all the while keeping up with the literature on cancer treatments, he says.

Arthur Levy of St. Vincent's Hospital worked with Angers when he was there and still is a close friend. He says Angers "has a huge drive to do good. He tries every tack available, often jumping ahead of investigators to try new methods on his patients. And he has the kind of patients who want that type of treatment."

Despite his independent style of research, Angers is not an Arrowsmith doing work in complete isolation. He regularly attends scientific meetings (at his own expense) and gets to know other researchers, whom he then calls upon for advice and exchange of ideas. But what is remarkable is that by investigating in his own way things that he thinks are important, he has produced results that may make the established research community sit up and take notice.

—GINA BARI KOLATA

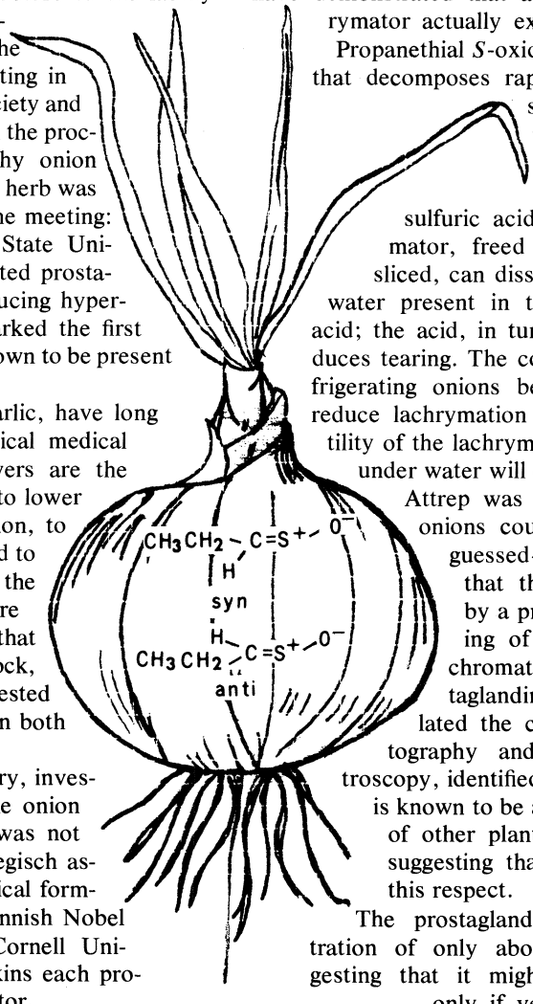
It's Nothing to Cry About . . .

The tears live in an onion that should water this sorrow.
—WM. SHAKESPEARE, Anthony and Cleopatra

It's nothing to cry about, says Eric Block of the University of Missouri at St. Louis, but previous investigators have assigned the wrong structure to the lachrymating agent in onions. Block presented the correct structure for the lachrymator at the recent joint meeting in Hawaii of the American Chemical Society and the Chemical Society of Japan and, in the process, offered an explanation for why onion fumes make one weep. The aromatic herb was also the focus of another paper at the meeting: Moses Attrep, Jr., of East Texas State University announced that he had isolated prostaglandin A_1, which is capable of reducing hypertension, from onions. His work marked the first time that a prostaglandin has been shown to be present in a plant.

Onions, and their close cousin garlic, have long been reputed to have almost mystical medical powers. Among those alleged powers are the ability to stimulate bile production, to lower blood sugar, to alleviate hypertension, to speed healing of gunshot wounds, and to cure scorpion bites, freckles, and the common cold. Both investigators were searching for chemicals in onions that might cause these reputed effects. Block, furthermore, is particularly interested in sulfur compounds and their role in both medicine and air pollution.

As long ago as the late 19th century, investigators had shown that oil from the onion (*Allium cepa*) is rich in sulfur. It was not until 1956, however, that W. D. Niegisch assigned to the lachrymator the empirical formula C_3H_6SO. In the early 1960's, Finnish Nobel laureate Arturo I. Virtanen and Cornell University graduate student W. F. Wilkins each proposed a structure for the lachrymator. The Nobelist's structure proved to be the wrong one. In 1971, M. H. Brodnitz of International Flavors and Fragrances Inc. confirmed Wilkin's proposal that the lachrymator is propanethial *S*-oxide. This compound can exist in two conformations, depending on whether the ethyl and oxygen moieties are on the same side of the double bond linking the central carbon and sulfur atoms (*syn*) or on opposite sides (*anti*). With no evidence to guide them, Wilkins and Brodnitz guessed that the compound existed in the *anti* conformation in onions. They were wrong. Using microwave spectroscopy, Block and Robert Penn of the University of Missouri have demonstrated that about 95 percent of the lachrymator actually exists in the *syn* conformation.



Drawing by Holly Bishop

Propanethial *S*-oxide is a very volatile compound that decomposes rapidly; Block thus had to use special techniques to isolate it at low temperatures. When the compound is dissolved in water, it hydrolyzes to form sulfuric acid. Block suggests that lachrymator, freed when onions are peeled or sliced, can dissolve in the small quantities of water present in the eye and produce sulfuric acid; the acid, in turn, acts as an irritant that induces tearing. The common kitchen practice of refrigerating onions before peeling them can thus reduce lachrymation because it reduces the volatility of the lachrymator. Similarly, peeling onions under water will dissolve the agent.

Attrep was intrigued by the reports that onions could lower blood pressure and guessed—correctly, it now appears—that this effect might be produced by a prostaglandin. An initial screening of onion extracts by thin-layer chromatography suggested that prostaglandins might be present. He isolated the compound by further chromatography and, primarily by mass spectroscopy, identified it as prostaglandin A_1, which is known to be an antihypertensive. Screening of other plants showed no prostaglandins, suggesting that onions might be unique in this respect.

The prostaglandin is present at a concentration of only about 1 part per million, suggesting that it might have a therapeutic effect only if very large quantities of onions are consumed—a regimen that might have some unpleasant social effects of its own. The concentration is probably not an economic one either, despite the fact that such prostaglandins sell for about $10 per milligram. It thus seems likely that the discovery of the compound in onions will remain little more than a botanical oddity.—THOMAS H. MAUGH II

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