would consist not only of the hepatitis B surface antigen but of a virus core protein. At the recent meeting in San Francisco of the First International Congress for Recombinant DNA Research William J. Rutter of the University of California at San Francisco described such an approach. He and his colleagues put two viral genes in tandem into a plasmid. One gene coded for the hepatitis B surface antigen and the other for a molecule closely related to a protein found in the viral core. To turn on operation of these genes, Rutter included in the plasmid a regulatory stretch of DNA called the trp-promoter. It can direct the bacterial cell to devote most of its protein synthesis to the viral genes. Rutter reports bacterial production of "significant quantities" of both the hepatitis B surface antigen and the core protein, as opposed to low levels of hepatitis B surface antigen purified from virus particles taken from hepatitis B carriers or as previously made in bacteria with recombinant DNA techniques (SN: 5/26/79, p. 344). Because both the hepatitis B surface antigen and the virus core protein have been detected in hepatitis patients, Rutter hypothesizes that a two-protein vaccine might be more effective than one made only of hepatitis B surface antigen.

Insights into hepatitis B virus's role in causing liver cancer are emerging from the lab of William S. Robinson of Stanford University Medical School. At the recent meeting in Dallas of the American Society for Microbiology Robinson reported that liver cancer is 300 times more prevalent among persons persistently infected with hepatitis B virus than among control subjects. Other researchers have found that hepatitis B viral DNA is integrated into the DNA of cancerous liver cells but not into the DNA of noncancerous liver cells (SN: 8/6/80, p. 102). Although both lines of research suggest that hepatitis B virus can cause liver cancer, Robinson points out that a viral cancer-causing gene per se may *not* be responsible for turning a liver cell into a cancer cell. One reason to think this is not the case is that while a cancerous liver cell's DNA contains all of the hepatitis B viral DNA, and while all of the viral DNA is transcribed into RNA, only some of the RNA is translated into proteins, notably the hepatitis B surface antigen; yet this selective pattern of gene translation has also been observed in some noncancerous liver cells. Instead, the hepatitis B virus may turn a liver cell into a cancer cell by a nonspecific mechanism, Robinson speculates. For instance, because the viral DNA is integrated into the cellular DNA, it might interrupt cellular DNA functions, and this interruption in turn might be what makes the cell cancerous.

"So I'm not at all sure," Robinson told SCIENCE NEWS, "that there is a gene in this virus that is directly responsible for changing cell function in a sense that we call [cancerous] transformation." □

Coffee and cancer: A brewing concern

People who drink coffee may be at double or triple the risk of developing pancreatic cancer, a rare but lethal disease, according to epidemiologists at the Harvard School of Public Health. If their "unexpected" finding is confirmed, and "[i]f the distribution of coffee consumption in our control group reflects that in the general population," the Harvard group says, "we estimate the proportion of pancreatic cancer that is potentially attributable to coffee consumption to be slightly more than 50 percent." But before banning the brew, remember that the jury is still out. Even Brian MacMahon and his Harvard colleagues point out that other data must be evaluated "before serious consideration is given to the possibility of a causal relation" between coffee and cancer.

MacMahon's project, described in the March 12 NEW ENGLAND JOURNAL OF MEDICINE, was actually designed to reexamine the incidence of pancreatic cancer in relation to its victims' smoking habits and to explore whether alcohol consumption plays a confounding role. The survey involved 369 pancreatic-cancer patients and a "control" group of 644 hospitalized patients with other ailments. Each was asked about smoking habits. Questions also probed the frequency with which each consumed alcoholic beverages prior to onset of the disease, the age span over which they drank and the beverage they consumed most often. Data about tea and coffee habits were limited to the typical number of cups consumed before onset of their current disease became evident.

The researchers observed no link between pancreatic cancer and use of alcohol, tea, pipe tobacco or cigars. There appeared to be a "weak positive association" between cigarette smoking and the disease—also noted in at least two earlier studies—though "only the data for women showed a significant dose-response relation." Coffee consumption was another matter.

Coffee-drinking men — regardless of how much they drank — showed a "flat" but statistically significant excess risk of pancreatic cancer over men who avoided the brew. But among women coffee drinkers, pancreatic-cancer risk increased in proportion to how much coffee they consumed. Combining both sexes, the pancreatic-cancer risk (adjusted for age and sex) showed no elevation for non-coffee drinkers, a doubling (2.1) for those drinking a cup or two daily and more than a three-fold increase for those downing at least five cups a day. MacMahon plans a follow-up study hoping to confirm or rebut these findings.

Another recent epidemiological study (SN: 1/31/81, p. 71), this one by Irving Kessler and Ruey Lin at the University of Maryland, also suggests that "one or more constituents (or contaminants) of coffee may contribute to the risk of pancreatic cancer." Because so many pancreatic-cancer patients in their study drank decaffeinated coffee, solvents such as the animal carcinogen trichloroethylene — used in decaffeinating coffee — "come immediately to mind," the researchers said. But many other factors were also linked with the cancer.

What does all this mean to the hard-core coffee addict? "Prognosis of [pancreatic] cancer is very unfavorable and therefore even a preliminary finding such as that of Dr. MacMahon's study arouses great concern," says a National Cancer Institute announcement. In fact, pancreatic cancer accounts for about 20,000 deaths in the United States annually, more than any other except colorectal, lung and breast cancers. However, NCI adds, "caution should be exercised regarding overreacting to a preliminary finding until results of further studies are reported."

But Kessler offers a further note of caution in interpreting the Harvard group's findings. After looking at a "whole constellation" of risk factors, he concludes that "there is substantial evidence" for believing that most human pancreatic cancers result from no one single factor — such as coffee drinking — but rather from a synergistic host of interacting factors. □

Metal drops that dig into graphite

Chemical reactions go faster with catalysis. That arouses the interest of physical chemists, who want to know how the catalyst speeds things up. It also attracts the interest of industrialists who see more efficient industrial processes in prospect. So as Reese Terrence Keith Baker of the Exxon Research and Engineering Co. in Linden, N.J., pointed out at the meeting this week in Phoenix of the American Physical Society, a study of the effects of metals in increasing the reaction rate of gasification of graphite can have a number of purposes. Such catalytic reaction rates may determine how long graphite structures will last, particularly in an oxygen-aiding atmosphere. Knowledge of such rates could aid development of better ways of removing graphite from places where it collects during coking and other such processes. Finally, the work may help in finding the best catalyst for gasification of coal. Gasification is often said to be the best way to make a nonpolluting fuel from coal.

In the course of their work, Baker and his co-workers have developed a tentative model for the mechanism of graphite gasification catalysis, which is always a most fascinating physical chemical point, and they have found that under the conditions of the experiment the solid metals