

not have time to move to the surface.

Another possible materials problem with the 1-2-3 superconductors that has gotten little attention but could prove important for commercial applications is their questionable stability. There are reports that the materials react readily with water and carbon dioxide. Several researchers said, however, that the stability problems seemed to disappear as they learned to make purer samples, and they speculated that the reactions with water and carbon dioxide depended on impurities in the samples.

With the different problems facing the 1-2-3 superconductors, perhaps the simplest solution would be to find high-temperature superconductors that are easier to work with. That may have happened.

Last month, two groups—one in Japan and one at the University of Houston—announced the discovery of a material that becomes superconducting at 110 K. The increase in critical temperature is important, but equally important is the fact that initial reports indicate that the new bismuth-strontium-calcium-copper-oxygen superconductors are not as balky as the 1-2-3 superconductors.

For one, their flaky structure—much like mica—seems to be more flexible than the 1-2-3 superconductors. The new material also seems to be more stable, it does not have to be processed at quite as high a temperature, and it does not need the final annealing step to add oxygen that the 1-2-3 superconductors demand. Researchers have not yet announced the new material's critical current density.

More recently, yet another high-temperature superconductor has been discovered, this one with a critical temperature of about 125 K. This substance, which consists of thallium, barium, calcium, copper, and oxygen, is too new for investigators to predict its physical and mechanical properties.

A year's intense work on the 1-2-3 superconductors has prepared the ground for a much more rapid development of the new materials. "Within 1 or 2 weeks, we'll know enough about these materials [to know if they are promising]," said Argonne's Brodsky. "If the properties look that much better, I think people will rush off in that direction." If this proves to be the case, the 1-2-3 superconductors may slowly sink out of sight, but the time spent studying them will not have been wasted. "We can use the information we've already got together to study the new materials," he said, "and they look much more complicated." ■

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Diet and Health in China

Chinese food can tell us a lot about the relationship of diet and disease, a relationship that, in countless studies, has proved slippery to pin down. So says T. Colin Campbell of Cornell University, who, with three colleagues from China and England, is now completing a 6-year study of Chinese dietary patterns. He provided glimpses into the study, which will be published later this year, at a recent Senate hearing on nutrition and health.

What drew the investigators to China is that country's enormous variation in cancer incidence, which became apparent with the 1981 publication of the *Cancer Atlas of China* by the Chinese Cancer Institute. The atlas revealed that in China cancer is very much a local disease, with mortality rates varying from several dozen-fold to 300-fold among regions. And in most regions, diet and life-style also vary tremendously: people usually live their entire lives in the county where they were born, eating locally grown foods.

These characteristics afford an opportunity to look at the effects of specific—and constant—diets on health, an opportunity that does not exist in the United States and other Western nations. With coinvestigators Chen Junshi of the Chinese Academy of Preventive Medicine, Li Junyao of the Chinese Academy of Medical Sciences, and Richard Peto of Oxford University, Campbell set out to do so, with funding from the National Cancer Institute (NCI) and the Chinese government.

They selected 65 counties across the country, reflecting the nation's wide variation in cancer incidence, and two villages or communes within each, for a total of 130 sites. The heart of the study was a 3-day survey of some 12,000 people, which recorded what they actually consumed over those 3 days.

The dietary survey was supplemented with laboratory analysis of food samples that provided a precise breakdown on the proportion of various fiber fractions, trace metals, pesticide residues, and other components. For about 6500 men and women between the ages of 35 and 64, blood and urine samples were analyzed to assess nutritional status. In all, they collected 350 items of information, which they are using to examine the role of diet in 12 cancers and 35 other diseases.

Details on the relation of diet to disease incidence in China will not be released until later this year, but at the hearing Campbell described a few key findings, focusing on what the Chinese data might reveal about U.S. dietary policy.

■ **Cholesterol.** Plasma cholesterol levels range from 90 to 175 milligrams per deciliter, which puts the Chinese high near the U.S. low. Cardiovascular disease continues to decrease as cholesterol levels drop below 180, Campbell reported. Moreover, the incidence of colon cancer also decreases along with cholesterol levels, in contrast to a few studies that have suggested the reverse.

■ **Fiber.** Chinese eat three times more fiber than do Americans, consuming anywhere from 8 to 77 grams of fiber a day, with an average of 34 grams a day. The U.S. average is 10 grams; NCI has set a target of 20 to 30 grams a day. However, because some evidence has suggested that a high-fiber diet may interfere with mineral absorption, NCI recommends an upper limit of 35 grams a day. The Chinese study does not bear that out, says Campbell. In fact, he says, hemoglobin levels are positively correlated with fiber intake.

■ **Fat.** Fat intake ranges from a low of 6% of total calories to a high of 25%, with an average of 15%, compared with a U.S. average of 40%. There is no evidence, Campbell says, that health is compromised by such low-fat diets, but further investigation is necessary.

■ **Total calories.** Although Chinese consume 20% more calories, per body weight, than do Americans, there is very little obesity. The Chinese are considerably more active than Americans, on average, says Campbell, "but I think that is only part of the story." He suspects it may be related to the type of calories consumed and how they are utilized. What this finding does imply, according to Campbell, is that caloric intake is not necessarily a determinant of obesity, nor is it necessarily a determinant of chronic disease risk, though obesity itself certainly is.

The opportunity for such studies may soon disappear. Diet has remained constant in rural areas, where the study was mostly conducted. But in urban areas, says Campbell, dietary patterns are already changing as the country opens its doors to the Western world. ■ **LESLIE ROBERTS**