead to better drug treatments for patients already affected.

The U.S. and French researchers targeted a gene that codes for a protein called angiotensinogen (AGT), an important raw material in the chemical process that regulates blood pressure. They examined DNA samples from a total of 379 pairs of hypertensive siblings from 215 families in Paris and Salt Lake City, as well as samples from 237 unrelated people who did not have high blood pressure. All study participants were white.

Although children inherit one of two versions of the AGT gene from each parent, the hypertensive siblings in the study shared the same parental AGT gene significantly more often than they would have by chance, the investigators found. This suggests that a tendency toward hypertension can pass from parent to child.

The researchers also identified a number of variations in the AGT gene, two of which appeared more often in hypertensives than in people with normal blood pressure. Lalouel and his colleagues believe these variants may indicate the predisposition toward high blood pressure.

In an effort to establish a more direct link between the gene variants and the disease, the researchers determined that hypertensives who inherited one particular version of the gene had elevated blood levels of AGT. Previous studies had linked excess AGT in the bloodstream to high blood pressure.

The study suggests, but does not prove, that people who develop hypertension may have inherited a tendency to do so, Lalouel explains. He warns that the data gathered so far do not demonstrate a cause-and-effect link between high blood pressure and a specific gene or genes.

Victor J. Dzau of the Stanford University School of Medicine reiterates this point. "The study itself is exciting, the results are compelling, but it certainly does not prove that we found the gene, or [one of many genes], for hypertension," he says.

Dzau, who has investigated the genetics of high blood pressure in rats, says the new work demonstrates that researchers can use the tools of modern genetics in humans to study complex, multigene diseases such as hypertension. Blood pressure regulation in humans, he points out, may involve anywhere from 20 to 50 genes.

Lalouel and his colleagues plan to extend their research to the study of hypertension in blacks, who develop the disease more frequently than whites (SN: 10/19/91, p.254). The researchers will also attempt to clarify sex-based differences in inheritance patterns that emerged during the study. Such differences, says Lalouel, may trace to estrogen's ability to switch on the AGT gene. — *D. Pendick*

Confirming a comet's belated return

When Comet Swift-Tuttle last visited the inner solar system, its icy glow shared the American skies with the flash of Civil War cannons. More than a century later, astronomers used the 1862 sighting to peg the comet's return for about 1981. They waited. But Swift-Tuttle didn't show.

Finally, Swift-Tuttle has graced the inner solar system again, albeit a decade later than expected. The comet's recent sighting confirms a 1973 prediction by Brian G. Marsden of the Smithsonian Astrophysical Observatory in Cambridge, Mass., that Swift-Tuttle might return in 1992.

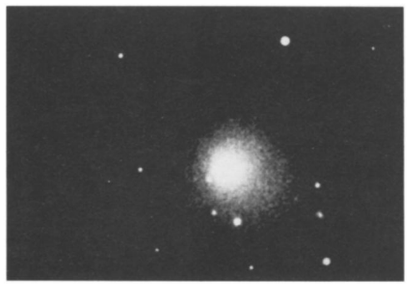
The solar family includes many comets whose round-trip journeys are measured in centuries. However, Swift-Tuttle has set a record as the longest-period comet whose return has been predicted and then confirmed by observation.

This comet is the source of the debris that rains down upon Earth every summer during the Perseid meteor shower. Thus, the frozen wanderer's return provides astronomers with a unique opportunity to combine observations of a comet with existing information on its dusty footprint, says Marsden.

In 1973, Marsden calculated that the comet would probably return in 1981, give or take two years. He based this prediction on the 1862 observations and the gravitational effects of the sun and planets.

But Marsden also offered an alternative prediction that took into account the presumed effects of gas outbursts from the comet as well as information from a 1737 sighting of a comet he thought could have been Swift-Tuttle. In this second calculation, Marsden gave the comet an "outside chance" of returning to the inner solar system in 1992 instead of 1981.

Then, early on the morning of Sunday, Sept. 27, comet enthusiast Tsuruhiko Kiuchi of Usuda, Japan, spotted a fuzzy ball among the stars of the Big Dipper. Professional astronomers soon confirmed the object as Comet Swift-Tuttle, back in its old neighborhood for the first time in 130 years.



Jack Newton

Far-ranging Comet Swift-Tuttle has returned to the inner solar system for the first time in 130 years.

Swift-Tuttle's orbit shows an unprecedented difference of 11 years between its expected date of return and its actual arrival. In comparison, Comet Halley's schedule is off by only four days per round trip. Marsden and others believe these discrepancies result from forces exerted by outbursts of sun-warmed gas from the comets' innards.

Astronomer Donald Yeomans of the Jet Propulsion Laboratory in Pasadena, Calif., says Swift-Tuttle provides a rare opportunity to study the long-term behavior of a comet. "There's a big controversy about how long these things last," he says. "Do they last tens of returns, thousands of returns, tens of thousands?"

The latest observations indicate that Marsden will have to wait until Dec. 12 to observe his prodigal comet at perihelion — the point in its orbit nearest the sun — instead of his originally projected date of Nov. 25. This slightly skewed calculation does not trouble Marsden much, however. "A 17-day error out of 130 years is good enough for me," he says. — *D. Pendick*