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Seeing smell: A little strip of high-tech litmus paper one day could detect diseases faster and more cheaply than current tests.

By **Eric Hand**
ST. LOUIS POST-DISPATCH
05/28/2007

You take a breath analysis test. Not to see if you've been drinking — though it is sensitive enough to discern Bud from Miller. This test tells you if you have early stage lung cancer.

This is not too far off, if all goes well for Kenneth Suslick, a chemist at the University of Illinois at Urbana-Champaign.

He has invented a little strip of high-tech litmus paper, called a colorimetric sensor array, that makes it possible, in effect, to see smells.

He puts dots of chemical-sensitive dyes onto a five-by-five array about the size of a quarter. The dyes change color when they come into contact with even the slightest whiff of an organic chemical, which rise as byproducts off of beer, soft drinks, bacteria and even tumors.

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The sensors do a much better job than electronic noses, which laboriously measure quantities of the individual gases in a smell.

"That's not the way Mother Nature usually does things," he said, referring to the way that eyes recognize a face (and noses recognize a smell) from its overall quality, not from individual freckles. Much like a fingerprint, the sensor array produces a dot map that precisely identifies the smell.

In recent scientific papers, Suslick has shown that the sensors can quickly and cheaply distinguish Pepsi from Coke and Bud from Miller. He thinks coffee, beer and soft drink companies might want to pursue the technology for quality control purposes. But the real applications are in medicine, he says.

Suslick founded a company, ChemSensing Inc., in 2002 with two main objectives: use the sensors in petri dishes to detect diseases of the blood such as sepsis; and breath analysis. Right now, a diagnosis takes two days and

requires multiple expensive tests, said ChemSensing President Matthew Placek. That time could be cut down to half a day, with a disposable strip that costs only dollars to make.

With the other objective, breath analysis, the strips can identify the strain of bacteria causing a respiratory infection such as pneumonia and allow a doctor to tailor a prescription. A recent pilot test at the Cleveland Clinic in Ohio found that the sensors could detect lung cancer on the breath of victims 75 percent of the time.

Placek says detection rates can be improved up to 90 percent and hopes to see the technologies available to the public in the next three to five years.

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