red after surgery. They published these findings in a prestigious journal, the *Proceedings of the National Academy of Science*, in 1969. The scientific community, which up until then had largely ignored CEA, snapped to attention. Here, for the first time, was a diagnostic blood test for human cancer.

The American branch of the Hoffman La Roche company purchased the rights to the CEA assay from McGill and invested some \$20 million in developing and marketing blood-testing kits based on it. About 100 million dollars worth of these tests are now performed every year around the world. Oncologists routinely use the information these tests provide. A failure of CEA levels to fall rapidly when a tumor is removed, for example, suggests that all the tumor has not been removed. If the levels do drop after surgery only to climb again some months later, this suggests that cancer cells have spread elsewhere — and this rise in CEA occurs long before any other clinical symptoms become apparent.

But such information has been found to be ambiguous. As scientists elsewhere repeated the assays that Gold and his co-workers carried out in Montreal, it became clear — as indeed Gold and Freedman had predicted — that the sensitivity and specificity of the test were not as good as the initial reports promised. CEA was not the panacea that some had hoped it would be. Significant numbers of patients with tumors begun in sites other than the bowel, or with diseases other than cancer severe cirrhosis, for example — gave false positive readings. Some patients were tested because, for example, blood spots had been observed in their stool, a symptom of bowel cancer, but no CEA was found; later however, surgeons found malignant tumors in their colons. Hence, a small proportion of both false-positive and false-negative results occur. But Gold contends that the field of tumor markers has grown exponentially in the past 20 years, with three to four books and hundreds of papers being published on the topic every year. He feels that new technology will in all likelihood improve the assays based on these markers.

Despite the problems, Gold and others consider the test of great value, especially in diagnosing patients after they have had surgery for the removal of cancerous tumors and it subsequently appears that the disease has spread or metastasized. He feels that the CEA test allows one to predict with a lead time of three months to three years that tumor growth has recurred. Gold is not enthusiastic about surgeons who opt for 'second look' surgery when CEA levels clearly rise subsequent to a falling off after the first operation — a sure sign that the disease is reestablishing itself. In such recurrent or metastatic conditions, a virtual shower of tumor cells moves out to colonize several areas at once, and in 'second look' surgery the physician removes only those tumors that are big enough to see. What is required instead, says Gold, is a better drug regimen, given systematically, to effectively attack all points of tumor growth without causing undue destruction to or impairment of normal tissue function. Says Gold: "Future generations will look back at the virtual poisons now administered in chemotherapy with incredulity, just as we do at earlier physicians who applied leeches."

At the beginning of his career, Gold spent most of his time doing science. Now he spends most of it doing medicine.

He still leads a research team with chutzpah, charisma and skill. "He'll have just read a paper," says Abe Fuks, a molecular biologist who works in Gold's lab, "and he'll say 'Why not try this?' I'll say 'You're crazy.' Far more often than not, he's been right." As first director of the McGill Cancer Centre, Gold coordinated oncology research and treatment in Montreal universities and teaching hospitals. "Phil laughs and slaps backs," says Jack Siemiatycki who, with Phil's support, launched a major cancer epidemiology study. "But when he sits down at a meeting it's 'O.K., What do we want? What can we do?' There's not much social chatter."

In 1981 Phil began his current job: physician-in-chief at the Montreal General Hospital. "I owe this place a great deal," he explains. "I try to give something back. I've been able to do research here, which I like. I've been able to teach, which I like too. And I'm able to look after people."