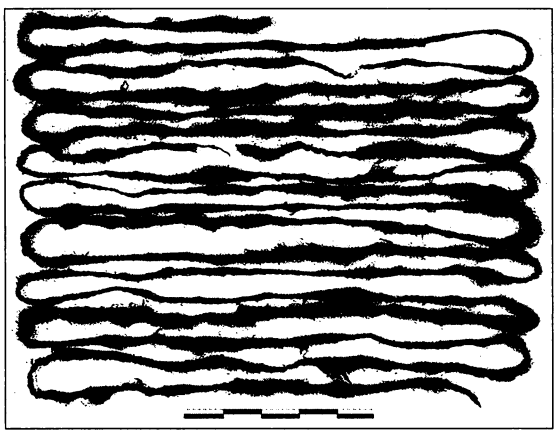
known to have spun fibers for cloth. Moreover, the specimens closely resembled yarns Sutherland had seen while helping to excavate a well-known Norse site, Gården Under Sandet (GUS), in Greenland.

Intrigued, Sutherland sent samples to Penelope Walton Rogers of Textile Research in Archaeology, an independent consulting firm in York, U.K.; Walton Rogers has analyzed many of the Greenlandic Norse textiles, including those from GUS, some of which were made of arctic hare fur and goat hair. She concluded that both Nunguvik samples had also been spun from arctic hare fur, and one had probable goat hairs attached, closely resembling GUS's 13th and 14th century textiles.



Yarn tells the tale. The Dorset didn't spin fiber, but yarn like that used by the Norse turned up in a Dorset site.

As Sutherland continued to pore through the Nunguvik collection, she found other Norse items. Several pieces of wood revealed European carpentry techniques, such as iron-stained holes apparently made by square nails and special kinds of fitted joints called mortise-tenon and scarfing. She also found small, Dorset-style carvings of European-looking faces.

Three other Dorset sites on Baffin Island yielded even more Norse traces. All three sites had produced specimens that the original excavators had described as musk-oxen cordage, but Walton Rogers pronounced two samples to be yarn made from arctic hare fur. One piece was infused with oil and pigment, suggesting a form of oilcloth. All three sites also yielded unusually worked wood similar to that from Nunguvik. One piece with a cut Norse-style design has been identified by conservator Greg Young of the Canadian Conservation Institute in Ottawa as fir, a southern tree rarely if ever found in arctic driftwood.

The number of Norse objects suggests that the Norse were frequent visitors to Canada's far north, argues Sutherland. "The contact was possibly sufficient to have influenced local technology. Some of the stuff might clearly be identified as Norse. Some might be the Norse stuff modified by the Dorset, and some might be a combination of the two technologies," she says.

Other researchers, although they agree there was some kind of contact, aren't yet sure how extensive it was. "Is this just the tip of the iceberg?" wonders William Fitzhugh, an archaeologist at the Smithsonian's Arctic Studies Center and the curator of the Viking show. "Or are we finding just a few things from a few chance encounters?"

Conclusively dating the artifacts, moreover, is proving difficult. At the moment, Sutherland believes the evidence points to the late 13th and early 14th centuries, as indicated by radiocarbon dates she obtained on one of the nail-pierced wood pieces from Nunguvik. But other radiocarbon dates, including on the Nunguvik yarn, are as early as the 7th and 8th centuries, and those dates fit the original excavators' estimates of the age of the Dorset sites.

But such early dates—more than a century before the great sea voyages were thought to have begun—would rewrite Viking history. Thus most archaeologists favor the medieval dates. "My qualified guess is that the yarn tells us about early Norse contacts with the people of the Late Dorset culture, between A.D. 1000 and 1300," says Hans Christian Gullov, an archaeologist at the Danish National Museum. Fitzhugh agrees, noting that bad times in the 13th century may have led the Norse to try their hand at trading walrus ivory, which was much coveted in Europe. That might spur a journey to the high Arctic and contact with the walrus-hunting Dorset.

All the same, Sutherland is not ready to rule out the early dates entirely. Crossing the Atlantic may not have been beyond the capabilities of Europeans at that time. "So we shouldn't be unwilling to consider something earlier." **–HEATHER PRINGLE**

Heather Pringle is the author of *In Search of Ancient North America.*

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ECOLOGY

Does Biodiversity Help Fend Off Invaders?

As nonnative species such as cheatgrass in the western United States and rosy wolf snails in Hawaii have swept over native ecosystems, ecologists have wondered why some ecosystems are more vulnerable to invasions than others. Theory suggests that an ecosystem rich in biological diversity should be better able to resist invasions, but contradictory studies have led to a heated debate

ScienceScope

English Seoul Mates Seoul National University (SNU), South Korea's finest, is hoping to lure talented students from beyond the Korean Peninsula with a new policy that encourages professors to teach as many classes as possible in English. Officials hope to triple the percentage of foreign undergrads, to 6%, over 3 years, and hike the share of foreign graduate students to 30%. Exchange students won't consider attending SNU until at least 20% of its classes are conducted in English, says one administrator. The recent repeal of a law against hiring foreigners has opened the door for English-speaking faculty at SNU and other state institutions.

Students are "excited and worried" about the change, says Kim Ha Seok, a professor of electrochemistry who has already started lecturing in English. Whereas Kim finds the shift to English has meant more time spent preparing lessons and greater use of visual tools, other scientists say they are able to cover more material and avoid awkward translations of technical terms. Says microbiologist Yim Jeong Bin: "It's a step in the right direction."

Prion Hunting Many Britons are breathing easier now that a preliminary study has cast doubt on predictions of a deadly epidemic. In early April, *The Sunday Times* of London reported findings showing that variant Creutzfeldt-Jakob disease (vCJD), a brain-wasting disorder that is the human form of mad cow disease, might spread to hundreds of thousands of people. But the British Department of Health said last week that the first spurt of data from a survey of 18,000 tonsils and appendices showed no sign of vCJD's hallmark: an abnormally folded protein known as a prion.

The early finding—from 3000 tissue samples warehoused since the late 1980s—is "welcome news," said Liam Donaldson, the government's chief medical officer. But the "results should not be taken as an indication of an 'all clear,' " he warns. There are still 15,000 samples to go, he noted, and researchers couldn't use the most sensitive techniques on archived tissue, leaving a chance of undetected prions.

Future studies, however, should help shed light on the prevalence of vCJD, which is already blamed for 55 deaths in the U.K. Results from a study of 2000 freshly removed tonsils, along with final numbers from the bigger study, could be ready by the end of the year.

tential drugs in a variety of cells, but they rarely use healthy human liver cells, says Strom, who is a liver expert, because the cells are very hard to obtain. Now, he says, "we have to be cognizant that we might miss some things. There is not really much in these preclinical studies [of TRAIL] that could have been done differently."

Strom did not set out to study TRAIL's role as a cancer drug. With graduate student Minji Jo and their colleagues, he was trying to find the molecular players that bring about liver cell death in diseases such as hepatitis and alcoholic cirrhosis. Previous work had shown that TRAIL kills cancer cells by triggering a form of cell suicide called apoptosis, and the team wanted to find out whether TRAIL-induced apoptosis might also be involved in the premature death of diseased liver cells.

Much to their surprise, the researchers found that TRAIL readily induces apoptosis in cultured liver cells from both sick individuals and healthy liver donors. Because the protein had never before been shown to trigger death in animal liver cells, "we thought [the result] was a fluke," perhaps an artifact of the team's culture conditions, recalls Strom.

Further work ruled out that possibility. For example, the team found that TRAIL also induces apoptosis in cells anchored in liver slices. And, in accord with previous findings, the researchers found no effect of TRAIL on cultured human epithelial cells derived from liver tissue or on rat, mouse, or monkey liver cells. "The animal cells are resistant in the culture dish, in whole livers, and in the live animal," Strom sums up. "This was not a culture artifact."

So why do human liver cells remain susceptible to TRAIL when other normal cells appear to fend the molecule off? Work a few years ago suggested that tumor cells succumb because they, unlike normal cells, fail to make a so-called decoy receptor that sops up TRAIL and prevents it from triggering the receptor that, in turn, programs cell suicide (*Science*, 8 August 1997, pp. 768, 815, and 818). But Strom and his colleagues found no differences between human liver cells and others in the production of either the decoy or regular TRAIL receptors. "This is very difficult to explain," says Nagata, whose own work focuses on apoptosis. "Perhaps, some factor is produced by mouse or monkey hepatocytes but not humans' that can inhibit TRAIL."

Researchers at Immunex and Genentech think there might be a simpler and, from their view, more favorable explanation for the Pittsburgh team's findings. Often, especially in the standard bench-top purification method used by Strom's group, TRAIL proteins clump together, forming "multimers" that are more toxic to cells than more natural preparations, says Douglas Williams, executive vice president and chief technology officer at Immunex. "The studies being reported are interesting," he adds, "but they have not been performed with the material we have been producing here at Immunex and Genentech."

To see whether that accounts for the discrepancy between the current observations and those made previously, Strom and the Immunex-Genentech workers will exchange their TRAIL preparations, and each group will redo the tests with the other's material. Until the results are in, TRAIL's fate will hang in the balance. "There is no magic drug for cancer at the moment," Nagata says.

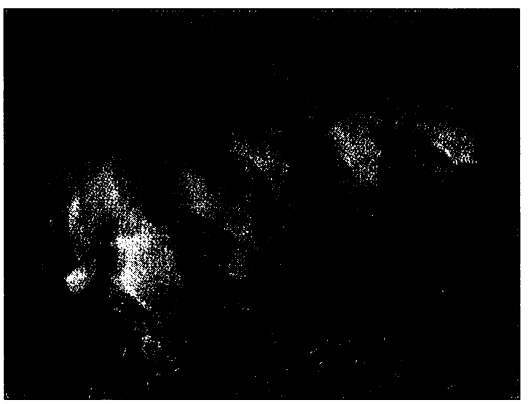
–TRISHA GURA

Trisha Gura is a science writer in Cleveland, Ohio.

ADVANCED TECHNOLOGY PROGRAM

Grants Evoke Squeals Of Delight and Anger

It's easy to understand why the "Three Little Pigs" is David Ayares's favorite children's story. On 14 March Ayares's company, PPL Therapeutics Inc. of Midlothian, Scotland, surprised the scientific community by announcing that it had successfully cloned a pig from an adult cell, taking a small but vital step toward its goal of mass-producing organs to be transplanted into humans.

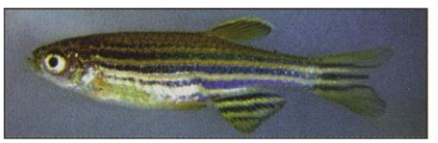


Corporate pork? ATP-funded research by PPL Therapeutics led to these cloned pigs.

Last week Ayares told a version of the story to an audience at the U.S. National Academy of Sciences, recounting how a $2 million grant last fall from a beleaguered federal research program had rescued his U.S.-based project. The grant came just in the nick of time, he said, as the company was ready to pull the plug because success seemed too far away. But unbeknownst to Ayares, at the very moment he was relating his story, a Big Bad Wolf on Capitol Hill

ScienceScope

Genome Club The zebrafish may soon join the elite list of organisms honored by having their entire genome sequenced. The Wellcome Trust's Sanger Centre is expected to make the little striped swimmer the target of a new large-scale sequencing project, Philip Ingham, a developmental geneticist at the U.K.'s University of Sheffield, announced last week at the Cold



Spring Harbor Laboratory in New York. Ingham told a meeting of developmental biologists—who value the species for its transparent embryos—that he is "99% certain" that Wellcome trustees will approve the project.

As the Sanger Centre winds down its work on the human genome in October, Ingham said, it will have the capacity to start sequencing the fish. He estimated that the center could complete a rough draft of the 1.8-billion-base-pair genome in 2 years. As with human data, the center plans to release its newest fish sequences nightly to a public database. "I am ecstatic," said geneticist Stephen Johnson of Washington University in St. Louis. "If Sanger does it, we are going to get a fantastic product."

Russian Roulette The U.S. government must step up efforts to prevent former Soviet weapons scientists from selling their services to hostile nations, experts say. Meeting in Washington last week, members of an outside task force reviewing the Department of Energy's (DOE's) beleaguered nonproliferation programs took the department to task for not taking the threat seriously enough. "Future generations are going to look back on this period and wonder why we didn't do more," said former representative Butler Derrick (D–SC), now a lobbyist.

The State Department estimates that DOE, State, and Defense Department assistance programs, funded to the tune of about $175 million this year, have helped fewer than 15,000 of Russia's 50,000 nuclear, biological, and chemical weaponeers find civilian work. To improve on that record, the task force plans to give DOE advice on how to persuade Congress—which is skeptical that the conversion programs work—to go for a big boost in the 2002 budget.

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CREDITS: (TOP TO BOTTOM) STEPHEN L. JOHNSON/WASHINGTON UNIVERSITY; PPL THERAPEUTICS