On the scent

Artificial noses are about to become more discriminating

CHEMICAL gatekeepers that admit only certain kinds of molecules could be used to build better sensors for chemical weapons or pollutants. These "access ports" will guide target molecules to an inner sanctum, where they can be trapped and identified,

To make the access ports, Ken Suslick and his colleagues at the University of Illinois at Urbana-Champaign tinkered with dendrimers, self-assembling polymers that branch out in all directions from a single molecule. They attached dendrimers to a porphyrin, an organic molecule with a metal binding site that can trap other substances.

Zinc is the metal at the active site of the team's artificial porphyrin. It works in the same way as hemoglobin, which contains iron for transporting oxygen in mammals.

Suslick's dendrimers formed two types of access port leading to the porphyrin binding site. One, shaped like a chimney, let in molecules only if they were slender. The other, shaped like a cave, admitted only short, chubby molecules. "We can choose between short fat molecules or long skinny ones," says Suslick. The porphyrins changed colour when they bound to their chosen targets, in the same way that haemoglobin turns red when it binds to oxygen and blue when the oxygen is released. The team's results will appear in this week's *Journal of the American Chemical Society.*

Forewarned: better artificial noses may give soldiers time to prepare for chemical attacks

The new molecules show that the concept works, but they have no direct application yet. However, Suslick's team is now working towards "artificial noses". "It's the sort of thing you could use in the food industry, in the chemicals industry or as detectors for chemical warfare agents," says Suslick. "You could have them in arrays for detecting all sorts of things." The ports could also be used to control specific molecules' access to catalysts in chemical reactions.

Jean Fréchet, a dendrimer specialist at the University of California at Berkeley, is impressed. "They've shown that by using the sheer bulk of the dendrimer, **they can** control what you let into the binding site," says Fréchet. "It's very much like the cavity in an enzyme." He believes that the idea could be applied to create a new generation of designer enzymes. **Andy**