

IMM's Caskey Developed DNA Technique Feds Use to ID America's Most Wanted



Houston's original DNA crime fighters were reunited at a Health Access Texas award luncheon May 23 honoring Dr. Thomas Caskey. In 1988, Caskey teamed up with then assistant district attorney Rusty Hardin to win a conviction in the first Texas criminal case in which DNA evidence was admitted. Left to right are: Caskey, Hardin, and Caskey's daughter, Caroline. Photo by Rob Cahill

By Rob Cahill, *Institutional Advancement*

When C. Thomas Caskey, M.D., embarked on a career in genetics research after graduating from the Duke University Medical School in 1963, he didn't expect to testify at a Hell's Angels trial or to tangle with future members of the O.J. Simpson "Dream Team" of defense lawyers.

But, Dr. Caskey — who now heads the Brown Foundation Institute of Molecular Medicine for the Prevention of Human Diseases (IMM), a part of The University of Texas Health Science Center at Houston — did that and more that included pioneering a DNA fingerprinting technique used by the FBI.

Dr. Caskey testified at the first criminal case in Texas in which DNA was used to place a suspect at a crime scene. This was an application of genetic research that no one saw coming when Caskey was training to be an internist.

Dr. Caskey, who at the time directed the molecular genetics program at the Baylor College of Medicine, also developed a DNA identification technique called short tandem repeat or STR that is today's gold standard.

The FBI converted its DNA database to the STR standard. Other laboratories use it, too.

"I didn't intend to be a forensic scientist but my disease discovery research offered the opportunity," said Dr. Caskey, who in 1971 moved his family to Houston from his job at the National Institutes of Health in

Bethesda, Md.

To researchers, Dr. Caskey is the scientist who discovered 12 disease-causing genes and proved the universality of the genetic code. He also is known to the business world for senior positions at Merck Research Laboratories as well as Cogene Biotech Ventures and Cogene Ventures.

To the public, he is the expert witness who helped authorities prosecute rapists, murderers and other felons, including several suspects represented by "Dream Team" attorneys Barry Scheck and Peter Neufeld. Ironically, two years later, Scheck and Neufeld would set up the "Innocence Project" and use DNA evidence to free prisoners. "I'm glad they saw the value of DNA identification testing," he said.

Dr. Caskey's involvement in DNA fingerprinting started in the late 1980s in Houston with a call from then assistant district attorney Rusty Hardin, who was trying to halt a serial rapist preying on elderly women. DNA had been used in England to solve the rape-strangulations of two 15-year-old schoolgirls but had not yet caught on in the United States,

Hardin said.

Hardin needed someone to connect a semen stain from the mattress of a 74-year-old victim to a suspect. Not surprisingly, the prosecutor was referred to Caskey at Baylor.

Hardin, now a prominent defense attorney, said it took less than three hours for Dr. Caskey to explain how DNA fingerprinting works. The suspect got life and remains in a state prison. Texas got its first DNA-related rape conviction.

Hardin recalled Dr. Caskey telling a defense attorney during cross examination, "I'm sorry. You're just going to have to start asking better questions."

"I had never been in a courtroom before," said Dr. Caskey, who edits the *Annual Review of Medicine*. "Defense attorneys were trying to keep DNA out and I was trying to get it in. They tried everything to discredit me. I had to learn how to control my temperament."

Dr. Caskey testified at the landmark DNA criminal trial "United States v. Yee" at a federal courthouse in Toledo, Ohio, during which Scheck and Neufeld mounted a full-scale attack on DNA testing. Despite their protests, the DNA evidence was admitted in the case involving crime scene blood and a motorcycle gang murder. "A bullet ricocheted, struck a suspect, thus leaving blood at the crime scene," he said.

At a hearing, Dr. Caskey was admonished by a judge who didn't want to hear another number on the statistical probability of the DNA coming from a different person. "I said the findings were very, very, very, very, very, very, very significant. Each very stood for a logarithm. The jury got the

point," he said.

It was during this time Dr. Caskey's laboratory at Baylor came up with a new DNA identification technique that required only small amounts of DNA, could be processed quickly and, most importantly, could be automated. His test focused on the one tenth of one percent of DNA that varies from person to person and involved a type of variation called STR which looks something like this:

C A T A C A T A C A T A C A T A C A T A

Each letter stands for one of four bases in DNA, and there are more than three billion of these letters strung together in each strand of DNA.

By comparing STRs at different locations along a DNA strand, Dr. Caskey could establish a match with a high degree of certainty. For example, match repeats at one location and the odds of the DNA coming from someone else are one in 25. Match a second location and the odds climb. Match STRs at 13 locations and the odds of a sample being from someone else are in the billions.

This STR identification technique stemmed from Caskey's work with "triple repeats" — a genetic variation he linked to a form of mental retardation called Fragile X Syndrome and a type of muscular dystrophy named myotonic dystrophy. "It was this disease discovery which led to the forensic application," he said.

Thanks to advances in technology, scientists can now make a match with a single molecule of DNA, although most rape kits and blood splatters contain hundreds of thousands of DNA molecules, Caskey said ★

Keeping the HSC Running in the Event of an Emergency

Continued from page 2

The facility status will be reflected on a campus map with color-coded university buildings. In the event of a yellow or red status, additional information will be available by clicking on the yellow or red object.

This information will be updated, minimally, on a daily basis by the OIA's Communications Team after receiving a

status report from pre-defined facility coordinators. The facility coordinator's response is based upon input from UT Police, Facilities, and Environmental Health and Safety representatives.

Information Systems updates will be communicated by the OIA's Communications Team daily on the

Internet. Information Systems will be grouped into these categories: campus infrastructure; clinical systems; academic systems; administrative systems; and collaborative technology. Details surrounding the individual systems impacted will be provided in the event of a yellow or red status.

Operational status, independent of facility

availability, will be indicated for each of the schools, the UT Harris County Psychiatric Center, UT Physicians Clinics and Administration. Any closures during the business continuity phase will be unique to the operational entity. A daily update for any change contrary to normal operations will use the green, yellow or red status indicators. ★

Necessary Institutional Infrastructure and Services

The following institutional infrastructures and services are essential to maintenance of an environment that can support efforts to maintain business continuity in the period 30 days after an event:

1. UT Police: Building access controls — locks, doors, security; controlling community unrest; crowd control.
2. Facilities: Building integrity — roofs, walls, windows, doors; building power — electrical, water, ventilation systems; debris removal.
3. Information Technology/

Communications: Information technology — phones, Internet communications, data preservation, business information systems.

4. Office of Institutional Advancement: Sources of communications — ability to transmit key decisions and information to the institutional community.
5. Environmental Health and Safety and Risk Management: Sanitation and health — the ability to determine if the work environment represents a potentially unsafe condition; hazardous wastes — the ability to remove and manage any hazardous wastes; insurance

- loss assessments — notifications and assessments by insurers.
6. Center for Laboratory Animal Medicine and Care: Animal care — the uninterrupted support and care of research animals.
7. Financial: The ability to purchase goods (procurement), bill for services (contracts, grants), and manage cash.
8. Human Resources/Payroll: Personnel policy — make decisions regarding return-to-work issues, hiring and separation of employees, maintain payroll (including time-keeping).
9. Medical billing: The ability to charge

- and collect for services rendered.
10. Registrar's Office: Tracking courses and grades for fulfillment of academic requirements; ability to process new applicants
11. Auxiliary Enterprises: Student Housing and Student/Staff Services — Housing for students and day care for faculty/staff/students; Transportation Services — off-campus transportation for health science center badge holders to on — campus work stations or classes. ★

Internal Communications Changes Coming

Continued from page 1

July/August issue.

Beginning Tuesday, July 31, and continuing until the intranet is officially launched, *The Leader Update*, the online news and feature update which has published on Monday and has been announced in Monday's *News on the Go*, will take over as the main internal news organ. It will publish every Tuesday, with alerts and links continuing in *News on the Go*, which also will publish on that weekday.

As the ramp up to the intranet continues, *The Leader Update* format will undergo some augmentation. The deadline for *News on the Go* will remain 10 a.m. on the Thursday prior to publication. The deadline to request inclusion of an article in *The Leader Update* is preferably one

week prior to the Tuesday of publication.

A special print publication — explaining how to access the intranet, what it will contain and how it should help you perform your work more easily — will publish a week or so before the intranet goes live.

Distinctions will continue to publish in print at the beginning of each month to highlight the university's distinctive capabilities and accomplishments in research, education, service and philanthropic support.

HealthLeader will continue to publish as a weekly online health and wellness magazine for consumers.

Please submit story ideas and requests for consideration for publication as follows:

• *The Leader Update* to Pamela.Lewis@uth.tmc.edu.

• *News on the Go*: Dated event/lecture information should be submitted to the Web Calendar at http://publicaffairs.uth.tmc.edu/calendar/submitevent_new.asp. Other items for that publication

should be sent to newsonthego@uth.tmc.edu.

• A mass or segmented e-mail for distribution to all or a large segment of the university community to Pamela.Lewis@uth.tmc.edu.
• *Distinctions* to Ina.G.Fried@uth.tmc.edu.
• *HealthLeader* to Karen.O.Kraker@uth.tmc.edu. ★



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