

'Genetic art' builds cryptic bridge between two cultures

Boston. A rare collaboration between about a dozen artists and scientists has led to an exhibition of so-called 'genetic art' at Harvard University in Cambridge, Massachusetts. But one planned exhibit that would have used artificial nucleotide sequences inserted into live *Escherichia coli* bacteria to express an encoded message has fallen foul of the university's safety committee.

The exhibition is the brain-child primarily of Joe Davis, the unofficial and unpaid 'artist-in-residence' in Alexander Rich's Molecular Structures Laboratory at the Massachusetts Institute of Technology (MIT), who says he was inspired by an exchange between the Nobel prize-winners for medicine, Max Delbrück and George Beadle.

In 1958, Delbrück sent a telegram to Beadle at the Nobel prize ceremony in Stockholm containing a string of 229 letters. These formed a coded message in which each of the letters A, B, C, and D corresponded to a DNA base, and a sequence of three bases in turn corresponded to a letter in the English alphabet.

Beadle successfully deciphered the message "break this code or give back the Nobel prize", and responded with a coded message of his own. Delbrück replied with yet another message, this one in the form of a set of coloured toothpicks which, when decoded, produced the message: "I am the riddle of life. Know me and you will know yourself."

Davis has now used PCR technology to take the concept a step further. Last year, he teamed up with biologists at MIT and the Free University of Berlin to synthesize DNA molecules composed of a sequence of 174 bases. The bases are arranged in triplets, each standing for a separate letter which together spell out Delbrück's "riddle of life" message.

The Harvard show consists of various sculptures — including a helical array of broomsticks, a string of coloured toothpicks, and a rack of test tubes containing light-responsive pigments — each illustrating this message in a different way.

Davis argues that the exhibition is a reflection on the idea that, despite what has been discovered about it, DNA still remains "one of the principal riddles of life". The

sculptures, he adds, are about "making the invisible visible — an effort common to art and science". But although his efforts have been appreciated on artistic grounds, their biological aspects have been controversial.

In September, Davis was given written permission from Harvard's Committee on Microbiological Safety (COMS) to display the recombinant *E. coli* organisms containing the "riddle of life" DNA at the exhibition, provided that he adhered to certain conditions.

Davis says he interpreted the conditions as allowing him to display "viable cultures" provided they were properly sealed and refrigerated, and kept secure. But the committee, in a subsequent clarification of its position, told Davis that the cultures had to be "inactivated" with formaldehyde and chloroform.

John Mekalanos, the chair of the medical school's safety committee, says the committee made "perfectly reasonable suggestions that should not infringe on [Davis's] artistic freedom". But Davis says he was reluctant to "kill" organisms he considers to be "harmless", and has instead chosen to display the synthetic DNA itself in two leakproof containers in a refrigerator — steps that would meet the committee's stipulations.

Sarah Zehr, a biological anthropologist at Harvard who helped to set up the show, says that she agrees with Davis that "fixing" the cultures was unnecessary, as "the DNA is inert and doesn't code for anything". But she accepts that recombinant DNA is still a politically charged issue in Cambridge, site of a fierce conflict between Harvard and the city's Mayor Al Vellucci in the late 1970s. "There are still some old sentiments here which die hard," she says.

Zehr claims that one of the benefits of the show is that "it brings artists and biologists together, two groups which normally have little to do with each other". Mekalanos says that he is also intrigued by the idea of using DNA as "a wholly new form of communication and artistic expression". He adds: "we're giving [Davis] a chance to display these biological materials because we feel it could be historically significant." The exhibition remains open until the end of the month.

Steve Nadis

Democrats rally to defend science from Congressional cuts

Washington. Democrat members of the US Congress are mounting a late bid to put proposed Republican cuts to research and development on the public agenda, just as the budget battle between President Bill Clinton and the Republican majority in Congress reaches its climax.

Last week, six Democrat senators joined Clinton administration officials to lambast what one of them — John Glenn of Ohio — termed the "myopic, Luddite view" of the Republicans on supporting research. "These modern-day Luddites would cut back on basic, non-defense research and development by 30 per cent by the year 2002," said Glenn, a former astronaut.

His views were echoed by John Rockefeller (Democrat, West Virginia), who said that the public did not understand the impact of the planned cuts. "This is as dangerous as [planned cuts in] Medicare, because it affects jobs for our young people in the future," he said.

Meanwhile, in the House of Representatives, George Brown (Democrat, California), the senior Democrat on the science committee, has set up a 16-member research and development (R&D) task-force, which will seek to raise public awareness of the difference between Democrat and Republican positions on R&D.

Brown is worried that scientists — particularly in universities — have accepted Republican assurances that basic science will be protected, and hopes to shake them out of any such complacency. The task force, which includes several Democrat members of the House appropriations committee, plans to meet Clinton soon to discuss his budget plans for the 1997 financial year (which begins on 1 October 1996), which is due in February.

The Clinton administration's Council of Economic Advisers backed up the Democrat Senators' attack by releasing a short report on the role of federally funded R&D in boosting the US economy. This predicts that industry-funded R&D will drop if government-funded R&D does so.

Challenged with National Science Foundation data showing that the Clinton administration has already cut R&D spending (see *Nature* 378, 3; 1995), Laura Tyson, Clinton's economics adviser, said that "our budget tries to maintain R&D spending, as a proportion of the total budget".

Earlier opposition to Republican budget plans has been undermined by bad relations between Clinton and Democrats in Congress. But Democrats have since closed ranks in an effort to land Republicans with the blame for the long-awaited budget 'train-wreck'.

Colin Macilwain