Two new wrinkles for cigarette smokers

Lung cancer, heart attack, stroke. For some people who seek out risky activities, the deadly dangers of smoking actually increase the cigarette's allure, research has shown. But two new reports focusing on certain nonlethal effects of smoking may provide even these daredevils with powerful incentives to kick the nicotine habit.

One study shows that women who smoke cigarettes may face an increased threat of developing urinary incontinence. The other confirms the link between smoking and premature wrinkling of the skin.

Researchers at the Medical College of Virginia in Richmond have gathered data suggesting that approximately one-third of all women suffering from urinary incontinence can blame this embarrassing problem on a current or past smoking habit. Richard C. Bump reported his team's preliminary data last week at the annual meeting of the American College of Obstetricians and Gynecologists, held in New Orleans.

Many physicians suspected that a smoker's hacking cough could contribute to the development of some types of incontinence.

However, says Thomas G. Stovall of the University of Tennessee in Memphis, "to my knowledge this is the first paper of its kind to address the independent contributing role of smoking in urinary incontinence."

The Virginia researchers studied 606 women aged 13 to 87 (with a mean age of 46) and uncovered a statistically significant relationship between smoking and all forms of urinary incontinence, including "stress" incontinence, in which abdominal pressure triggers the loss of small amounts of urine, and another type that involves large urine spills.

Of the 322 women suffering from incontinence, 35 percent reported a smoking habit. By contrast, only 24 percent of 284 women who showed no signs of bladder problems said they smoked cigarettes. Former smokers also were overrepresented among the incontinent subjects: 16 percent of the incontinent women reported a previous history of smoking, while only 8 percent of continent women said they used to smoke. Only 49 percent of the incontinent had never smoked, whereas 68 percent of the continent had never smoked.

According to the team's statistical analysis, smokers and former smokers run twice the risk of all types of incontinence compared with nonsmokers.

Although the mechanism by which smoking causes urinary incontinence remains unclear, Bump speculates that nicotine may cause the muscles controlling the bladder to contract, thereby leading to urine spills. Other cases may develop when violent coughing, caused by irritating cigarette smoke, weakens the muscles that keep the bladder's urethra closed, he says.

The Virginia study did not assess the risk of urinary incontinence among male smokers, but another report brings bad news for smokers of both genders. At the University of Utah Health Sciences Center in Salt Lake City, Donald P. Kadunce and his colleagues have found that men and women who smoke are more prone to facial wrinkling than their nonsmoking peers.

The Utah team studied 109 smokers and 23 people who had never smoked. To assess skin condition, the researchers photographed the participants and used a numerical score as an estimate of wrinkle severity. After controlling for sun exposure, age and sex, the investigators discovered that premature wrinkling increased with cigarette consumption and the duration of the smoking habit. Heavy smokers were nearly five times more likely to show excessive skin wrinkling than their nonsmoking counterparts, the authors report in the May 15 ANNALS OF INTERNAL MEDICINE.

Smokers with a penchant for sunbathing may face the greatest risk of facial furrows, given the researchers' finding that excessive sun exposure and smoking may work together to produce wrinkles.

The team speculates that smoking hastens wrinkling by damaging collagen, a fibrous protein found in skin. They add that eye irritation from smoke, especially in bright sunlight, could lead to squinting, which in turn could cause crow's feet.

Taken together, the two reports add substantially to the negatives associated with cigarettes. "For many smokers, particularly the young, evidence that smoking causes conditions like wrinkles, bad breath or yellow teeth is much more compelling than the evidence that smoking kills," says Thomas E. Kottke at the Mayo Clinic in Rochester, Minn., who wrote an editorial accompanying the Utah group's report. — *K.A. Fackelmann*

Weaving a tapestry of spiral chemical waves

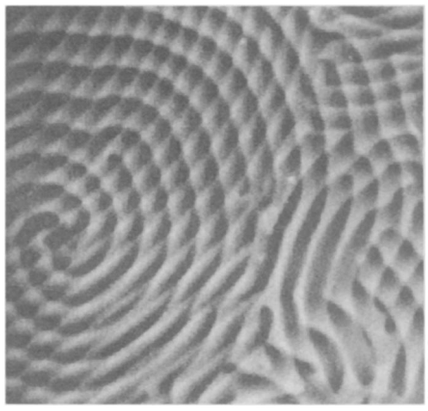
Oscillating chemical reactions display a rich repertoire of moving patterns. Waves of color in the shape of spirals and concentric rings drift gracefully through thin liquid films, moving in sync with the periodic rise and fall in the concentrations of the chemicals involved.

But the sights are even more spectacular when two sets of chemical waves interact. "This kind of chemistry is very pleasing to the eye," says chemist Kenneth Showalter of West Virginia University in Morgantown. "There's a tremendous richness here to explore."

To study how chemical waves interact, Showalter and his co-workers watch the formation of patterns on both surfaces of a thin polymer membrane stretched out like a drumhead and immersed in a solution-filled reaction vessel. The solution contains the ingredients for a widely studied oscillating chemical system known as the Belousov-Zhabotinsky reaction (SN: 7/1/89, p.6).

By loading the membrane with ferroin, an iron-containing catalyst, the researchers ensure that the reaction takes place only on the membrane surfaces rather than in the solution. As the stirred chemical reagents swirl past each surface, they react to produce the distinctive red and blue bands characteristic of this reaction. The membrane's transparency allows the researchers to see the two chemical wave patterns superimposed on each other.

The membrane also acts as a kind of gatekeeper, allowing only certain chemical species to pass through. Thus, the wave pattern formed on one side of the membrane initially appears quite independent of that formed on the other. But over several hours, the two patterns evolve in such a way as to indicate that they somehow "feel" each other, Showalter and his colleagues observe.



Showalter

A three-armed spiral, or vortex, arises spontaneously as two chemical wave patterns interact. The field of view is roughly 6 millimeters wide.

This coupling of the two sets of chemical waves produces a geometrical complexity not seen in the patterns formed by a single set of waves. At first, the coupling spontaneously gives rise to spiral waves. More complex, irregular patterns often appear at later stages. Eventually, the two waves become synchronized in time and space.

Such studies may offer insights into the chemical communication that occurs across biological cell membranes, Showalter says. He and his co-workers describe their experiments in the May 9 NATURE. — *I. Peterson*