

# Mars Probe Returns Detailed Images

NASA's Mars Reconnaissance Orbiter has sent home its first close-up pictures of the Red Planet. They show a portion of a massive canyon as well as bright patches of what appears to be water ice near Mars's north pole.

MRO went into orbit around Mars in March. It is equipped with the most powerful camera ever sent to another planet, the High Resolution Imaging Science Experiment (HiRISE).

The camera took some pictures shortly after arriving at Mars, when it was in a much wider orbit around the Red Planet, NewScientist said.

Now, it has beamed back images taken from less than 300 kilometers above the planet's surface. The new images were taken on 29 September and show parts of Mars in unprecedented detail.

## Grand Canyon

A second image shows an area at 86.5° north, very close to the north pole. Layers of dust mixed with ice can be seen in a sloping cross section, possibly caused by sunlight sublimating frozen carbon dioxide on a hillside.

The layers are laid down with different thicknesses as a result of variations in Mars's

number Nicolas Thomas of the University of Bern in Switzerland.



Details as small as 90 centimeters across are seen in this HiRISE image of Mars's giant Valles Marineris canyon. (NASA Photo)

The number of craters present there can be used to estimate how much time has passed since the layers were laid down, Thomas says. This will help "piece together some sort of sequence of events" at the site, he told New Scientist.

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The layers are laid down with different thicknesses as a result of variations in Mars's

climate. HiRISE's unprecedented resolution will allow the lay-

into steep slopes on the planet. Some scientists believe these features were carved by melting water ice. HiRISE has also taken some color images, which the science team is still processing and plans to release in a few days. "From working on it, I can already tell you that it's going to be good," says Thomas.

An image has also been obtained with MRO's Compact Reconnaissance Imaging Spectrometer for Mars (CRISM). It has lower resolution than HiRISE but can make detailed measurements of the light spectrum of the areas it looks at, which allows it to map out their chemical compositions.

## Melting Water

Among the database of more than 5000 targets the HiRISE science team hopes to look at, Thomas is particularly keen on studying places where gullies have cut

ters to be probed in finer detail than ever before in order to understand these climatic shifts, Thomas says. The images will help tide scientists over until they can physically drill down into the polar ice caps to investigate the planet's past, Thomas says. "The only way we can do this now is with a remote sensing using a high-resolution camera."

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# Fully Grown Cells Yield Clones

By cloning two mice from cells fated never to divide again, researchers in the United States have defied the notion that cloning mammals is easiest from stem cells, or other cells that are still dividing, Nature.com reported.

In cloning, researchers use a technique called somatic cell nuclear transfer, in which the nucleus of a cell, such as a skin cell, is inserted into an egg stripped of its own nucleus. This process is thought to reprogram the DNA in the nucleus, effectively overwriting the genetic program that makes it behave as a skin cell and replacing it with one that can orchestrate the development of an embryo.

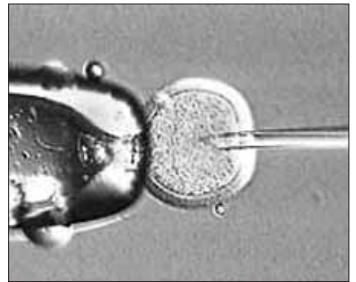
It was thought that stem cells, which have the capacity to turn into many cell types, are easier to reprogram and so should be better for cloning. Their genetic program is considered to be less engrained than

that of cells that have already differentiated and so are committed to being skin, blood, brain or bone for the rest of their lives.

Jerry Yang of the University of Connecticut in Storrs, Tao Cheng of the University of Pittsburgh, Pennsylvania, and their team tested this idea using fresh mouse blood cells at three different stages of differentiation.

One group of stem cells were differentiated very little and were able to give rise to all blood cell types; a second had differentiated to the stage where they could make only a handful of cell types; and a third group was composed of completely differentiated white blood cells called granulocytes.

The team found that the granulocytes—the most differentiated cells—were actually easier to clone, they report in Nature Genetics. Some 35% of attempts to clone these cells grew into young embryos



Stem cells are easier to reprogram and should be better for cloning. (Google Photo)

after nuclear transfer, and two eventually developed into animals that were born but died. In comparison, just 11% of clones from intermediate cells, and less than 8% of those from the least differentiated stem cells, grew into embryos. "It was very surprising," Yang says.

Unluckily, researchers are unsure why these differentiated blood cells are easier to clone than the blood stem cells.

It is possible that the

granulocytes contain some particular mix of biochemical factors that makes them easier to clone. Or the blood stem cells might have properties that make them more difficult to clone than other stem cells, says Ian Wilmut of the University of Edinburgh, UK, who led the team that cloned Dolly the sheep. It is well established that cloning from embryonic stem cells has a much higher success rate than most other cell types.

# Why Pigments Fade in Paintings?

US scientists say they have determined why natural ultramarine blue pigment fades—an important determination for the art world.

Researchers from New York University and the Pratt Institute say the pigment, obtained from the semi-precious stone lapis lazuli, has been most valued by European painters since the late 13th century, UPI said.

Instances of fading of ultramarine pigments are known, but the mechanism of color alteration of the pigments is not understood.

Alexej Jerschow, an assistant professor of chemistry at NYU, Eleonora Del Federico, an associate professor of chemistry at the Pratt Institute, and colleagues

noted ultramarine pigments consist of a framework of aluminum and silicon atoms. The intense blue color is formed by small molecules made up of sulfur trapped within that framework.

The scientists discovered that upon color degradation, the framework breaks apart and releases the color-forming molecules.

"Apart from the scientific interest in this work, these ... investigations promise to have tremendous impact on our understanding and prevention of the chemical processes that underlie the slow—often irreversible—decay of our cultural heirlooms," said Jerschow.

The research team is also investigating lead-soap formation in traditional oil paintings.

# Anti-Cancer Effect of Aspirin Clarified

Previous research has shown a possible anti-cancer effect for aspirin. Now, new findings suggest that the drug achieves this by cutting off the tumor's blood supply, not just by blocking an enzyme called cyclooxygenase.

While aspirin may not represent a suitable treatment for cancer, since many of the effects are only seen at very high doses, understanding how the drug works may lead to new therapies.

"Our work," senior investigator Dr. Helen M. Arthur told Reuters Health, "shows that the protective effects of aspirin against cancer may be partly due to the ability of aspirin to restrict the blood supply to a developing tumor, which limits tumor growth."

To investigate underlying processes, Arthur, from the University of Newcastle in the



At standard doses, aspirin does not affect the cells, but seemed to disrupt the surrounding proteins that provide a support structure for blood vessels. (Yahoo Photo)

UK, and colleagues exposed blood vessel cells to aspirin or to drugs like Celebrex (celecoxib), which block various forms of cyclooxygenase.

In the Federation of American Societies for Experimental Biology (FASEB) Journal, the researchers report that aspirin, at doses well above what is typically used for pain control, caused death of the blood vessel cells.

At standard doses, aspirin did not affect the cells, but seemed to disrupt the surrounding proteins that provide a support structure for blood vessels.

Celebrex and the other drugs, which largely target just cyclooxygenase, did not show these effects.

"The next stage in this research is to discover the mechanism by which aspirin can do this, which will also help us to identify new drug targets to treat cancer," Arthur concluded.

# Scientists Identify Tobacco Carcinogen

US researchers have pinpointed a key killer compound in cigarette smoke. According to HealthDay, the



Acrolein can trigger DNA mutations in cells while reducing the cell's ability to repair that damage. (Google Photo)

chemical acrolein—found in tobacco and also some cooking oils—appears to be a prime cause of smoking-related lung cancer and some nonsmoking-related lung cancers as well, according to studies conducted with lung cancer cells.

Acrolein can trigger DNA mutations in cells while reducing the cell's ability to repair that dam-

age, the researchers explained.

"Cigarettes have a lot of carcinogens, some are more potent and more abundant than others," said lead researcher Moon-shong Tang, from the departments of environmental medicine, pathology and medicine at New York University. "Acrolein is probably the true variant that causes smoking-induced lung cancer."

In fact, Tang's team found acrolein to be 10,000 times more prevalent than another class of carcinogen, called polycyclic aromatic hydrocarbons (PAHs), which had previously been identified as a cause of lung cancer.

Lung cancer remains the leading cause of cancer death for both men and women, killing more than 163,000 Americans each year, according to the American Cancer Society. Overall, lung cancer has only a 15 percent survival rate.

Tang noted that, in Asian countries, many women who don't smoke still get lung cancer. However, these women cook with oils that are heated to very high temperatures and release high amounts of acrolein. "We think this is related to female lung cancer," Tang said.

"Now we know the cause of smoking and nonsmoking lung

cancer," Tang said.

The New York City researcher believes the finding has implications for preventing lung cancer and assessing the lung cancer risk of various populations.

If acrolein were removed from cigarettes, he speculated, they would be less likely to cause lung malignancies.

However, another expert believes that many other carcinogens in cigarette smoke contribute to cancer risk.

"It is not simple to conclude that any one carcinogen in cigarette smoke is necessarily responsible for lung cancer. It would be a mistake to do that," said Stephen S. Hecht, the Wallin Professor of Cancer Prevention at the Cancer Center and the Department of Laboratory Medicine and Pathology at the University of Minnesota and author of an accompanying commentary.

Hecht believes the notion of a "cancer-safe" cigarette is misguided. "If people got the impression that by removing or reducing any one carcinogen from cigarette smoke that you could therefore produce a safe product with respect to lung cancer, that would be wrong," he said.

Mr. Shahin (Ghamizadeh)



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