

# Scientists Produce Neurons From Skin

A breakthrough that could lead to revolutionary advances in the fight against neurodegenerative diseases. Scientists from Université Laval's Faculty of Medicine, Canada, have succeeded in producing neurons in vitro using stem cells extracted from adult human skin. This is the first time such an advanced state of nerve cell differentiation has been achieved from human skin, according to lead researcher Professor François Berthod. This breakthrough could eventually lead to revolutionary advances in the treatment of neurodegenerative illnesses such as Parkinson's disease. Berthod and his team described the method used to produce these neurons in a recent issue of the *Journal of Cellular Physiology*. EurekAlert.com says the researchers used skin obtained from plastic surgery procedures. They subjected these skin samples to various treatments in order to extract neuron precursor cells, which they then proceeded to cultivate in vitro. Skin itself does not contain neurons, which are hosted in the spinal cord, but contains only their extensions, called "axons." The researchers' challenge was thus to produce neurons from undifferentiated cells rather than multiply neurons from nerve cells. Tests conducted by the researchers demonstrated

that stem cells from the skin can proliferate and differentiate in vitro when placed in the appropriate environment. They progressively took on the oblong shape typical of neurons. At the biochemical level, researchers discovered that in the days following the start of the experiment, the cells began producing markers and molecules associated with the transmission of nerve impulse between neurons, which are hosted in the spinal cord, but contains only their extensions, called "axons." The researchers' challenge was thus to produce neurons from undifferentiated cells rather than multiply neurons from nerve cells. Tests conducted by the researchers demonstrated

problem of human neural cell availability for research," explains Berthod. "Since neurons do not multiply, researchers now have to rely on laboratory animal neurons to perform their experiments." In the longer term, the ability to produce neurons from skin cells opens the door to revolutionary therapeutic applications. "We could take a patient's skin cells and use them to produce perfectly compatible neurons, thus eliminating the risk of rejection. We could then transplant these nerve cells in the diseased areas of the brain, which seems particularly interesting for diseases such as Parkinson's," concludes the researcher.

# Hunting Chimps Change View of Human Evolution

Chimpanzees have been seen using spears to hunt bush babies, researchers said on Thursday in a study that demonstrates a whole new level of tool use and planning by our closest living relatives. Perhaps even more intriguing, it was only the females who fashioned and used the wooden spears, Jill Pruetz and Paco Bertolani of Iowa State University told Reuters. Bertolani saw an adolescent female chimp use a spear to stab a bush baby as it slept in a tree hollow, pull it out and eat it. Pruetz and Bertolani, now at Cambridge University in Britain, had been watching the Fongoli community of savanna-dwelling chimpanzees in southeastern Senegal. The chimps apparently had to invent new ways to gather food because they live in an unusual area for their species, the researchers report in the journal *Current Biology*. "This is just an innova-



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tive way of having to make up for a pretty harsh environment," Pruetz said. The chimps must come down from trees to gather food and rest in dry caves during the hot season. "It is similar to what we say about early hominids that lived maybe 6 million years ago and were basically the precursors to humans." Chimpanzees are genetically the closest living relatives to human beings, sharing more than 98 percent of our DNA. Scientists believe the precursors to chimps and humans split off from a common ancestor about 7 million years ago. Chimps are known to use tools to crack open nuts and fish for termites. Some birds use tools, as do other animals such as gorillas, orangutans and even naked mole rats. But the sophisticated use of a tool to hunt with had never been seen. The chimps choose a branch, strip it of leaves and twigs, trim it down to a stable size and then chew the ends to a point. Then they use it to stab into holes where bush babies might be sleeping. It is not a highly successful method of hunting. They only ever saw one chimpanzee succeed in getting a bush baby once. The apes mostly eat fruit, bark and legumes. Pruetz noted that male chimps never used the spears. She believes the males use their greater strength and size to grab food and kill prey more easily, so the females must come up with other methods. "The observation that individuals hunting with tools include females and immature chimpanzees suggests that we should rethink traditional explanations for the evolution of such behavior in our own lineage," she concluded in her paper. "The multiple steps taken by Fongoli chimpanzees in making tools to dispatch mammalian prey involve the kind of foresight and intellectual complexity that most likely typified early human relatives."

## Rare Squid Caught

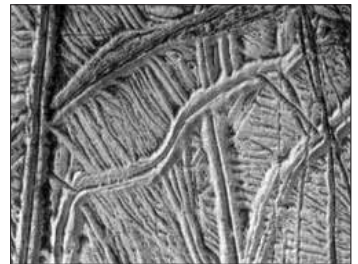
A fishing crew has caught a colossal squid that could weigh a half-ton and prove to be the biggest specimen ever landed, a fisheries official said Thursday. The squid, weighing an estimated 990 lbs and about 39 feet long, took two hours to land in Antarctic waters, New Zealand Fisheries Minister Jim Anderson told AP. The fishermen were catching Patagonian toothfish, sold under the name Chilean sea bass, south of New Zealand "and the squid was eating a hooked toothfish when it was hauled from the deep," Anderson said. The fishing crew and a fisheries official on board their ship estimated the length and weight of the squid. Detailed, official measurements have not been made. The date when the colossus was caught also was not disclosed. Colossal squid, known by the scientific name *Mesonychoteuthis hamiltoni*, are estimated to grow up to 46 feet long and have long been one of the most mysterious creatures of the deep ocean. If original estimates are correct, the squid would be 330 pounds heavier than the next biggest specimen ever found. Colossal squid can descend to 6,500 feet and are extremely active, aggressive hunters, he said. The frozen squid will be transported to New Zealand's national museum, Te Papa, in the capital, Wellington, to be preserved for scientific study. Colossal squid are found in Antarctic waters and are not related to giant squid found round the coast of New Zealand. Giant squid grow up to 39 feet long, but are not as heavy as colossal squid.



Caught in the Ross Sea, Antarctica, the creature, known as a colossal squid (scientific name *Mesonychoteuthis hamiltoni*), is thought to be the largest squid ever found anywhere in the world, weighing an estimated 450kg, 150kg heavier than the next biggest specimen ever found.

## Urge to Explore Europa

A scientist at the University of California, Berkeley wants NASA to look for life on Jupiter's icy moon Europa. According to UPI, paleobiologist Jere H. Lipps, a professor of integrative biology, said "Because of the well-supported presence of water ice on Europa, and the probability that there are briny oceans, Europa has to be a major target for the search for life in the solar system." "Many of us are proposing that there is habitat there where we can expect to find evidence of life," he added. Europa, Jupiter's third-largest moon, is thought to have an ocean of water covered by a layer of ice that could be miles thick. "Life thrives in ice, it doesn't mind at all," said Lipps. He said life on other planets is more likely to be akin to bacteria than humans. Bacteria, diatoms, clams, snails, sponges and even fish larvae live under the ice shelves, yet often appear on the surface because of upheavals in the ice. Using his knowledge of Earth's polar environments gained over 12 years working in Antarctica, including on the Ross Ice Shelf, Lipps proposed 25 likely habitats for life on Europa in a 2005 paper in the journal *Icarus*. "A sampling strategy for life and its history on Europa should include paleontological, molecular biological, and volatile and organic chemical objectives that would clearly



Europa's surface is a maze of intertwined ridges of solid ice, kilometers high, that may harbor evidence of life under the ice.

document the present and/or former evidence of life on Europa," he said. He also urged detailed imaging of surface features, even at the microscopic level, since "the most exciting and convincing evidence for the general public would be an image of a life form." Lipps said that if we start planning now, we could perhaps have a spacecraft on Europa in 15 years.

## Drug Attacks HIV In a New Way

Italian researchers say they've developed an AIDS drug that attacks the disease in a new way. "The molecule, MK518, has a wholly new mechanism," Gennaro Ciliberto, head of a molecular biology research institute run by drug company Merck, told ANSA. Ciliberto said MK518 and other "integrase inhibitors" may help AIDS patients who have developed a resistance to other anti-retroviral drugs. Integrase is an enzyme in HIV that allows the virus to integrate with body cells, ANSA reported. "If you knock integrase out of the picture, HIV can't possibly infect anyone because the virus isn't able to replicate," Ciliberto told ANSA. ANSA reported Merck expects U.S. Food and Drug Administration approval for the drug before the end of 2007.

## Caffeine for Elderly Hearts

Drinking caffeinated beverages may protect the elderly against heart disease death, New York researchers have found. "The protection against death from heart disease in the elderly afforded by caffeine is likely due to caffeine's enhancement of blood pressure," said Dr. John Kassotis, an associate professor of medicine at SUNY Downstate, UPI reported. The heart-protective effects of caffeine were only found in patients age 65 and older who were not severely hypertensive. The researchers from SUNY Downstate and Brooklyn College used data from the first federal National Health and Nutrition Examination Survey Epidemiologic Follow-up Study. They found that participants 65 or more years old with higher caffeinated beverage intake had a lower risk of coronary vascular disease and heart mortality than did participants with lower intake of caffeinated beverages.

## Fluid Dynamics Works on Nanoscale in Real World

In 2000, researchers showed that fluid dynamics theory could be modified to work on the nanoscale, albeit in a vacuum. Now, seven years later they've shown that it can be modified to work in the real world, too—that is, outside of a vacuum. According to EurekAlert.com, understanding the motion of fluids is the basis for a tremendous amount of engineering and technology in contemporary life. Planes fly and ships sail because scientists understand the rules of how fluids like water and air behave under varying conditions. The mathematical principle that describe these rules wave put forth more than 100 years ago

and are known as the Navier-Stokes equations. They are well-known and understood by any scientist or student in the field. But now that researchers are delving into the realm of the small, an important question arises: namely, how do these rules work when fluids and flows are measured on the nanoscale? Do the same rules apply or, given that the behavior of materials in this size regime often has little to do with their macro-sized cousins, are there new rules to be discovered? It's well-known that small systems are influenced by randomness and noise more than large systems. Because of this, Georgia Tech physicist Uzi Landman reasoned that modifying the Navier-Stokes equations to include stochastic elements—that is give the probability that an event will occur—would allow them to accurately describe the behavior of liquids in the nanoscale regime. "Knowing that the hydrodynamic theory, that is the basis of venerable technologies around us, can be extended to the nanoscale is fundamentally significant, and a big relief!" said Landman. "Particularly" so, now that we have been able to use it to describe the behavior of nanofluids in a non-vacuous environment—since we expect that this is where most future applications would occur."

## New Security Scanners Can See Through Clothes

Sky Harbor International Airport became first to begin testing a controversial new screening system that takes X-rays of passengers' bodies in an effort to find concealed explosives and other weapons. It can see through people's clothes and show the body's contours with bluish-inducing clarity, AP says. Critics have said the high-resolution images created are too invasive. But the Transportation Security Administration adjusted the equipment to make the image look something like a line drawing, while still detecting concealed weapons. During testing, the machine will be

used only as a backup screening measure. Passengers who fail the standard screening with a metal detector will be able to choose between the new device or a pat-down search. "It's 100 percent voluntary, so if the passenger doesn't feel comfortable with it, the passenger doesn't have to go through it," TSA spokesman Nico Melendez said. Passengers selected for screening by the device are asked to stand in front of the closet-size X-ray unit with the palms of their hands facing out. Then they must turn around for a second screening from behind. The procedure takes about a minute. The machine will be tested for up to 90 days at a single checkpoint at Sky Harbor International Airport's largest terminal, which hosts US Airways and Southwest Airlines, the two busiest airlines in Phoenix, Arizona, US. The security officer who works with the passenger going through the screening will never see the images the machine produces. The pictures will be viewed by another officer about 50 feet away who will not see the passenger. The machine cannot store the images or transmit them and once screening is done, the image is gone forever.

## Spearmint Tea Could Combat Body Hair

A few mugs of spearmint tea could help women combat excess facial and body hair, Turkish researchers report. According to Reuters, women with excess body hair, a condition known as hirsutism, who drank two cups of the herbal tea a day for five days showed significant reductions in their levels of free testosterone. Dr. Mehmet Numan Tamer and colleagues from Suleyman Demirel University in Isparta said. Typical treatments for hirsutism target excess levels of male hormones, and include oral contraceptives to prevent the production of these hormones or drug treatment to block the body's response to them. Tamer and his team point out in the journal *Phytotherapy Research*. Hirsutism is characterized by excessive hair growth on the face, breasts and belly, and affects about 5 percent of women. It is thought to be related to the body's level of androgens (male hormones). The researchers had 21 women with hirsutism drink a tea prepared from a heaping teaspoon of dried spearmint leaves twice daily. Twelve of the women had polycystic ovary syndrome, while the rest had hirsutism with known cause. After five days, the women's lev-

els of free testosterone (the biologically active form) declined, although their total testosterone level stayed the same. Women's levels of luteinizing hormone, follicle stimulating hormone, and estrogen rose, while their triglyceride levels dropped significantly. Women with high male hormone levels may also have high levels of triglycerides, insulin resistance, and obesity, the researchers note. "Spearmint can be an alternative to antiandrogenic treatment for mild hirsutism. However, further studies are needed for testing the reliability and availability of spearmint as a drug for hirsutism," the researchers conclude.