Primack said he hoped people will learn that although vaping and smoking may seem so different that one should not lead to the other, initial e-cigarette use may predispose people to take up conventional smoking for several reasons. “Most e-cigarettes deliver nicotine more slowly than traditional cigarettes. So it’s sort of a perfect ‘starter cigarette’: New users can start with e-cigarettes and then progress to regular cigarettes when they need more nicotine.”

Another reason is that e-cigarettes are designed to mimic the behaviors and sensations of cigarette smoking—unlike other forms of tobacco/nicotine use such as smokeless tobacco.

“This might make the person more accustomed to the physical act of smoking, making it an easier transition.”

Home is one place adults could steer children away from e-cigarettes. A study in the Aug. 25, 2015, issue of Academic Pediatrics found that is simply not happening and instead might be leading to their acceptance. According to lead author Jane Garbutt, M.B., Ch.B., research associate professor of medicine and pediatrics at the Washington University in St. Louis School of Medicine, many parents who vape aren’t aware of the dangers to children. Their use may send mixed signals to impressionable children and might tempt them to try the e-cigarettes themselves.

In the study, 658 parents and guardians completed a self-administered paper survey during an office visit to 15 pediatric practices in the St. Louis area. Data were collected between June 24 and November 6, 2014. Attitudes toward use of e-cigarettes are reported for those aware of e-cigarettes before the survey. Almost all respondents knew about e-cigarettes; 20% had tried them, and 12.5% said a family member regularly used e-cigarettes. In two-thirds of homes where children were exposed to e-cigarettes, they also were exposed to regular cigarettes. Only 15% of e-cigarette users reported having told their pediatricians they were using the devices, and only 6% said doctors had discussed the use and safe storage of e-cigarettes—which leads to another hazard. Garbutt said cavalier attitudes toward securing the devices and e-liquids could lead to youthful experimentation of a substance that can be toxic when ingested.

Garbutt said many adults, including pediatricians, simply aren’t aware of the dangers. With evidence mounting about the link between e-cigarettes leading to smoking, she said parents and doctors must warn patients about the potential dangers.

“We strongly encourage pediatricians to ask parents about nicotine use, including e-cigarettes, and to discuss the risks of exposure,” Garbutt said. “Ingestion is bad, of course, but even skin exposure to e-liquid can harm children.”

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Bovine Leukemia Virus Possibly Linked to Breast Cancer

By Gunjan Sinha

For more than 50 years, scientists have debated whether viruses can cause breast cancer. A new study implicates yet another virus.

Scientists led by Gertrude Buehring, Ph.D., professor of virology at the University of California, Berkeley, School of Public Health, found bovine leukemia virus (BLV) in breast tissue from women with breast cancer twice as often as in tissue from healthy women. The researchers analyzed breast tissue samples received between 2002 and 2008 from the Cooperative Human Tissue Network. An anatomical pathologist confirmed classification of breast cancer cases and control tissues (from reduction mammaplasties) on the basis of medical records and microscopic examination. Out of 114 breast cancer samples, researchers found 59% infected with BLV, compared with 29% of 104 control samples. Statistically, the odds of having breast cancer if BLV was present were 3.1 times greater than if BLV was absent—a higher ratio than the most often publicized risk factors, including obesity, alcohol consumption, and use of postmenopausal hormones.

The study was published in PLoS ONE (doi:10.1371/journal.pone.0134304).

“It’s fascinating,” said Julie Parsonnet, M.D., professor of medicine and infectious diseases at Stanford School of Medicine in Palo Alto, Calif. “Do I believe it? There have been a lot of associations between viruses and cancer that haven’t led anywhere.”

“If breast cancer was related to unpasteurized milk consumption, cancer rates ought to be sky-high in developing countries. The opposite is true.”

BLV infects dairy and beef cattle’s blood cells and mammary tissue. The retrovirus is easily transmitted among cattle primarily through infected blood and milk, but it causes disease in less than 5% of infected animals.

Buehring’s study does not show that BLV causes human cancer. It merely suggests an association. The virus may be a bystander, or it may have an affinity for cells that have already transformed into a malignant state, Parsonnet said, adding that much more study is needed. Nevertheless, the proposed pathogenesis of BLV-associated breast cancer isn’t unprecedented: Cervical cancer caused by human papillomavirus can take decades to develop. Moreover, that virus causes cancer in only about 1% of infected women, according to Buehring. BLV may have a similar trajectory in humans, she added, which may also explain why some control samples showed presence of the virus.

Buehring was first inspired to study the association in 1980. While attending a lecture, she learned about experiments carried out in the 1930s to figure out whether a faulty gene or an infectious agent was causing mammary cancer in...
a laboratory strain of mice. Scientists swapped pups from mice with a high incidence of cancer with pups from mouse strains with a low incidence. The incidence of cancer in pups matched that in foster mothers—implicating an infectious agent, later discovered to be mouse mammary tumor virus passed to pups during nursing.

"It occurred to me that humans are foster nursed on the cow," Buehring said.

After a scan of the veterinary literature, Buehring focused on BLV, the only oncogenic virus in cattle that can be passed to calves in milk. Initial studies to detect the virus in human breast tissue came up empty, so Buehring shelved the idea.

Around 1990, new sensitive technologies to detect viral DNA became available. Buehring picked up the research again. Last year her group showed in Emerging Infectious Diseases that BLV was present in human breast tissue (doi:10.3201/eid2005.131298). The study overturned long-held dogma that BLV was not transmissible to humans, she said. In 2013, researchers in Bogotá, Colombia, also found evidence of BLV in breast tissue but were puzzled to find a higher incidence in control samples (Open J. Med. Microbiol. 2013;3:84–90).

How BLV is transmitted to humans isn’t clear—milk pasteurization inactivates the virus. Drinking unpasteurized milk may be one route, Buehring hypothesized, or the virus could have entered the human population before pasteurization became widespread and is now spread among humans.

The hypotheses are a very intriguing starting point, said John Coffin, Ph.D., professor of molecular biology at Tufts Sackler School of Biomedical Sciences in Boston.

“They really need to be followed up with more study.”

For example, if BLV is present in breast cancer tissue, it should also be present in some fraction of cell lines.

“That would be interesting to know.”

Coffin would also like to know whether BLV DNA sequences are integrated into host cell DNA, which would hint at a mechanism. Mouse mammary tumor virus and avian sarcoma leukemia virus integrate into host cells, for example, and transform them into cancerous ones.

Still other researchers are highly skeptical.

“It’s possible, but the totality of evidence does not make this plausible,” said Lajos Pusztai, M.D., Ph.D., codirector of Yale’s Cancer Center Genetics and Genomics Program. “If breast cancer was related to unpasteurized milk consumption, cancer rates ought to be sky-high in developing countries. The opposite is true,” he said.

Moreover, efforts to sequence all DNA in breast tumors and match them to known pathogens have not reported BLV, Pusztai added.

More important, the paper doesn’t present evidence that the BLV sequence detected is indeed BLV and not a segment of an ancient virus that long ago integrated into the human genome, Pusztai said. The Berkeley researchers confirmed BLV infection by using the polymerase chain reaction to detect a segment of BLV DNA in mammary epithelium and an antibody assay specific for a viral protein. However, 5%–8% of the human DNA sequence is made up of viral DNA (Nature 2001;409:860–921).

Meanwhile, Buehring’s study may tip the balance toward better controlling BLV spread in cattle herds. A very accurate antibody test is available to detect the virus in cattle, said James Evermann, Ph.D., professor of infectious diseases at Washington State University College of Veterinary Medicine in Pullman. Some U.S. dairy farm owners already screen for BLV voluntarily and cull infected animals. In Europe, several countries have mandatory screening programs in place. Even if the association does not hold up to scrutiny, “we should be proactive,” Evermann said. “We have the means to eradicate it.”

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Deep Sequencing of Acute Myeloid Leukemia Reveals Driver Mutations and New Targets

By Vicki Brower

Patients with acute myeloid leukemia whose mutations persisted a month after starting treatment were three times more likely to relapse and die as those who cleared the mutations, according to a new study (JAMA 2015;314:811–22; doi:10.1001/jama.2015.9643). Designed to determine whether mutations in the genome detected at the beginning of treatment were associated with outcomes, the research revealed that patients who cleared mutations at 30 days had a median survival of 42 months, compared with 10.5 months for the others. “In addition to helping determine whose disease is higher risk early in treatment without having to wait for a recurrence, our study points to the importance of clearing the driver mutations, not simply subsets of mutations,” said primary investigator Timothy Ley, M.D., Lewis T. and Rosalind B. Apple Chair in oncology and professor of medicine and genetics at Washington University in St. Louis.

Using whole-genome sequencing, Ley’s team showed that genetic mutations that were initiators of early blood cell transformation, such as TET2, DNMT3A, IDH1, and IDH2, were rarely eradicated by using conventional chemotherapy. By contrast, other mutations, such as FLI3, KRAS, NRAS, and NPM1, were commonly cleared and often absent at relapse. “This suggests that they [the latter] are relatively late mutations,” Ley said. His study may help explain why 20% of adults with acute myeloid leukemia (AML) do not achieve remission with initial, or induction, chemotherapy, and why about 50% patients relapse after complete remission. “Our research suggests that to cure patients with AML, it may be necessary to direct therapy to eradicate disease-initiating mutations,” Ley said. Until recently, most sequencing did not look at clonality, that is, which clones had evolved from the original mutations and which occurred...