AIDS: Casual contact exonerated

Research findings on AIDS at the Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC) in Minneapolis this week covered the gamut from good to bad to surprising. The good news: The syndrome is apparently not transmitted through casual household contact and hence not among school children; health care workers who handle AIDS patients, even workers who have accidentially stuck themselves with needles, have little if any chance of becoming infected, according to researchers.

The bad news: Heterosexual transmission, at least in Haiti and Africa, is becoming increasingly prevalent. And the surprising news: The virus associated with the disease may have been around as long ago as 1962.

A Centers for Disease Control (CDC) study of 101 members of households that included an AIDS sufferer shows transfer of infection only in one instance, in a baby born to an infected mother. "From this study," says Martha F. Rogers of the CDC in Atlanta, who headed the study, "our best estimate of the risk of household transmission is zero." The belief that AIDS victims in schools can transmit the disease, she says, has no scientific basis in the data collected thus far.

Three studies presented at the meeting show little if any risk to health care workers involved with AIDS patients. In a CDC study of 802 workers nationwide who had been exposed to AIDS blood or body fluids, only one person with no other risk factors was infected with the virus; of 527 health care workers in two prospective studies, only 1 of 95 workers who had accidentally stuck themselves with a needle, showed evidence of exposure. The incidence might be so low because it takes repeated exposures or an overworked immune system to allow the virus to establish itself, researchers suggested.

Heterosexual transmission is establishing itself as a mode of infection in Haiti and Africa. In Haiti, 14 percent of AIDS victims in a 1980-1982 survey were women; thus far in 1985, 36 percent are women, reports Warren D. Johnson Jr., of Cornell Medical College in New York City. When the researchers questioned AIDS patients about recent deaths of spouses, they found 5 percent had spouses who died of confirmed AIDS and another 15 percent had died of what seemed to be AIDS.

A study in Kenya, which has not reported a high AIDS incidence, shows the virus is establishing itself among prostitutes at an alarming rate. Of 64 women who served a "lower class" clientele, 42 had AIDS antibodies, while 8 of 26 with a "higher class" clientele had antibodies; no overt disease has yet been seen.

Where the virus comes from remains to be solved, but a report at the meeting may add 10 years to its age. J.A. Epstein and colleagues at the Food and Drug Administration reported finding AIDS-specific antibodies in two of 544 blood samples collected in Upper Volta in 1963—10 years earlier than previously reported Ugandan samples (SN: 3/16/85, p. 173). Whether this means the AIDS virus itself was present, or just a similar virus, remains to be seen, Epstein says. —*J. Silberner*

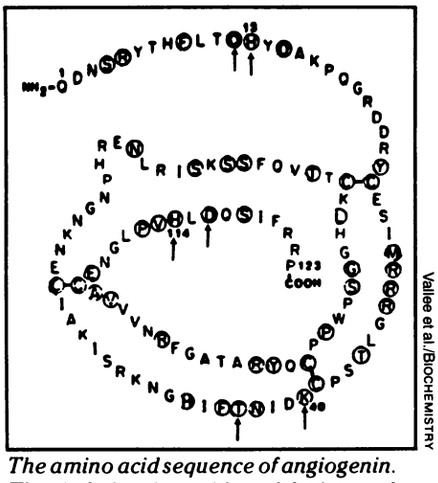
Call of the tumor: Chemical trigger for blood vessel growth

New tissue — whether it results from repair, normal growth or malignancy — demands a blood supply. Fifteen years ago, a scientist proposed that tumors disperse potent chemical factors that cause nearby blood vessels to sprout and extend. In a series of articles in the Sept. 24 BIOCHEMISTRY, Bert L. Vallee and his colleagues at Harvard Medical School in Boston report the identification, purification and detailed characterization of a human protein that triggers extension of the blood vessel system. These papers provide the first report on work over more than a decade.

The identification of such an angiogenic factor has widespread implications for treatment of diseases. Such a factor may lead to therapies to increase blood supply in cases of heart disease, stroke, fetal blood insufficiency and wound healing. Conversely, other therapies may inactivate the angiogenic factor to decrease blood supply to solid tumors and to treat rheumatoid arthritis, diabetic symptoms and skin disorders.

The chemical is a small protein derived from a human colon tumor. Very small amounts of the protein, which the researchers call angiogenin, generate blood vessel growth in living tissue of various animal species, including chick, rabbit and mouse. While the scientists have not detected angiogenin produced by any non-malignant tissue, they do find its gene in normal cells.

A surprising aspect of angiogenin is that its amino acid sequence has similarities to that of another human protein, an enzyme that breaks up RNA. James F. Riordan, who works with Vallee, says, "This finding may give some clues to angiogenin's mode of action and it may help us design an inhibitor of angiogenin." So far, no enzymatic activity of angiogenin has been found.



Vallee et al./BIOCHEMISTRY

The amino acid sequence of angiogenin. The circled amino acids and the internal bridges are found in the same places as in human pancreatic ribonuclease. Arrows mark the amino acids that form the catalytic site in the ribonuclease.

While Vallee kept his work on angiogenin under wraps, other scientists have described other blood-vessel stimulating chemicals. The originator of the angiogenesis hypothesis, Judah Folkman, also at Harvard Medical School, and others have reported a set of proteins that trigger growth of blood vessels and also the division of certain cells in laboratory culture. These proteins are characterized by an unusually strong binding to a sugar polymer, heparin. Roger Guillemin and colleagues at the Salk Institute in San Diego will soon publish the amino acid sequence of one called fibroblast growth factor.

"Vallee's factor is a completely different molecule," says Michael Klagsbrun, a colleague of Folkman's. "It doesn't stimulate [cell] proliferation and it does not bind heparin. So there are at least two classes of angiogenesis factors."

But Vallee is unwilling to regard the heparin-binding molecules as true angiogenesis factors. "The ancillary activity confuses the issue," he says, adding that angiogenin is 1,000 times as potent in triggering blood vessel growth as is the fibroblast growth factor. The work of both Folkman and Vallee has been funded by a 12-year, $25 million agreement with Monsanto Co. in St. Louis, Mo.

Vallee's major interest is not the therapeutic applications of angiogenin, but the basic question of how the growth and development of biological systems is turned on and off. "The question is how one comes to the point of inducing or organizing a system by molecular entities. Extension [of blood vessels] is as much a problem in organization and development of form as is the generation of organs in an embryo," Vallee says, "Generation of organs has been the stuff of scientific dreams for decades. It is now a reality." —*J.A. Miller*