

Tamoxifen may not prevent breast cancer

U.S. researchers sparked a transatlantic debate this spring when they announced that the drug tamoxifen can prevent women from developing breast cancer. Researchers in Britain responded that longer studies were necessary to justify that conclusion.

Now, two teams of European researchers offer some support for those critics. In the July 11 LANCET, both groups report preliminary findings that indicate tamoxifen—a widely prescribed medication for limiting breast cancer recurrence—provides no significant protective effect.

Like the U.S. researchers, teams in England and Italy examined whether the drug reduces the number of new cases of cancer among healthy women with no previous breast cancer but who were, for a variety of reasons, at high risk of contracting the disease.

Neither study found a significant difference in cancer incidence between women who took an inactive substance, or placebo, and those who received tamoxifen. In contrast, the U.S. Breast Cancer Prevention Trial had found that among participants diagnosed with invasive breast cancer, almost twice as many were taking the placebo as tamoxifen (SN: 4/11/98, p. 228).

Citing statistical shortcomings in their own data, the European investigators

stop short of dismissing tamoxifen's preventive effects and instead call for further research. The British team, led by Trevor Powles of the Royal Marsden NHS Trust in Surrey, England, reports a chance of about 1 in 10 that their study erred in failing to observe the effect reported by the U.S. team. The finding in the Italian Tamoxifen Prevention Study, by researchers at the European Institute of Oncology in Milan, appears less powerful still.

The U.S. team calculated the odds at 1 in 10,000 that its results were due to chance alone. Barnett Kramer of the National Cancer Institute (NCI) in Bethesda, Md., which sponsored the U.S. study, argues that this trial was the most accurate because of its large size—13,388 women participated. In contrast, only 2,494 women were included in the British study, and 5,408 women participated in the Italian trial.

The British study, however, tracked its participants for almost 6 years, compared with only about 4 years in both the U.S. and Italian trials.

The NCI halted its study last March, after finding what they termed dramatic evidence of tamoxifen's protective benefit. "I have seen nothing in either of those [LANCET] articles which would lead me to change our conclusions in any way," says

Bernard Fisher of Allegheny University of the Health Sciences in Pittsburgh, who directed the U.S. trial.

The latest reports have nevertheless renewed discussion about whether any protective benefit of tamoxifen outweighs its side effects, which can include uterine cancer and life-threatening blood clots. "What cautious people thought was, we shouldn't jump to act based on that one [U.S.] study," says Cynthia Pearson of the National Women's Health Network in Washington, D.C.

Significant differences between the participants in the U.S. and European studies may explain the contrasting results, Fisher says. More women in the U.S. study had passed menopause, which is associated with an increased risk of breast cancer. Also, the European researchers allowed participants to treat symptoms of menopause with estrogen-like drugs, which Kramer says could have distorted the results. Estrogen helps breast cancer cells grow, and tamoxifen blocks its action.

In a commentary in the same issue of LANCET, Kathleen I. Pritchard of the University of Toronto says the U.S. findings "seem robust." But, she adds, the disparate results suggest that tamoxifen may only initially suppress the growth of small, difficult-to-detect tumors. In the longer term, those cancers may grow if they become resistant to tamoxifen or if a woman stops preventive therapy. —J. Brainard

Air-filled spaces make swifter chips

Bubbles don't usually belong in computer chips, but in a new study, researchers at the Georgia Institute of Technology in Atlanta demonstrate the feasibility of using air gaps as insulators in integrated circuits.

At present, layers of easily made silicon dioxide separate the tiny electronic components in chips to prevent signals from heading down the wrong path. To make a new generation of smaller, faster chips with tightly packed features, researchers will need to find better insulating materials.

Air happens to be one of the best insulators around. Although other scientists have considered building air gaps into integrated circuits, it has been difficult to make pockets of air that small, says study coauthor Paul A. Kohl. He and his colleagues now have developed a technique that he says is "the simplest way to make an effective air gap."

The researchers created a test sample by etching a pattern into a special polymer, laid on a rigid foundation. Then they deposited a metal, either gold or copper, in the pattern and laid a coat of silicon dioxide over the whole structure. Heating the sample to 450°C burns away the polymer, which escapes

through the silicon dioxide overcoat.

The choice of polymer is crucial because "it has to decompose at exactly the right temperature," says Kohl. The silicon dioxide is deposited at 200°C, so the polymer must not burn away until a higher temperature is reached. The team modified a polymer made by BF-Goodrich in Brecksville, Ohio.

Although many polymers leave residue behind when heated, this one burns very cleanly and slowly, ensuring that the chip doesn't "blow up like a volcano," Kohl adds. He and his colleagues describe the technique in the July ELECTROCHEMICAL AND SOLID STATE LETTERS.

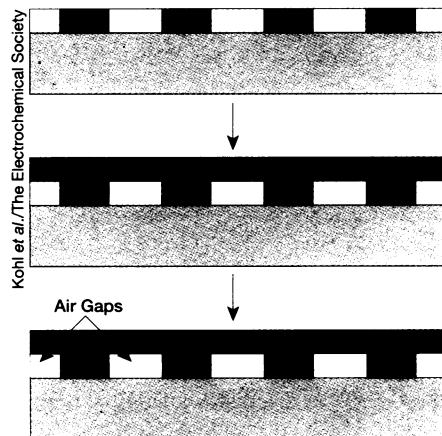
The amount of insulation provided depends on the air gap's dimensions relative to the thickness of the overcoat. The new system could potentially achieve the insulating ability that the semiconductor industry anticipates needing for a new generation of chips, according to Kohl's analysis.

The decomposition temperature used by Kohl, however, may be "a little on the high side" to be used with new copper chip technology (SN: 9/27/97, p. 196), says Toh-Ming Lu of Rensselaer Polytechnic Institute in Troy, N.Y.

Kohl says that the technique could

also provide a way to make other devices, such as thin membranes for pressure sensors.

Scientists are currently investigating other insulating materials, including fluorinated polymers and silicon dioxide foams (SN: 12/14/96, p. 383). Air gaps combined with traditional silicon dioxide could compete favorably with these alternatives, Lu says. —C. Wu



Top: A metal (blue) and a polymer (yellow) are deposited on a foundation (green). Middle: An overcoat (orange) seals off the structure. Bottom: Heat burns away the polymer, leaving pockets of air (white).