Biomedicine

Gifts come with demands, restrictions

A new study suggests that scientists might be wise to look a gift horse in the mouth—at least when it comes to corporate gifts bestowed on a research laboratory.

Eric G. Campbell of the Massachusetts General Hospital in Boston and his colleagues sent a survey to almost 3,500 biomedical researchers working at the 50 universities that receive the most funding from the National Institutes of Health in Bethesda, Md. The survey asked if the scientists had taken any gifts from industry, including equipment, biomaterials such as cell lines, or funding for trips to professional meetings.

The team reports that 43 percent of those surveyed said they had taken such gifts from firms in the last 3 years. Despite receiving federal funding, 66 percent of those who had taken gifts said the support was important to their research effort.

Most recipients acknowledged that the donors expected something in return. For example, 63 percent said that sponsors wanted acknowledgment of their support in articles published by the researchers. In addition, 32 percent said that donors wanted to review any resulting scientific articles or reports before publication, and 19 percent said that companies expected to claim ownership of any patentable results that derived from their gift.

These restrictions on gifts may pose problems for both researchers and universities, the authors conclude. Most universities, for instance, have rules prohibiting faculty members from giving away the rights to intellectual property. By accepting corporate gifts with strings attached, researchers may be violating these policies. The authors also note that prepublication review policies present "cause for concern" because they can create lengthy delays in making scientific findings public.

The report appears in the April 1 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. In an accompanying editorial, Lisa A. Bero of the University of California, San Francisco suggests that universities take a hard look at their guidelines on corporate gifts. —*K.F.*

Tumor-starving drugs show promise

To grow, most cancers must attract new blood vessels to supply them with abundant nutrients. Therefore, some researchers are betting that drugs which starve these fast-dividing, malignant cells can be used to stop a tumor's spread.

Two research teams presented findings on such drugs at the American Association for Cancer Research meeting held in New Orleans from March 28 to April 1.

Researchers at Aeterna Laboratories in Sainte-Foy, Quebec, have derived an experimental drug from shark cartilage, which contains substances that inhibit blood vessel growth, or angiogenesis. Éric Dupont and his colleagues gave the experimental drug to 310 people with advanced lung cancer. Although it provoked side effects such as fever in a few people, the compound appears safe, the researchers report.

The team, which has shown that the drug reduces the spread of lung cancer in mice, now has an experiment under way to investigate the drug's efficacy in people.

A U.S. team is focusing on a similar agent, called Angiostatin. That compound is a modified version of a human protein that blocks blood vessel growth.

B. Kim Lee Sim of EntreMed in Rockville, Md., and her colleagues injected melanoma, a deadly skin cancer, into mice. They then treated the animals with Angiostatin for 11 days and counted the number of tumors spawned by the original cancer. "We showed that Angiostatin inhibits the number [of new tumors] by 60 to 80 percent," Sim says.

EntreMed researchers hope that the drug will produce similar results in people with melanoma—and perhaps other cancers as well. —*K.F.*

Computers

Hiding secret data in plain view

Using encryption to transform sensitive information into a form that is unintelligible to an eavesdropper isn't the only way to keep a secret. Computer scientist Ronald L. Rivest of the Massachusetts Institute of Technology has now proposed a scheme that allows a secret message to be hidden—without scrambling the digits representing the message—within a larger document. He describes the technique, called chaffing and winnowing, in an article posted on the World Wide Web at http://theory.lcs.mit.edu/~rivest/chaffing.txt.

The sender breaks the confidential digital message into packets and tags each packet with a short string of digits known as a message authentication code. The message packets can then be intermingled with fake packets bearing bogus authentication codes to create a plausible missive.

Because the sender and receiver share a secret method for authenticating the origin and contents of each packet, the receiver can readily distinguish between the legitimate information (wheat) and the gibberish (chaff). A spy is left in the dark. "This technique can provide excellent confidentiality of message contents without involving encryption," Rivest says.

Because individual packets are not encrypted and packet authentication is widely used in routine communication, the scheme may legally evade regulation under U.S. government rules restricting the exportation of cryptographic technology (SN: 6/8/96, p. 357). It also circumvents government proposals that call for law enforcement officials to have access to methods of surreptitiously decoding encrypted messages (SN: 6/19/93, p. 394). Rivest contends that such loopholes show "the difficulty (or impossibility) of drafting any kind of reasonable law restricting encryption or confidentiality technology." —*I.P.*

Web searches fall short

Looking for the latest information on quantum teleportation, laser fusion, or some other scientific topic? For an increasing number of people, including many researchers, the World Wide Web serves as a huge, searchable encyclopedia. To find what they need, users typically consult one of the large search engine companies, each of which offer extensive, regularly updated indexes of directly accessible Web documents. Web content is increasing so rapidly, however, that no single search engine indexes more than about one-third of it, Steve Lawrence and C. Lee Giles of the NEC Research Institute in Princeton, N.J., report in the April 3 Science.

The researchers studied the coverage of the six largest Web search engines—AltaVista, Excite, HotBot, Infoseek, Lycos, and Northern Light—by analyzing responses to queries from institute employees, mainly scientists, in the course of their normal work. From their results, based on tests conducted Dec. 15 through 17, 1997, Lawrence and Giles estimate that the indexable Web contains at least 320 million pages. Estimated coverage by the six search engines ranged from 34 percent for HotBot to 3 percent for Lycos.

The researchers also investigated what percentage of documents reported by each search engine proved invalid because the page had moved or no longer existed. Those values varied from a high of 5.3 percent for HotBot to a low of 1.6 percent for Lycos, suggesting a possible trade-off between database size and update frequency.

"Combining the results of multiple engines can significantly increase coverage," Lawrence and Giles conclude. For example, the six engines in the study, as a group, covered about 3.5 times as much of the Web as the average engine. If only two engines are used, Lawrence and Giles recommend trying the two that at present have the widest coverage: HotBot and AltaVista. The indexing patterns of all the engines, however, may vary significantly. —*I.P.*