

Ignoring Evidence-based Medicine: Perils of Physician Bias in Lung Cancer Screening

Lung cancer is currently the deadliest form of cancer in the American population. 224,000 new cases of lung cancer are expected to be reported this year alone. In spite of rapid advances in screening procedures, lung cancer tends to be detected at an advanced stage. This reduces the efficacy of therapeutic interventions and results in an astonishingly high mortality rate of 70%. It turns out that late detection of lung cancer might stem not from inadequate screening technology, but from misconceptions among physicians.

Low-dose computed tomography (LDCT) is a highly effective lung cancer screening procedure, recommended by the Centers for Disease Control and Prevention (CDC). As the name suggests, it uses low-dose radiation and an X-ray machine to generate high-resolution images of a patient's lungs and helps the physician determine whether cancer is present. Dr. Jan Eberth and his colleagues at the University of South Carolina set out to investigate how physicians use LDCT. They conducted a survey on 101 physicians who belonged to the South Carolina Academy of Family Physicians.



The results of the survey revealed paradoxical attitudes. Although as many as 98% of the physicians thought LDCT could effectively detect lung cancer at an early stage, only 41% believed that LDCT saved lives. 88% of the respondents expressed concern about the side effects of the LDCT procedure in spite of overwhelming clinical evidence showing minimal risk and tremendous health benefits. Even when the participants were asked whether they would prescribe LDCT to a 60 years old patient with a long (30 years) smoking history – a textbook example for LDCT – a significant fraction (12%) of the physicians decided against LDCT and chose chest x-ray instead. Given the relatively small sample size and geographic area covered, the conclusions might not be generalizable to the national level, but they present an

alarming trend of failure to practice evidence-based medicine in cancer care.

"Education is needed to bridge these knowledge gaps and lay a foundation on which physicians can base their treatment recommendations," Dr. Eberth commented. "With the Centers for Medicare and Medicaid Services now offering reimbursement to primary care providers to engage in shared decision making with their patients about lung cancer screening, it is vital that providers have an accurate understanding of the eligibility criteria for screening and potential risks and benefits. Decision aids may be a useful tool to facilitate these treatment discussions."

–**Mohammad Zulfiquer Hossain**

<http://www.labroots.com/trending/cancer/3342/knowledge-gap-lung-cancer-screening-procedure>

Development of New Material to Quickly Kill E.coli

A new material has been developed by scientists in Singapore that possesses the ability to kill *E. coli* bacteria in 30 seconds. Since antimicrobial resistance

is an emerging problem in recent times, discovery of other means to combat antimicrobial infection has become essential. Host defense peptides, also known as antimicrobial peptides or AMPs, are one of the areas that have been explored. AMPs are natural parts of innate immune response found in every classification of life. These are broad spectrum and have been found to kill everything from viruses to gram-negative bacteria with different modes of action. Scientists at the Institute of Bioengineering and Nanotechnology (IBN) at Agency for Science, Technology and Research (A*STAR) Singapore, led by Yugen Zhang, have made a molecule from a linked chain of chemicals, called imidazolium oligomers. These molecules



kill bacteria by penetrating the cell membrane, which is beneficial as leaving the cell membranes intact by traditional antibiotics allow the bacteria to grow antibiotic resistance. Dr. Zhang explained that the new material can kill bacteria and also inhibit antibiotic resistant bacteria and that computational chemistry has also supported their experimental findings that the chain-like compound works by attacking the cell membrane. The imidazolium oligomers are simply a white powder that is soluble in water. The research team determined that if the powder was dissolved in alcohol, gels spontaneously formed. This stuff could be used in alcohol sprays to sterilize hospitals or homes. It has the potential to kill harmful strains of *E.coli* and the other antibiotic resistant bacteria and fungi. This rapid bacteria-killing material might just be a powerful new weapon against drug-resistant microbes.

–**Nishat Jahan**

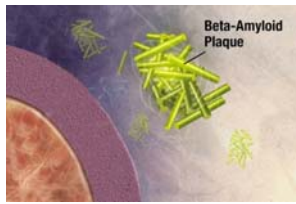
<http://www.labroots.com/trending/microbiology/3328/material-developed-quickly-kills-e-coli>

Infections and Alzheimer's: Is There a Link?

It has been known for a while that plaques of the protein amyloid beta are part of the pathology of Alzheimer's disease. Multiple studies showed that build-up of this protein in the brain is associated with the destruction of brain tissue and the devastating cascade of memory loss and cognitive decline that defines Alzheimer's. Neurodegeneration

in Alzheimer's disease has been thought to be caused by the abnormal behavior of A-beta molecules, which are known to gather into tough fibril-like structures called amyloid plaques within patients' brains. In other words, while A-beta plaques do accumulate and cause tissue degeneration, there is more to it. Before they went rogue, they appear to have been helpful. A new study performed by the neurologists working at

Harvard Medical School and Massachusetts General Hospital (MGH) revealed that the amyloid-beta protein also has the potential to defend the body against infection. This could be inferred from an in vivo experiment carried out through the injection of bacteria into the brains of mice that had been genetically altered to have Alzheimer's, plaques of A-beta surrounded the bacteria, essentially trapping it. The team used salmonella bacterium, but other research teams have experimented with herpes and influenza and seen similar reactions. While initially it is a good thing, the process goes awry when A-beta is overexpressed, perhaps in reaction to repeated infections or larger amounts of bacteria. Once the scale is tipped and there



is too much A-beta the process goes from therapeutic to toxic and Alzheimer's can be the result. Another protein, antimicrobial peptide (AMP) LL37 which is also known as an immune system soldier in fighting off infection has been implicated in causing the inflammation that could be responsible for the A-betas to grow larger and more invasive, thus setting off the Alzheimer's disease process. After identifying the cause of the ailment, the next important step is to search for microbes in the brains of Alzheimer's patients that may have triggered amyloid deposition as a protective response, later leading to nerve cell death and dementia. If the culprits could be determined – be they bacteria, viruses, or yeast –it might be possible to therapeutically target them for primary prevention of the disease.

–Tanisha Khan
<http://www.labroots.com/trending/neuroscience/3286/infections-alzheimer-s-link>

FDA Drug Safety Communication: FDA Warns about Serious Bleeding Risk with Over-the-Counter Antacid Products Containing Aspirin

People usually take over-the-counter aspirin-antacid products which are sold under various trade names, including Alka-Seltzer Original, Bromo Seltzer, Medique Medi Seltzer, Picot Plus Effervescent, Vida Mia Pain Relief, Winco Foods Effervescent Antacid and Pain Relief, and Zee-Seltzer Antacid and Pain Reliever to make themselves feel better from heartburn, sour stomach, acid indigestion or upset stomach. The U.S. Food and Drug Administration have been lately warning consumers about the risk of serious bleeding when using these aspirin-containing antacid products. Even though FDA issued a warning about serious bleeding risk with aspirin in 2009, it still has recorded eight new cases of serious bleeding caused by these products as people do not realize the product carries a bleeding warning. Hence, it has been advised that consumers should always read the Drug Facts label carefully when purchasing or taking an OTC product to treat heartburn, acid indigestion, or sour or upset stomach. If the product contains aspirin, they should consider choosing a product without aspirin to relieve

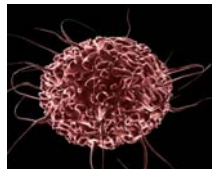
your symptoms. People with a higher risk of serious bleeding include those being aged 60 and older, having a history of stomach ulcers or bleeding problems, taking blood-thinning drugs and steroid medicine, taking other medicines containing NSAIDs such as ibuprofen or naproxen, and drinking three or more alcoholic drinks each



day. The deputy director of the Division of Nonprescription Drug Products Dr. Karen Murry Mahoney said in the release, “it is important people read the labels on their over-the-counter medications so they know what is in it, and what potential risk factors for bleeding are. We are continuing to evaluate the safety concerns related to antacid-aspirin combination products and plan to convene an advisory committee of external experts in 2017.” –Noshin Muhtasim
http://www.fda.gov/Drugs/DrugSafety/ucm504328.htm?source=govdelivery&utm_medium=email&utm_source=govdelivery

Acoustic Properties may Reveal Cancer Cell's Identity

The acoustic properties of a cell can give away its identity, revealing to researchers whether the cell is cancer or normal. That is the premise behind the new research by a team of researchers at Lund University in Sweden and the Massachusetts Institute of Technology (MIT). By applying an ultrasound technique to flowing cells, the research team reported different cells in blood can be matched to unique acoustic properties. They termed this method “iso-acoustic focusing” (ICF). The aim to isolate cancer cells from blood is not new since the discovery of circulating tumor cells in blood. But the race has been on to find reliable ways by which to detect and measure these abnormal cells. And Augustsson's team thinks acoustics is the key. For their experiment, they forced cell solutions through a micro-channel inside a chip. Ultrasound exposure separates the cells in its acoustic field, and the team can then study the



lateral movements of the cells. These telltale acoustic properties could be unique to the cells and serve to identify the type of cells that pass through the channel. Since they were looking for individual cells in a blood sample which contains billions of cells, the smallest overlap in size between the cancer cell and other blood cells will lead to thousands of blood cells 'contaminating' the cancer cells extracted through the separation. In applying the ICF method to white blood cells, the team reported different acoustic properties between the different white blood cell subgroups. In addition, they noted cancer cells cultured in lab express different acoustic properties than healthy cells obtained from donors. The team hopes this technique will enable reliable detection and diagnosis of cancer cells from blood. Current strategies of size selection are limited in potential and often lead to false results. As such, the team is conducting several follow-up studies to further validate the potential of ICF as a cancer diagnostic tool.

–Fabiha Tasnim
<http://www.labroots.com/trending/cancer/3134/acoustic-properties-reveal-cancer-cell-s-identity>