



SCIENCE BRIEFS

U.S. scientist creates lethal smallpox viruses

A scientist funded by the U.S. government has deliberately genetically engineered a form of mousepox, similar to the human smallpox virus, which kills animals that were given anti-mousepox drugs or were even vaccinated. The virus killed 100% of the vaccinated mice it infected. A similar cowpox virus, capable of infecting humans, has also been created. The scientist claims the purpose of the research is to explore what bioterrorists might do. Others point out that terrorists may find a way to use these methods to make viruses capable of spreading to humans.

Source: *New Scientist*

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World's rarest dog dying of rabies

There are only 480 left, and 20 of them died just this past week. The Ethiopian wolf is being threatened with an outbreak of rabies, and as many as three-quarters of the animals may die unless government officials move quickly to vaccinate the animals, say experts. The dogs have only just recovered from a rabies outbreak in 1991, which reduced their population to only 120 animals. It seems that outbreaks occur as soon as the animals start doing well—when they are too densely packed into a certain area, diseases are more likely to spread.

Source: *Nature*

-ZOE CORMIER

Life from lump of clay?

Scientists in Boston have found that the two components necessary to create the first cell, membrane sacs and genetic material, could have come together in a lump of clay. Experiments in the past have shown that RNA, akin to DNA, can form spontaneously inside a lump of clay. This new work shows that membranes can form up to 100 times faster inside clay than they normally would, and that when they form in clay RNA can get inside them much easier, making simple cells. The scientists were also able to get the cells to divide inside the clay.

Source: *Science*

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From cannabis to carburetor

U of T prof makes autoparts from hemp

by ZOE CORMIER
VARSITY STAFF

Amid the clutter of textbooks, journals, papers and reams of notes in the office of Dr. Mohini Sain sit a car door, a bus seat, an instrument panel, a deck plank, and a car bumper—all of them made from hemp.

Dr. Sain is a professor in U of T's Faculty of Forestry and the Department of Chemical Engineering and Applied Chemistry, and has conceived of more things to do with hemp than you can think of to do with the strongest (mechanically speaking) of hemp plants, cannabis. "We look at the potential for hemp in automotive parts, sports apparel, the furniture industry, aeronautics, and the medical industry," Dr. Sain

said. You can make skis, dashboards, bumpers, I beams, cross ties for railroad tracks, canoes, tennis rackets, basketball stands, car door panels, roof shingles and a myriad of other things from the materials that he and his collaborators have developed. And hopefully, in the very near future, we will be able to make biomedical supplies, like bloodbags, and even airplane parts from hemp.

"Our direction is to move away from fossil fuel based synthetics to more natural alternatives," said Dr. Sain.

How does he manage to turn fluffy green cannabis plants into car siding capable of withstanding a full-on impact? A long chemical process

allows Dr. Sain to extract long, thin strands of pure starch, or cellulose (a long chain of sugar) from hemp. In the plant, many of these strands put together make a hemp fiber. By first isolating individual strands and then reassembling them back into fibers, chemists make fibers with as few defects as possible, making them much stronger. They can also control the length and diameter of the strands—the longer and thinner the strand, the stronger it is.

By enmeshing hemp fibers into a matrix of glue, Dr. Sain has been able to create plastics almost identical to conventional plastics (save for their brown colour). The glue could be synthetic, or it could be natural—there are already many bioplastics made from soy or corn being used. Dr. Sain is particularly interested in producing construction materials from a glue of wood resin interwoven with hemp fibers. The wood resin could easily come from leaf litter and forest floor debris, he said. Fewer trees would have to be cut down than are needed to support our current construction business.

The technology is not entirely new—for years Dr. Sain and many other scientists have been making biomaterials, or industrial materials made from natural products. You may even have already ridden in a car made with hemp parts. Dr. Sain's fiberglass-like hemp material has been used in car door siding for two years now. Transit seats made from 100 per cent hemp with a polyester glue are already in widespread use. "The first generation of biomaterials has already been in use for several years. For example, in the construction industry, if you go to places like Home Hardware, you can find decking materials made from synthetic plastics combined with wood fibers or rice husks," said Dr. Sain.

Dr. Sain is working towards improving the strength and durability of these materials, and devising even more ways of using hemp com-

mercially. He hopes that he will be able to create steel interfused with hemp. Weaving hemp fibers into steel makes the metal stronger, which would allow auto manufacturers to lower the thickness of the steel they use. Not only would this mean using less steel, but it would also mean making a much lighter car that would use far less fuel, costing less for everyone and creating less pollution. Win-win.

With such a development you could literally build a car from the inside out with hemp—the steel frame and body, hubcaps, bumpers, instrument panel, seats, and seat coverings all could be made with hemp.

Dr. Sain is also optimistic that within a few years we will have blood bags and other biomedical supplies made from hemp. Syringes and gloves and other medical gear, by and large, cannot be reused, but ones made from hemp would be 100% biodegradable. He and his associates will first have to ensure however that these biodegradable materials will be safe for human use. No matter how fond you are of environmentally friendly alternatives, an IV bag that slowly disintegrates into your drip and your veins is not a pleasant thought.

Hemp alternatives not only make environmental sense, says Dr. Sain, they make economic sense. "We look to make environmentally and economically sustainable materials." By creating industrial products with hemp, "you can bring some of this value back to the farmers who grow the plants, and then you can develop some small industries and employ some people to make these materials. You not only give added value to the farmers, you also get additional employment.

"This is a public issue. That's why we are scientists—we are interested in accepting the challenges and finding solutions. We meet the concerns of the public."



ZOE CORMIER



COURTESY OF M. SAIN

Top: Dr. Mohini Sain. Bottom: A sun visor made of hemp and plastic.