Biomedicine

Nosing out a dog's risk of lung cancer

Dogs with long noses may have a built-in protection against lung cancer caused by inhaling tobacco smoke. That's the conclusion of a new epidemiologic study of dogs and their human companions.

Previous studies have demonstrated that people who live with smokers run a higher risk of lethal lung cancer (SN: 1/25/92, p.54). Epidemiologist John S. Reif of Colorado State University in Fort Collins and his colleagues wanted to find out whether exposure to a smoky environment posed a similar threat for pet dogs as well.

In searching the oncology records kept by two veterinary hospitals, the researchers identified 51 dogs with lung cancer and 83 control dogs with other forms of cancer.

The team estimated exposure to tobacco smoke by sending a questionnaire to each dog's owner. In the Feb. 1 AMERICAN JOURNAL OF EPIDEMIOLOGY, Reif and his colleagues report that they found a statistical link between exposure to passive smoke and lung cancer in dogs with short and medium-size noses.

Surprisingly, dogs with long muzzles showed no excess risk of lung cancer when they lived with an owner who smokes.

The team believes these dogs' long noses effectively filter noxious substances from smoky air. Thus, cancer-causing particulates remain in the nose and never reach the lung.

Should smokers trade in their Pekingese for an Afghan? Better to quit smoking, Reif suggests. There's plenty of evidence that a smoke-filled home causes lots of health problems for both humans and their pets, he says.

Although long-nosed dogs are protected from lung cancer, they may run an increased risk of nasal cancer, Reif notes.

Female smokers risk artery spasms

For the first time, cardiologists report that smoking is a risk factor for potentially fatal coronary artery spasms.

A study by cardiologist Dennis G. Caralis and his co-workers at St. Louis University School of Medicine shows that female cigarette smokers run 7.7 times the risk of coronary spasm faced by nonsmoking women.

The 21 women, age 36 to 41, suffered from unexplained chest pains. Examination of their coronary arteries showed no sign of advanced atherosclerosis, the buildup of fatty deposits that can also cause angina (chest pain).

Finally, tests indicated that the women suffered from coronary spasms, which occur when the smooth muscle of the coronary arteries suddenly contracts, constricting the heart's blood supply. The sudden spasms can cause chest pain and in severe cases a heart attack.

Nobody really understands what causes coronary spasm. To get to the bottom of the mystery, the team recruited 63 women about the same age as the patients to serve as controls. All study volunteers then answered questions about their health, including their smoking history.

After analyzing the data, the team discovered that 13 of the 21 women with coronary spasm (62.5 percent) currently smoked, compared with only 11 (17.5 percent) of the 63 controls. Although the scientists looked at a number of factors, only cigarette smoking was significantly linked to coronary spasm in the women. The team reports its data in the March CIRCULATION.

Caralis warns against jumping to any conclusions based on the results of this small, very preliminary study. For example, the scientists don't know whether smoking provokes coronary spasm in men. More research, with larger numbers of volunteers, must be undertaken to verify the smoking and coronary spasm link, he says.

However, the study is strong enough to warn female smokers about the possible link to coronary spasm, Caralis adds.

Planetary Science

Ron Cowen reports from Houston at the annual Lunar and Planetary Science Conference

Halos on Venus: An explosive finding

Using a pile of sand, an aluminum plate and an explosive charge to simulate conditions when rocky space debris disintegrates in Venus' dense atmosphere, two Russian scientists may have explained the formation of the splotchy halos that surround many craters on the planet.

Detected by the Venus-orbiting Magellan craft, the radar-dark halos seem unique in the solar system. Researchers believe their properties stem from Venus' atmosphere — some 90 times as dense as Earth's — which causes tens of thousands of meteoroids to burn up before they can strike the surface. As they slam into the thick atmosphere, the dying embers generate shock waves strong enough to pulverize surface rock into fine dust, which reflects radar poorly and might account for the halos (SN: 12/21&28/91, p.424).

Ivanov, Provalov

Top image depicts experimental setup, with central sandpile, adjacent sand strip and sand-filled holes; string of explosives hangs above sandpile. Middle photo, taken just after detonation, shows that the shock wave has only disturbed central sandpile. Final image shows that activity in the wake of the shock wave has created spiked halo.

But the typical halo found by Magellan encircles the shocked region tens of kilometers beyond the point at which a disintegrating asteroid would have struck the Venusian surface, notes Boris A. Ivanov of the Institute for Dynamics of Geospheres in Moscow. Thus, it seemed unclear whether shock waves alone could fully explain the halos.

Ivanov and institute colleague A.A. Provalov designed an ingenious experiment to better understand how halos form. They used a circular pile of sand on a 1-meter-square aluminum plate to represent the loose layer of Venusian surface soil just beneath an incoming projectile. An adjacent strip of sand and two sand-filled holes represented more distant surface features. And a string of explosives hanging just above the circular sandpile simulated a projectile in Venus' atmosphere.

When they detonated the explosives, Ivanov and Provalov found that the resulting shock wave disturbed only the central sandpile, not the nearby sand strip or sand-filled holes. Less than a half-second later, however, after the wave had passed, sand erupted from the holes and the strip began changing shape. In fact, observes Ivanov, the main motion of the sand occurred far behind the expanding shock wave.

He attributes the delayed motion to two effects. Air forced into the holes by the shock wave rushes back out as the wave travels on, blowing sand out with it. In addition, air molecules caught up in vortices created in the wake of the shock wave attain speeds up to 10 meters per second, helping to spread the sand strip out into a splotchy halo.

The experiment exhibits several phenomena resembling those on Venus, Ivanov notes. For example, the shock generated when an object strikes Venus could temporarily force molecules from the planet's lower atmosphere to mix with porous surface soil, much as the air mixed with the sand-filled holes in the lab.