

The grand mouse mother of them all

One female mouse, living more than 60 years ago, is the ancestor of almost all the inbred mice in laboratory use. This surprising proposal arises from a University of California study of the genetic material carried by mitochondria — the power plant structures of cells (SN: 9/15/79, p. 184). The mitochondria are passed directly from mother to offspring; the father's mitochondrial DNA never mixes in. Stephen D. Ferris, Richard D. Sage and Allan C. Wilson report in the Jan. 14 NATURE that the mitochondrial DNA of nine major inbred mouse lines is indistinguishable. In contrast, they found 18 distinct types of mitochondrial DNA among five colonies of recently inbred mice and 20 wild mice collected from the United States, Denmark, Switzerland, Yugoslavia, Morocco and Egypt.

The simplest explanation for the common DNA in the old inbred strains is a common female ancestor. This ancestor is a surprise because the old inbred strains, begun between 1909 and 1921, were thought to stem from at least five unrelated females selected from scientific institutes in Massachusetts and Paris and from pet dealers in Ohio, New Jersey and Massachusetts. Ferris and colleagues calculate the low probability of about one in 10 million that the inbred strains (called DBA, BALB/c, SWR, PL and C57-C58) would have identical mitochondrial DNA by chance.

Although at first sight the claim that a single female gave rise to the various inbred strains is astonishing, on further reflection it is less unexpected, says M.F.W. Festing of the Medical Research Council Laboratory Animals Center in Surrey, England. In the same issue of NATURE he comments that many inbred strains are traced back to a Massachusetts mouse colony established early in this century. The colony included "fancy" mice imported from Europe, where mouse fanciers had come to be dominated by a single man so the diversity of tame mice was probably limited. Festing also suggests that in mouse colony crosses involving wild mice, the wild partners were probably male. Tame, rather than wild, females would be more likely to rear young successfully in captivity.

Inadvertant mix-ups of inbred mice, which all look similar, is another likely source of the shared heritage. Ferris suggests such an exchange was probable between 1919 and 1921 when three of the critical strains were housed under one roof. He points out evidence that mixing of inbred strains also has occurred several times more recently.

In their work at Berkeley, Ferris and colleagues distinguish types of mitochondrial DNA by the pattern of fragments resulting from cuts by 11 enzymes. The nine "old" inbred strains give identical patterns. Ferris explains that the genetic material in



the nucleus of cells doesn't provide evidence of a common ancestor, because there paternal and maternal DNA mix. "It all gets scrambled around over many decades," Ferris says. But the mitochondrial DNA undergoes no mixing, but a low level of mutation undetectable over only a few thousand years of evolution.

The scientists propose the common female ancestor lived as recently as 60 years ago or as long ago as 3,200 years, when mice were first domesticated both in China and in Crete. Festing says Ferris's study emphasizes the value of studying wild mice. Festing points out that had Ferris and colleagues included in their study only the standard laboratory mouse strains, they could have concluded quite erroneously that all mice have identical mitochondrial DNA. —J.A. Miller

STS names its top 40 young researchers

Though it's technically feasible to levitate trains with superconducting magnets, the superconducting track would probably require prohibitively expensive cooling, according to Marc Klein. The 17-year-old designed apparatus to test the behavior of superconducting materials — such as magnets, lead and copper — to temperatures of -268°C in research that qualified him for the 41st annual Science Talent Search. As one of 40 STS winners chosen from among 950 qualified candidates, Klein will attend a five-day all-expenses-paid session of the Science Talent Institute in Washington, beginning February 25, to compete for \$89,500 in Westinghouse Electric Corp. scholarships and awards.

STS contestants often tackle sophisticated endeavors. From his basement, for instance, Gary Griner, one of this year's winners, recorded earthquakes — and one underground nuclear test — to determine the speed of seismic waves traveling through the earth's interior. Over the course of 18 months, tremors from as far

away as Japan and the Indian Ocean were studied with a homemade seismograph of the aspiring engineer's own design.

The Westinghouse competition, administered by Science Service, aims to "discover and develop scientific and engineering ability among high-school seniors." And its track record is impressive. Five former winners have gone on to win Nobel prizes — three in the last three years. This past year's chemistry Nobelist, Roald Hoffmann, for example, was a 1955 STS winner (SN: 10/24/81, p. 261).

This year's 40 winners are:

ALABAMA: Gary Merle Griner, Jr., Huntsville H.S., Huntsville.

CALIFORNIA: Vickie Marie Abel, Corning Union H.S., Corning; Lynn ane Uyeda, Monterey H.S., Monterey; Niels Phinn Mayer, Corona del Mar H.S., Newport Beach; Theron William Stanford, San Marino, H.S., San Marino.

CONNECTICUT: Timothy Thomas Tylaska, Stonington H.S., Pawcatuck.

GEORGIA: David Erich Nahmias, Briarcliff H.S., Atlanta.

ILLINOIS: Helen Elaine Getto, Lane Technical H.S., Chicago; Wendall Alan Lim, University of Chicago Laboratory Schools H.S., Chicago; John Douglas Goldman, and Raj Kamal Seth, Evanston Township H.S., Evanston; Donna Joy Buchholz, Rolling Meadows H.S., Rolling Meadows.

INDIANA: Marc Alexander Klein, Bloomington H.S. North, Bloomington.

MARYLAND: Stephanie Ann Telesetsky, Stone Ridge Country Day School of the Sacred Heart, Bethesda.

MICHIGAN: Jene Marlene Spears, Renaissance H.S., Detroit.

MISSOURI: Janet Elizabeth Nelson, Central H.S., St. Joseph.

NEW JERSEY: Jared Adam Silverman, Shore Regional H.S., West Long Branch.

NEW YORK: Steven Norbert Hochwald and Jonathan Taylor, Benjamin N. Cardozo H.S., Bayside; Ronald Marc Kantor, Riverdale Country School, Bronx; Reena Beth Gordon, Midwood H.S., Brooklyn; John Robert Malinowski, Half Hollow Hills H.S. East, Dix Hills; Sharon Marcus, Jamaica H.S., Jamaica; Alan L. Weindorf and James Matthew Weisz, Long Beach H.S., Long Beach; Saechin Kim and Li Tso, Bronx H.S. of Science, New York; Richard Ke-Jen Chang, Noam David Elkie, Ogan Gurel, Joel N. Hirschhorn and Tammy Gay Zietchick, Stuyvesant H.S., New York; Lynne Page Snyder, Smithtown H.S. West, Smithtown.

OHIO: Karen Bernadette Dollries, Oak Hills H.S., Cincinnati; Mitchell Tsai, Theodore Roosevelt H.S., Kent; Kelly Ann McAleese, Black River H.S., Sullivan.

OKLAHOMA: Frank Yu-Heng Wang, Norman H.S., Norman.

PENNSYLVANIA: Ashraf Ahmed Elshami, Central H.S., Philadelphia.

TEXAS: Blake Linton Wilfong, Westbury H.S., Houston.

WISCONSIN: David Andrew Horowitz, James Madison Memorial H.S., Madison. □