

SCIENCE & MEDICINE

BRIEFS

Octopi walk like a man, fast as they can

Sometimes two legs are all you need — even if you're an octopus with eight tentacles to choose from.

Biologists have discovered two species of octopus that sometimes pull up six arms and scoot backward on just two. The trick may be a way for the octopus to zip away from predators — as fast as 5.5 inches each second — while remaining camouflaged.

Researchers from California and Indonesia reported the findings last week in *Science*.

Alexandra Witze

Mutation of one gene lets fish shed armor

Organisms can sometimes adapt to new environments quickly, a study of fish has shown. Tiny changes in just one gene can dramatically alter the form of the stickleback fish, transforming its heavy armor to an ultralight cloak.

In the latest issue of the journal *Science*, researchers from California and British Columbia report that mutations in a particular gene have occurred repeatedly around the world as sticklebacks living in the sea relocate into freshwater lakes and streams.

The mutations transform a row of 35 hard armor plates on the marine fish's back into just a handful of plates, or no plates at all on the freshwater varieties. Scientists speculate that the lighter armor found on freshwater sticklebacks may improve maneuverability in fast-moving stream water.

The new study is one of only a handful so far that have documented how specific gene changes can change an organism's appearance.

Sue Goetinck Ambrose

A shot at finding the best flu vaccine

Method could help match virus strains that are making people sick

By ALEXANDRA WITZE
Science Writer

New research from Rice University could give the annual flu vaccine a shot in the arm.

Bioengineer Michael Deem has invented a method that could help the flu shot — which contains a mix of flu strains that changes each year — more closely match the strains that are making people sick. In theory, the research could help vaccine developers choose the most effective flu-fighting mix for that year.

"It seems we've developed a tool for vaccine design," Dr. Deem said. He reported his findings last week in Los Angeles at a meeting of the American Physical Society, and has also passed them along to flu-control experts.

Doctors who specialize in the flu say Dr. Deem and his colleagues may be onto something.

"His technology offers a very accurate way of anticipating what virus strains we have to use for the vaccine," said Mohammad Madjid of the University of Texas Health Science Center at Houston, who studies the link between the flu and

heart attacks.

"More importantly," he added, "is it a good match for this year or not? That's a big problem right now."

Early each year, the World Health Organization in Geneva recommends which three strains to include in the next winter's flu vaccine for both hemispheres. Which strains get picked depends on which ones are most widespread and whether any new or particularly virulent strains have surfaced recently.

The three chosen strains, or versions of them, are then grown for months in chicken eggs before being tested for safety. By autumn, the flu vaccine is distributed to health providers nationwide.

The shot contains killed versions of the three strains, which means it has to closely match the strains that are circulating among people. Doctors currently test the closeness of the match through ferret tests.

But those tests aren't always accurate, Dr. Deem said.

"As far as we know, we're the first people to show this relative lack of correlation," he said. "We find that a little surprising."

Instead, his mathematical model compares genetic sequences for the part of the flu strain that triggers the biggest immune response.



TIM BOYLE/Getty Images

The method appears to predict a match much better than the ferret studies do, he said.

Looking back to 1971, he said, the research seems to explain why some annual vaccines performed well while others did not. It could also help doctors decide which

strains to include in upcoming vaccines.

For instance, last year's flu shot included a strain called Wyoming, but Dr. Deem's model suggested that a related strain called Kumamoto might have been more effective. Next year's shot will replace

Wyoming with an emerging strain called California, a decision his research supports.

Klaus Stöhr, who runs the flu program for the WHO, has told Dr. Deem that he is interested in any way to improve the vaccine's effectiveness.

Vaccines are expected to be in ample supply this year. Last winter, a vaccine shortage prompted more than 16 million people to give up their shot. Still, 4.5 million doses were left unsold, health officials announced last week.

Dr. Deem became interested in the flu vaccine when he got his 1998 shot at a Costco in Los Angeles. The nurse giving him the shot told him he might be more likely to get the flu if he skipped the next year's dose.

That didn't seem to make sense, so Dr. Deem began researching the flu. He read about the phenomenon known as "original antigenic sin," in which a person's immune system recognizes a new flu strain but then tries to fight it the same way it fought earlier strains it had encountered.

Thus, he said, skipping a flu shot can make a person more likely to get the flu than if he or she had never gotten a shot at all.

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Dallas teams fighting heart disease on two fronts

By SUE GOETINCK
AMBROSE
Science Writer

New research from two teams of Dallas scientists may lead to better ways to treat heart disease.

One of the teams, led by Russell DeBose-Boyd of the University of Texas Southwestern Medical Center at Dallas, has discovered how the body fights back against the cholesterol-lowering drugs called statins.

Statins block an enzyme called

HMG CoA reductase, leading to an increase in the liver's ability to soak up cholesterol from the blood. But when drugs block the enzyme, something else happens — molecules that would normally degrade the enzyme become more scarce. The amount of active enzyme increases and becomes harder and harder to block with the drugs. This limits how effective statins can be.

In the current issue of the journal *Cell Metabolism*, Dr. DeBose-

Boyd and his colleagues report that a molecule called lanosterol triggers destruction of the enzyme. If scientists could come up with a drug to mimic lanosterol, it could make statins more effective or even provide an alternative medication to lower blood cholesterol levels. Participating in the research was Bao-Liang Song of UT Southwestern and New York University's Norman Javitt.

The second team, also from UT Southwestern, has bred mice that

can eat a fatty, high-cholesterol diet and not develop clogged arteries.

The mice lack the gene for a protein that protects blood cells called macrophages. These cells contribute to the vessel-clogging plaques in people with high cholesterol. But in mice that can't produce the protein, the cells die and no plaques form.

Toru Miyazaki, the immunologist who led the study, said it might be possible to develop a

drug that blocks the protein. If such a drug could be found, in theory people could eat a high-fat diet and not suffer the usual consequences.

The study also appeared in the journal *Cell Metabolism*. Other UT Southwestern researchers who participated in the research were Satoko Arai, John Shelton, Angie Bookout and David Mangelsdorf. Scientists from the University of California, Los Angeles also participated.



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