RANDOM SAMPLES

edited by CONSTANCE HOLDEN

Sorry News for NIMH Head-Hunt

Life at the National Institute of Mental Health (NIMH) has had its share of bumps lately. The institute, in turmoil over feared cuts in its clinical program, has been without a permanent director since its controversial head, psychiatrist Fred Goodwin, left last spring. A new director was to be named early this year. But that is unlikely now that one of the reported top contenders for the job has died unexpectedly.

Stanford University child psychiatrist and genetics researcher Roland Ciaranello, said to be one of the three leading candidates for the job, died early on the morning of 15 December while jogging in Puerto Rico during the annual meeting of the American Congress of Neuropsychopharmacology. He was 51.

NIMH officials won't say anything about the status of their head-hunt now, but a source familiar with the search says that the search committee, chaired by National Institutes of Health (NIH) deputy director Ruth Kirschstein and drug abuse institute head Alan Leshner, had been "very impressed" with Ciaranello. They were not the only ones. "I had hoped he would be chosen, because I thought he would do an excellent job," says University of Iowa schizophrenia researcher Nancy Andreasen, one of the other top contenders. Andreasen says she has not heard from NIMH since Ciaranello's death, "but I've had a lot of practice at this," because she was also under consideration before Goodwin got the job in early 1992.

The NIMH source says the search committee is going to take another look at the field of possibilities before submitting its recommendations to NIH Director Harold Varmus—and when that will be no one's saying. Aside from Andreasen, the most likely candidate is said to be psychiatrist William ("Biff") Bunney, a former NIMH researcher now at the University of California, Irvine.

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Fore-armed. Troops in the gulf operated in constant fear of a chemical attack ordered by Iraqi president Saddam Hussein.

Jury Still Out on Gulf Syndrome

Nearly 4 years after the Gulf War, a new report says that chemical or biological weapons did not—contrary to claims made by many soldiers—cause an array of illnesses reported by war veterans. So the perpetrator of "Gulf War Syndrome" for now remains a mystery, according to the report, released last week by the Institute of Medicine (IOM).

Since the 6-week-long war with Iraq ended, more than 30,000 of the 700,000 U.S. troops who served in the Persian Gulf area have reported symptoms ranging from headaches and memory loss to birth defects in their children. Some 20% of the illnesses can't be attributed to known medical conditions, says McGill University epidemiologist John Bailar, chair of the IOM panel. In congressional hearings over the past 2 years, witnesses have suggested that the ailments were caused by exposure to chemical or biological weapons.

However, the IOM panel has dismissed that notion. It reviewed all the data collected by the Department of Defense and the Department of Veterans Affairs and concluded that it "could find absolutely no reliable intelligence and no medical or biological justification for any of these purported claims." The panel went on to criticize the government's conduct of Gulf War health studies and called for large-scale epidemiological studies. The panel now intends to try to develop a theory on what's causing the mystery ailments; a second report will be issued in late 1996.

Veterans groups are pleased about plans for further research. But contrary to the panel's conclusion, says American Legion spokesperson Phil Budahn, "we believe there is reliable evidence that chemical warfare agents were in the combat theater."

Cutting RNA With DNA

The discovery in the 1980s of ribozymes, the enzymatic RNA that breaks down and pieces together other RNA molecules, suggested a way in which early RNA-based life forms may have replicated themselves. Ribozymes also represented a whole new set of molecules—in addition to proteins—that could act as biological catalysts.

Now, in the December *Chemistry & Biology*, Ronald Breaker and Gerald Joyce of The Scripps Research Institute report that they have created yet another type of biological catalyst: DNA molecules that can cut RNAs.

Because catalytic DNAs probably can't exist in nature, Breaker and Joyce made their own, using a process called test-tube evolution. First, they generated 100 trillion different single-stranded DNAs. Each sequence was connected to the top of a tiny test tube via an RNA link. Metal ions—necessary cofactors for many enzymes—were then added to the mix. The few DNA strands that could snip their RNA link fell to the bottom of the tube. By replicating the fallen DNAs, attaching their progeny to the top of fresh tubes, and then repeating the process several times, Breaker and Joyce evolved themselves a fast-acting RNA-cutting DNA.

Thomas Cech of the University of Colorado, Boulder, who shared a Nobel Prize for discovering ribozymes, says that "the prediction [had] been that DNA can be an enzyme, too." Confirmation of that prediction is "a bit of a Breaker-through," he quips.

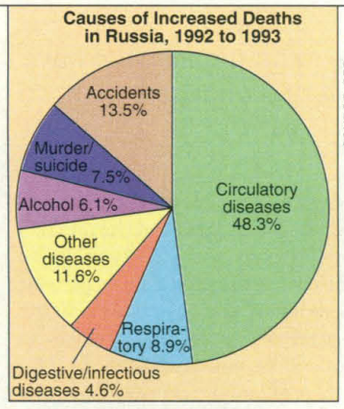
Breaker and Joyce hope that enzymatic DNAs can be developed into drugs that fight viral infections by destroying the viruses' own RNA. The DNA molecule is more stable than RNA enzymes that are currently being developed as anti-viral drugs, says Joyce.

High Price of Freedom

The end of socialism seems to have rent a large tear in the social fabric of the former Soviet Union. Russia in particular is an ailing society by every indicator: Birthrates have plunged, marriages are on the decline, divorce is up, and infant mortality is up. And murder, suicide, and disease rates—especially those related to stress, drinking, and smoking—have been on the rise, according to a new report from the Population Reference Bureau (PRB) in Washington, D.C.

In Russia, writes PRB demographer Carl Haub, there has been a "spectacular increase in mortality." Life expectancy for Russian men has taken a steep downward turn, dropping nearly 5 years between 1990 and 1993 to 58.9 years. "Russian male life expectancy is by far the lowest of all industrialized countries," writes Haub. Female life expectancy also dropped, from 74.3 to 71.9 years.

The heightened death rates, including increased numbers of



Sick society. Drinking plays a big role in increased deaths.

murders and suicides, appear to stem from both mental and physical stresses of chaotic economic and political circumstances. "The increase in deaths from stress-related factors appears to reflect the sudden loss of confidence in a social system that once provided employment and housing to nearly every Russian," Haub writes.

Russia specialist Murray Feshbach, professor of demography at Georgetown University, says that all the major causes of increased mortality (see chart) are exacerbated by alcohol consumption. Much of the increase in circulatory diseases, for example, is in the form of ischemic heart disease, which is closely linked to alcohol abuse. Feshbach says that close to one third of the liquor on the market today is of bad quality, making the problem worse. He also says former president Mikhail Gorbachev's attempts to limit the availability of alcohol have led people to ingest all sorts of poisons, "from perfume to jet fuel." On top of that are increased stresses from environmental toxins, bad diets, and smoking.

Hope for Ethanol Fuel?

Ethanol has been touted for decades as a clean-burning alternative to gasoline, but it costs more than gas and has never taken off. On page 240 of this issue, however, researchers in Colorado report they may have found a way to reduce that cost substantially. They have given an ethanol-fermenting bacterium a genetic boost, increasing its output by up to 25%.

Ordinarily, yeast is the ethanol generator of choice, fermenting glucose in feedstocks such as corn or trees. But this biomass typically contains other sugars, such as xylose, that yeast can't easily convert. Researchers have already tried to improve sugar conversion by introducing ethanol-making genes into the bacterium *Escherichia coli*, which can ferment xylose to ethanol. But these organisms don't function well when ethanol concentrations are high.

The Colorado researchers, led by Stephen Picataggio of the National Renewable Energy Laboratory in Golden, sought instead to combine the talents of two bacteria. From *E. coli* they took four genes that convert xylose to intermediate sugars and inserted them into an organism called *Zymomonas mobilis*, which can't break down xylose but which can convert the intermediate sugars into ethanol. Unlike *E. coli*, says Picataggio, "*Z. mobilis* is tolerant of high ethanol concentrations."

But because the presence of glucose can inhibit the mechanisms that break down the xylose, the researchers had to take one more step. "We put the xylose-fermenting genes under the control of promoters [genetic on-off switches] that are insensitive to glucose," says Picataggio. This "allows the organism to ferment glucose and xylose at the same time."

This was a critical practical step because, says microbiologist Tyrrell Conway of Ohio State University, Columbus, "virtually all feedstocks used for [ethanol] production have a mixed substrate [of different sugars]." Conway calls the Colorado group's accomplishment "a significant step forward." The new bugs, he says, should not only be able to churn out more fuel but are well suited to commercial-scale manufacturing.

Saving Our Roots From Roots

To save a 3.5-millon-year-old trail of ancestral human footprints at Laetoli, Tanzania, from nature's incursions, the government of that country and the Getty Conservation Institute of Santa Monica, California, have launched a collaborative conservation project. The 75-foot-long track—one of the most important anthropological sites in the world—was discovered in 1977 by Mary Leakey, and 2 years ago researchers noticed that acacia tree roots were growing into the prints and gravel was becoming embedded in the hardened volcanic ash that formed them.

T. MOON/GETTY CONSERVATION TRUST

Growing over. Ancestral footprints penetrated by acacia roots.

Last summer, some stopgap measures, such as killing the trees, were taken. This summer, a team of experts will converge on the site for 6 weeks of work until the rainy season starts. Chemist and conservationist Neville Agnew of the Getty Conservation Institute says the team will excavate up to half the trackway and do a "surgical extraction" of roots that have penetrated the footprints. The holes will then be filled with an inert material. "It's going to be very difficult," says Agnew. The team, which will be guided by a cast of the site copied from the original one made by Leakey, will return next year to finish the job.

Agnew says the project has been slow to start in part because decisions had to be made about whether the entire track should be lifted and removed to a museum. The plan now is to keep the trail permanently buried, as it has been, under several feet of dirt and stones.

From Computer Flop to Gigaflop

The Intel Corporation, maker of the infamous Pentium processor, has been in need of some good press. Now they've got it. Last week Sandia National Laboratory announced that by hooking up two Intel Paragon supercomputers they had nearly doubled the world record in computing speed, leapfrogging the Japanese competition.

Fujitsu had held the latest speed record of 170.4 billion operations per second (gigaflops). But when the two Intel machines were tested on a benchmark matrix of linear equations, they clocked in at a whopping 281 gigaflops.

What prompted Intel and Sandia to go for the record, says Art Hale, manager of the parallel computing science department at Sandia, were the two Paragon supercomputers sitting at Intel's Beaverton, Oregon, facility, waiting to be shipped to their purchasers. Linked, the two machines had at their disposal 6786 processors working in parallel.

How long the new record will last is anybody's guess, says Hale; "perhaps as little as 6 months," he suggests. He notes that this year's big supercomputing conference, "Supercomputing 95," to be held in San Diego in December, will feature a Teraflop Challenge to see if computer scientists can hit one trillion operations per second.