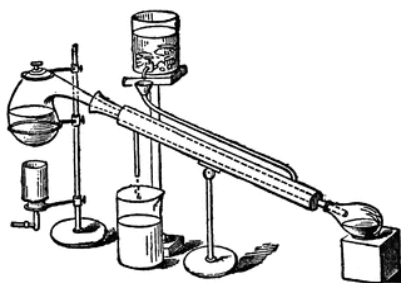




# ***SOUTHWEST RETORT***



**SEVENTIETH YEAR**

**DECEMBER 2017**

*Published for the advancement of  
Chemists, Chemical Engineers  
and Chemistry in this area*

published by

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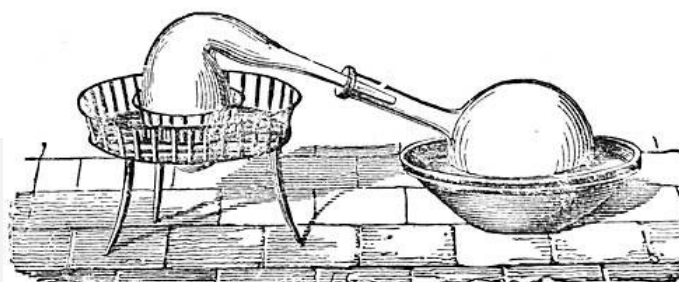
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## EMPLOYMENT CLEARING HOUSE

Job applicants should send name, email, and phone, along with type of position and geographical area desired; employers may contact job applicants directly. If you have an opening, send your list- ing, including contact info for your company, to [retort@acsdfw.org](mailto:retort@acsdfw.org). Deadlines are the 7<sup>th</sup> of each month.

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## FIFTY YEARS AGO IN THE SOUTHWEST RETORT

The winner of the 1967 ACS Southwest Regional Award was Dr. Sean P. McGlynn of Louisiana State University. Professor McGlynn received his award on Dec. 8 at a banquet held at the ACS Southwest Regional Meeting in Little Rock, Arkansas. Professor McGlynn was born in Dungloe, County Donegal, Ireland and received all his education through the master's degree in Ireland. He received his Ph.D. in molecular spectroscopy in 1956 at Florida State, working for Michael Kasha. He then did post docs with Kasha and with W.T. Simpson at the University of Washington before joining LSU in 1957. He progressed rapidly through the ranks to full professor. He was awarded an Alfred P. Sloan Fellowship in 1964. He was a visiting associate professor in biophysics at Yale in 1960-61. He has written two books, published 70 research papers, and directed the research of 16 post docs, 10 Ph.D. students, and four M.S. students. His papers in molecular spectroscopy have earned wide acclaim.

The ACS Southwestern Regional Meeting was held Dec. 7-9 in Little Rock. The meeting was preceded by a Dec. 6 short course on "Modern Theory of Acids and Bases" taught by Dr. Ralph Pearson of Northwestern University. The plenary lecture on "Activated Complex Structure" was given by Dr. Henry Eyring. The meeting featured 242 presentations in all areas of chemistry. All of the abstracts were published in the Dec., 1967 issue of The Southwest Retort. The meeting also featured a tour of the Aluminum Company of America's plant at Bauxite. The general chairman for the meeting was Thomas E. Shook from Pine Bluff Arsenal. The technical chairman

was Dr. Edward S. Amis of the University of Arkansas.

Varian Associates announces an invitation to a demonstration of the very latest in NMR spectrometry. The new, moderate-cost 60 MHz T-60 NMR spectrometer will come your way in the Southwest aboard the world's first Mobile NMR laboratory.

*contributed by  
E. Thomas Strom*



## And Another Thing...

I Do Not Know  
Denise Merkle, PhD

Just today, at the behest of a very demanding dashboard, I took someone's nearly-new car to the dealership from which it was purchased, to have its first oil change. The event was somewhat like baby's first steps, when the parent doesn't get a chance to witness them. Anyway. This particular dealer has teams of technicians, whose dance of the wrenches is conducted by service advisors. And these advisors, as with apps, phone systems, keypads, and event planning programs, need to know a lot of information before they can even begin the symphony of attention devoted to the aforementioned vehicle. Which technician services the car? (Services. Watch the verbs, please). Since I have no idea who cares for the car: I don't know. Have we seen the car before? I don't know. Is there anything else needed? I don't know. By this time, of course, the Service Team Leader had begun to look at me as if I were a particularly inept pianist who had wandered accidentally onto the stage with a Philharmonic orchestra (which is, honestly, close to how I feel when I am piloting the thing). Sadly, it was not enough for me to wave my hands in the general direction of the combustion engine's equivalent of Audrey II\*, that bloodthirsty plant, and point out that I was responding to the vehicular translation of 'Feed Me, Just Feed Me'. No. I had to determine all sorts of parameters - and also if it wanted a bath. My answer: I Do Not Know.

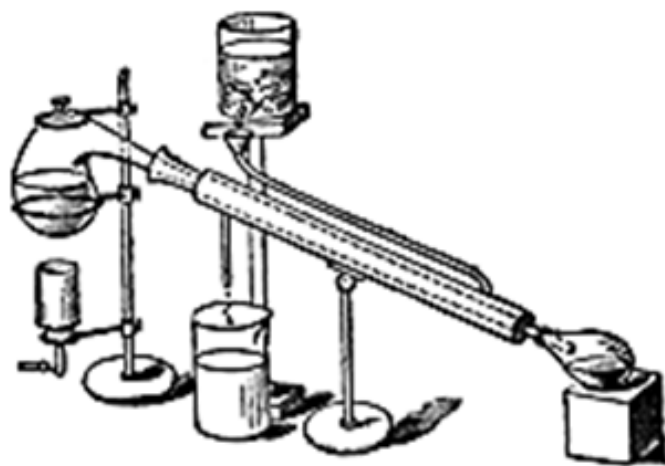
Actually, it is not my car, and I don't pay a lot of attention to its irrelevant details. So it only cemented the Service Department's idea that I had randomly driven someone unknown's car off the street into a service bay when a tech walked over to me (as I sat engrossed in my electronic reading material), and asked, 'Dark Blue X?' Well, you know, I am not totally certain what color "My" X

is. Thank Goodness, another acolyte of the Service Guru claimed the Dark Blue X, as I sat, pondering, 'What color is it?'

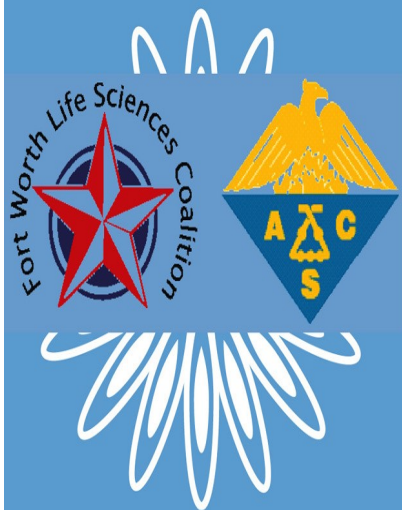
Finally, finally, I was able to drive away in a newly serviced, newly spiffy vehicle, which I recognized only because someone told me, 'It's this one' - and I had left my jacket on the back seat. The escape from the grilling about information I did not have and do not wish to have was an amazing relief - How many questions can one be expected to field in a day?

Vehicle service - complete. Now, to decorate the house for the season: What color lights do you want? Aaaaaaaahhhhhh - and very Happy, Stress-free Holidays to All!

\* [http://www.endgameent.com/project/47/Little\\_Shop\\_of\\_Horrors/](http://www.endgameent.com/project/47/Little_Shop_of_Horrors/)





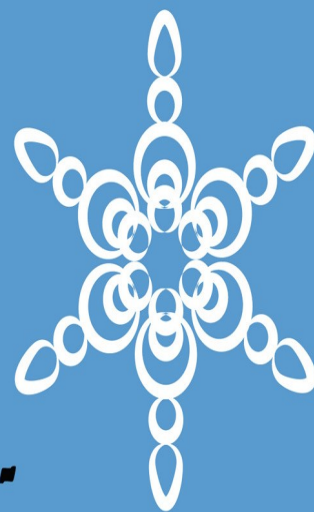


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## *From the ACS Press Room*

# *Bioelectronic ‘nose’ can detect food spoilage by sensing the smell of death*

### **Nanodisc-Based Bioelectronic Nose Using Olfactory Receptor Produced in *Escherichia coli* for the Assessment of Death-Associated Odor Cadaverine** **ACS Nano**

Strong odors are an indicator that food has gone bad, but there could soon be a new way to sniff foul smells earlier on. As reported in **ACS Nano**, researchers have developed a bioelectronic “nose” that can specifically detect a key decay compound at low levels, enabling people to potentially take action before the stink spreads. It can detect rotting food, as well as be used to help find victims of natural disasters or crimes.

When food begins to rot, the smell that we find repulsive comes from a compound known as cadaverine. That’s also the substance responsible for the stench of rotting bodies, or cadavers — hence the name. The compound is the result of a bacterial reaction involving lysine, which is an amino acid commonly found in various food products. A previous study has shown that a receptor in zebrafish has an affinity for cadaverine. To make this receptor in the laboratory, scientists have turned to *E. coli* as a host cell because it can easily produce large quantities of proteins. But the production of this receptor in *E. coli* has been a challenge because it needs to be in a membrane.

One way to do this is to make the protein in a bacterial cell and reconstitute it in nanodiscs, which are water friendly, membrane-like structures that the receptor can reside in. So, Seunghun Hong, Tai Hyun Park and colleagues wanted to see if they could put the receptor into nanodiscs to create a sensitive and specific detector for cadaverine.

The researchers successfully produced copies of the receptor in *E. coli* and assembled them into nanodiscs. The receptor-containing nanodiscs were then placed in a special orientation on a carbon nanotube transistor, completing the bioelectronic nose. During testing with purified test compounds and real-world salmon and beef samples, the nose was selective and sensitive for cadaverine, even at low levels. Additionally, the researchers say the detector could someday prove useful in finding bodies, since the compound is also produced when a person dies.

The authors acknowledge funding from the National Research Foundation of Korea, the European Research Council, the BioNano Health Guard Research Center and the Korea Basic Science Institute.



# Around the Area

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## ‘Stressed out’ cocoa trees could produce more flavorful chocolate

*Environmental Growing Conditions in Five Production Systems Induce Stress Response and Affect Chemical Composition of Cocoa (*Theobroma cacao* L.) Beans*

**Journal of Agricultural and Food Chemistry**

Most people agree that chocolate tastes great, but is there a way to make it taste even better? Perhaps, according to scientists who looked at different conditions that can put a strain on cocoa trees. Reporting in ACS’ **Journal of Agricultural and Food Chemistry**, they say that although the agricultural method used to grow cocoa trees doesn’t matter that much, the specific weather conditions do.

Cocoa trees grow in hot and humid climates near the equator.

Traditionally, these trees are raised together in mixed groves with other types of trees and plants that can cool the air and provide vital shade. The system, called agroforestry, provides a low-stress environment, increases nutrients in the soil and helps maintain ground water levels.

But to gain higher yields, growers sometimes plant cocoa trees in solitary, “monocultural,” groves, in which the trees are exposed to stressful conditions. In response to the stress, trees produce antioxidants that can potentially counteract the damage, but these compounds also could change the quality characteristics of the beans. Wiebke Niether, Gerhard Gerold and colleagues from FiBL (Switzerland) wanted to find out whether differing growing methods can influence the chemical

composition, and potentially the flavor, of cocoa beans.

The researchers harvested beans from five cocoa tree farms in Bolivia at the beginning and end of the dry season, which runs from April to September. The trees were raised in full-sun monocultural groves or in agroforest settings. The beans were fermented and dried, then analyzed. The research team detected only minor differences in the chemical composition among the beans harvested from the farms during the same weather conditions. Slightly more phenols and other antioxidant compounds were detected in beans taken from monoculturally grown trees than those that

came from trees grown with agroforest methods, but the differences were not significant, according to the researchers. The larger contribution to chemical composition was the weather. Overall, the antioxidant content increased and fat content of the beans decreased during the dry season as temperatures rose and soil moisture dropped.

The researchers say these differences could contribute to variability in cocoa bean flavor.

The authors acknowledge funding from Johannes-Hübner-Stiftung, Mrs. O.Riedl-Hübner, FiBL (Switzerland), the Biovision Foundation for Ecological Development, the Coop Sustainability Fund, the Liechtenstein Development Service and the Swiss Agency for Development and Cooperation.





*From the ACS Press Room*

**LIGHTS, CAMERA, ACTION!**

**HOW XANAX WORKS**

<https://youtu.be/Kq6oNcd3d-U>

**HOW HAND SANITIZERS WORK**

<https://youtu.be/245jz3ZqZqM>

**THE ART AND SCIENCE OF  
GLASSBLOWING**

<https://youtu.be/HkLpAw9u-UU>

## Preventing psoriasis with vanillin

### *Oral Administration of Vanillin Improves Imiquimod-Induced Psoriatic Skin Inflammation in Mice*

**Journal of Agricultural and Food Chemistry**

Small amounts of artificial vanilla extract, also known as vanillin, are in a wide range of products, from baked goods to perfumes. But vanillin's versatility doesn't stop there.

In a recent mouse study reported in ACS' **Journal of Agricultural and Food Chemistry**, researchers report that this compound could also prevent or reduce psoriatic skin inflammation.

Psoriasis is an inflammatory skin disorder that affects about 125 million people worldwide, resulting in scaly red plaques that typically show up on the elbows, knees or scalp. Immune system proteins called interleukins (IL) 17 and 23 are known to be key players in the development of the condition. Interestingly, vanillin can have effects on different interleukins that are involved in other inflammatory conditions and diseases. So, Chien-Yun Hsiang and Tin-Yun Ho wanted

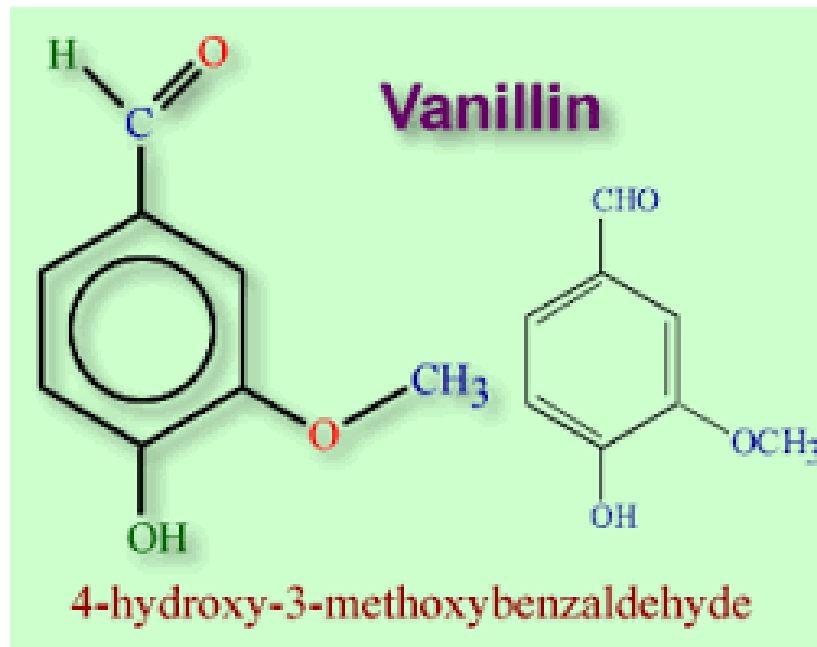
to see if treatment with vanillin could prevent psoriatic symptoms.

The researchers induced psoriatic skin inflammation on groups of mice by putting a compound called imiquimod on their skin. In addition, the mice were orally given daily doses (0, 1, 5, 10, 50 or 100 milligrams/kilograms of body weight) of vanillin for seven days. Mice treated with 50- or 100-

milligram/kilograms of body weight doses had reduced psoriatic symptoms compared to those receiving smaller or no doses of vanillin. In all mice treated with vanillin, IL-17 and IL-23 protein levels were decreased. The researchers say that vanillin was an effective compound

against psoriatic skin inflammation in this animal model.

The authors acknowledge funding from the Ministry of Science and Technology (China), China Medical University and the Ministry of Education, Taiwan.



## To improve dipstick diagnostic and environmental tests, just add tape

### *Low-cost Chemical-Responsive Adhesive Sensing Chips*

#### **ACS Applied Materials & Interfaces**

Simple paper-strip testing has the potential to tell us quickly what's in water, and other liquid samples from food, the environment and bodies — but current tests don't handle solid samples well. Now researchers have developed a way to make these low-cost devices more versatile and reliable for analyzing both liquid and solid samples using adhesive tape. They report their approach in the journal **ACS Applied Materials & Interfaces**.

One of the best-known examples of a paper dipstick test is the home pregnancy test, which detects the presence of a particular hormone in urine. Pregnancy tests are known to be accurate, but many other paper-based sensors are not as reliable. Liquid samples can push the color indicator off the paper or outward toward the edges of the readout, making the results inaccurate or harder to read. When it comes to testing anything solid, such as food or soil, samples need to be processed into a liquid form. Wei Shen and colleagues wanted to address these limitations and expand paper-based sensor applications to analyze solids.

To test either liquid or solid samples, the researchers turned to the same household staple many of us use to repair a torn book page or affix a photo to a piece of paper: adhesive tape. The team drew chemical symbols onto the tape using indicator “inks” that change color when they react with specific substances, such as copper and chromium. The low-cost sensor, which the researchers dubbed “chemical responsive adhesive tape,” or CAT, changed color and revealed the chemical symbols in response to solid heavy metal salts in a powder and metal ions in solution. Additionally, when paired with paper-based sensors, CAT could detect heavy metal ions in water, without displacing the indicator ink. The researchers also showed that the sensor could be used to detect proteins in solution.



The authors acknowledge funding from the Chinese Scholarship Council, the Australian Research Council Discovery Program and the Zhejiang International Science and Technology Cooperation Project.



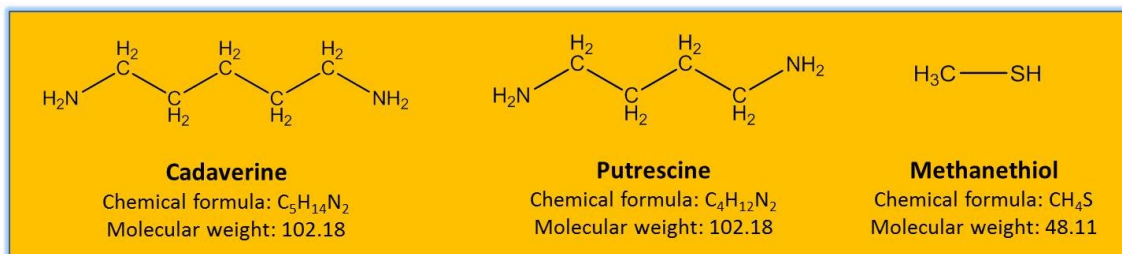
## From the editor

Are the nano-sniffers for cadaverine better than a buzzard's nose? Buzzards circle in thermals—updrafts—seeking the scent of rotting carrion. I have heard it said—but am not sure it is true—that if natural gas is spiked with cadaverine, circling buzzards would aid in finding leaks. That might be chemistry mythology...

But if you're interested in learning more about the odor of death, go to this link:

<http://guestblog.scientopia.org/2011/09/26/chemistry-for-the-zombie-apocalypse/>

It is a fascinating—if nauseating—discussion of this topic and technical details from the series *The Walking Dead* and the Zombie Scent Combo:



So, best of the holidays to you!

Best regards,  
Connie