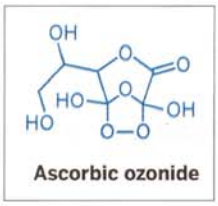
and higher radiopacity than did the low-temperature solution-based polymerization method. The radiopacity depended on the number of iodine atoms in the polymer. Polymers made by either method were biocompatible with mouse fibroblast cells at low polymer concentrations.

AIRBORNE PARTICLES LEAVE LUNGS SUSCEPTIBLE TO OZONE

Epidemiological studies have demonstrated that airborne particles cause lung problems, but scientists haven't known how. Agustín J. Colussi and colleagues at Caltech now have found that particles wreak havoc on the lungs' natural protection against damaging ozone (*Proc. Natl. Acad. Sci. USA* **2008,** 105, 7365). Ascorbic acid (vitamin C) in lung fluid usually scavenges inhaled ozone and breaks it into harmless by-products. The researchers used mass spectrometry to show that when droplets of ascorbic acid meet ozone gas under acidic conditions, ascorbic acid turns ozone into potentially harmful secondary ozonides such as ascorbic ozonide. Inhaling fine particles (less than 2.5 μm) can lower the pH of lung fluid and thus might trigger the production of ozonides, they suggest. Most airborne particles also carry iron, which can cause ozonides to turn into cytotoxic radicals, they note. The researchers suggest that it is the combination of ascorbic acid, ozone, low lung pH, and iron that causes an acute inflammatory response in the lungs when airborne particles are inhaled.



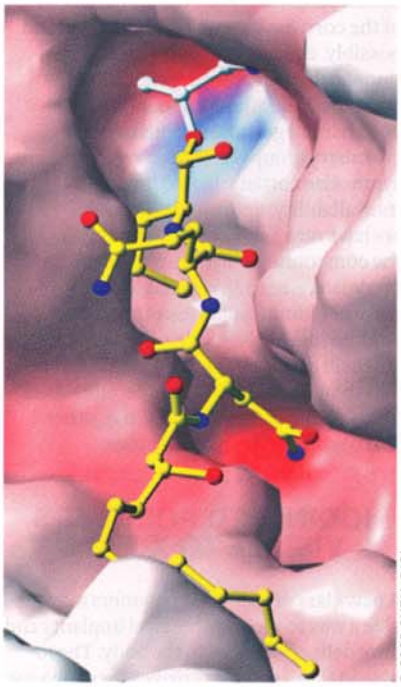
Ascorbic ozonide

METHOD TAGS MOLECULES' NEIGHBORS

A reaction catalyzed by horseradish peroxidase (HRP) could help identify the molecules that come together to produce signal transduction, cell adhesion, and other biological events (*Proc. Nat. Acad. Sci. USA,* DOI:10.1073/pnas.0710346105). Such processes involve interactions among lipids and proteins that cluster together within cell membranes. A research group led by Koichi Honke of Kochi University Medical School, in Japan, found that HRP can convert an aryl azide-biotin reagent into an active radical species that can then label other molecules with biotin. The researchers exploited that reaction by tethering HRP to a molecule such as a membrane protein antibody, allowing the antibody to anchor to cell membrane targets, and then adding the reagent to biotinylate molecules surrounding the antibody's target. The group analyzed the resulting biotin-tagged molecules using antibody arrays to determine the components of the molecular cluster. The labeling technique can capture events in living cells, and it labels molecules out to a distance of about 300 nm from the target. The method is easy, allows for high throughput, and uses standard laboratory equipment, the authors note.

FELLUTAMIDE BLOCKS PROTEASOME TO AID NEURONS

The natural product fellutamide B aids brain cells by inhibiting the proteasome, the cell's garbage disposal for proteins, Yale researchers have found. The finding could aid the design of small-molecule therapies that promote the well-being of neurons. Craig M. Crews and coworkers show that fellutamide B, a small molecule isolated from a marine fungus, binds to caspase-, trypsin-, and chymotrypsin-like regions of the proteasome via a threonine residue. This binding inhibits enzyme-catalyzed protein hydrolysis in the proteasome, which, in turn, activates transcription of a polypeptide called nerve growth factor (NGF) (*Chem. Biol.*, DOI: 10.1016/j.chembiol.2008.03.020). NGF, which protects existing neurons and can repair those damaged by injury or disease, has shown potential for treatment of neuronal injuries such as stroke, as well as Parkinson's and Alzheimer's diseases. However, when administered directly, NGF cannot cross the blood-brain barrier, greatly limiting its potential as a treatment for such diseases. Fellutamide B, in contrast, is small enough that it potentially could cross the blood-brain barrier and stimulate NGF synthesis within brain cells.


Fellutamide B (yellow) bound to threonine (white) in chymotrypsin-like region of proteasome.

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CRUDE OIL'S POLAR PORTION YIELDS TO MS

A new method makes it easier to analyze asphaltenes, mostly aromatic compounds that make up the heaviest and most polar fraction of crude oil. As oil prices rise, asphaltenes are becoming increasingly important because of their high concentration in heavy oils and tar sands. Laser desorption ionization mass spectrometry usually works well for polar molecules, but the method has given widely varying molecular weight distributions for asphaltenes. Now, Andrew E. Pomerantz of Schlumberger-Doll Research in Cambridge, Mass., Richard N. Zare of Stanford University, and coworkers report that two-step laser MS, in which the desorption and ionization steps are spatially and temporally separated, resolves these problems. The researchers use infrared pulses from a CO_2 laser to desorb neutral species from the sample and then use ultraviolet laser pulses to ionize these desorbed species (*J. Am. Chem. Soc.*, DOI: 10.1021/ja801927v). Unlike laser desorption ionization, the two-step process prevents asphaltene aggregation. The researchers' results show that the asphaltene mass spectrum has a broad maximum near 600 dalton and extends to more than 1,000 Da.