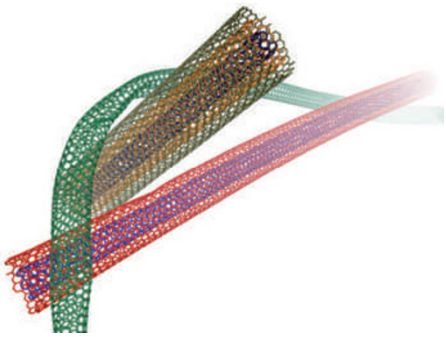
Seventy-nine molecules were identified that bind to the Aβ peptide from this highly sensitive, high-throughput assay, and were subsequently tested for their ability to prevent Aβ42-induced killing of a cell line. Fifteen of these increased the survival of cells incubated with Aβ42 by more than 30%. Further investigations with one of these compounds suggested that it enhanced Aβ42 aggregation. This microarray method shows promise for the identification of therapeutic leads, regardless of their action mechanism.

CARBON NANOTUBES

At a stretch

Science **330,** 1364–1368 (2010)



Viscoelastic materials are both viscous (they can dissipate energy) and elastic (they can reversibly deform and reform). Their uses are widespread and range from biological tissues through to everyday objects such as mattresses, to high-performance materials such as vibration isolators. One drawback of many of these materials, however, is the limited temperature range of their optimal performance. Outside these temperatures, they are either brittle or they degrade.

Now, a team from the Japanese National Institute of Advanced Industrial Science and Technology led by Kenji Hata and Don Futaba have created a material from carbon nanotubes (CNTs) that is viscoeleastic between −196 °C and 1,000 °C. To create as many physical connections between CNTs as possible, they made randomly oriented, long and clean CNTs, which they then compressed. This quadrupled the density of the material, and scanning electron microscopy revealed a complex structure of interconnected CNTs. The stress–strain behaviour of the compressed material showed that it possessed viscoelastic properties, with stiffness and damping similar to silicone rubber — a known viscoelastic material with the previous best thermal stability.

Comparing the two materials over a large temperature range, however, showed that the silicone rubber degraded at 200 °C, whereas the CNT material's properties did not change at all up to 600 °C. Similarly, the silicone material hardens at −55 °C, but the CNTs maintain their properties down to −140 °C. Repeated stress–strain experiments (even up to one million times) showed that the material has excellent fatigue resistance — Hata, Futaba and colleagues suggest that it dissipates energy through the zipping and unzipping of the tubes at points where two are in contact.

ENANTIOMER SEPARATION

Selective soap films

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Enantiomer separation is big business — worldwide sales of single-enantiomer drugs, for example, reached $147 billion in the year 2001 and enantiomer separation has been used both to obtain enantiopure starting materials and to separate racemic mixtures of the final product. Now, Purnendu Dasgupta from the University of Texas at Arlington and co-workers from Chiang Mai University in Thailand have introduced a new enantiomer-separation method — selective permeation through a chirally doped soap film.

Soap films are ultrathin liquid membranes formed by surfactant molecules, and consist of two layers separated by a solution of micelles. They are known to be gas-permeable, and can dissolve a wide range of substances. Dasgupta and co-workers created soap films doped with α-cyclodextrin — a cyclic oligosaccharide widely used in chiral separations — and then showed that one enantiomer of gaseous α-pinene (a chiral bicyclic hydrocarbon) passed through the film faster than the other, leading to its enrichment. Interestingly, it is the (+)-enantiomer that is enriched despite it being the one that binds most weakly to α-cyclodextrin, showing that, in fact, such binding slows down the permeation of the membrane.

As yet, the selectivity of the enrichment is small: (+)-α-pinene permeates the membrane about 1.6 times faster than the (−)-enantiomer. The demonstration, however, that a stable film containing a chiral dopant can be formed is an important first step, and the enrichment factor corresponds well to the difference in binding constant of the two enantiomers of α-pinene to the chiral dopant. Ultimately, complete chiral separations could be achieved by the use of multiple membranes.

The definitive versions of these Research Highlights first appeared on the *Nature Chemistry* website, along with other articles that will not appear in print. If citing these articles, please refer to the original web version.

blogroll

Taking the P

An arsenic-loving bacterium sent the blogosphere into overdrive.

It started quietly enough. NASA announced a press conference "to discuss an astrobiology finding that will impact the search for evidence of extraterrestrial life" to be published in *Science*. Some people put two and two together but didn't get four: Jason Kottke, for example, suggested that NASA had "discovered arsenic on Titan and maybe even detected chemical evidence of bacteria utilizing it for photosynthesis" (http://go.nature.com/7gdq6m). When the paper came out you could almost feel the hype deflating, but plenty of people still found the 'Bacterium that can grow by using arsenic instead of phosphorus' interesting (http://go.nature.com/fjHeOg).

The press coverage was intense, but people were reading the paper carefully and critically. To take just one prominent example, blogging (micro)biologist Rosie Redfield concluded on RRResearch "Lots of flim-flam, but very little reliable information" (http://go.nature.com/DDeSJW). As the blogosphere's reaction continued, science writer Carl Zimmer contacted 13 experts, all of whom gave the paper a thumbs-down in an article for Slate (http://www.slate.com/id/2276919/).

Responding to the comments, the paper's first author, Felisa Wolfe-Simon, issued a statement that the authors "welcome lively debate" but that they "invite others to read the paper and submit any responses to *Science* for review so that we can officially respond" (http://www.ironlisa.com/gfaj/). Indeed, the backlash against the backlash was supported by Dr Isis, who forthrightly told those critical of the work to "Put your experiment where your mouth is! [...] The language of those discussions needs to be data" (http://go.nature.com/r6TDCn). The episode caused many blogs to question the roles of peer-review, press conferences and blogging — too many to list.

And finally...if you're worried about the future of peer-review after this, why not read some of *Environmental Biology*'s funniest reviewers' quotes (http://go.nature.com/mvwwCY).