talists," he says of Spiegel and his colleagues. But, he warns, "one shouldn't draw inferences for the population on the basis of [this single] study."

Fox also cautions that randomization may not be reliable when the number of subjects is relatively small, as it was in the Spiegel study. He warns that there could be hidden differences between the two groups that might account for their different survival times.

"Obviously if you could do it with 1000 patients you'd feel more certain of it," Spiegel agrees. But he points out that his coauthor, respected Stanford biostatistician Helena Kraemer, felt the numbers were large enough. The researchers also specifically checked to see if the two patient groups were equivalent in every clinically used predictor of cancer outcome.

They found no significant difference between the control and intervention groups in the kind and amount of surgery, chemotherapy, and radiation the patients received; their ages at the time of diagnosis; time between diagnosis and metastasis (a strong indicator of the aggressiveness of the cancer); and time between metastasis and entry into the study or activity levels at the time of entry into the study. Women in the psychotherapy group tended to have less advanced tumors at the time of their original diagnosis, but the difference was not quite significant and Spiegel and his colleagues showed statistically that it did not cause the difference in survival.

Although Spiegel's study has been judged sound, he shares Holland's and Fox's worries that it will encourage practitioners who would substitute psychotherapy for proven medical treatments. Spiegel points out that the women in his study all underwent standard cancer treatment. And the psychotherapy itself was benign, he says, unlike some therapy programs that tell patients they are personally responsible for their cancers and make them feel like failures when they are unsuccessful in keeping their disease at bay mentally.

Spiegel does not suggest that the psychic change brought about by group therapy necessarily had a direct effect on his patients' physiology or disease. Rather, he says, the therapy may have caused a change in mental attitude that made the subjects comply better with their doctors' orders regarding medication and diet. He also suggests the pain reduction may have allowed them to remain more active than the control group. He plans follow-up studies to investigate how the therapy may extend lives.

"What I am flat out certain of is that something about being in the groups helped these women live longer," he says. "But what that is, I don't know."

■ MARCIA BARINAGA

Teller, Chu "Boost" Cold Fusion

Cold fusion research may get renewed attention now that two well-respected researchers from outside the field have come to its support. Last week, after participating in a 2½-day workshop in Washington, D.C.,* Paul Chu and Edward Teller both called for additional experiments to understand the anomalous effects that have been attributed to cold fusion.

The National Science Foundation and the Electric Power Research Institute, which jointly sponsored the meeting, decided to include Chu, a leading researcher in high-temperature superconductivity, and Teller, a dean of American nuclear physicists, in order to have some disinterested, even skeptical, observers who would make sure the discussions were properly scientific. Chu, who is at the University of Houston, even agreed to serve as co-chairman. By the end of the meeting both were convinced that the experimental evidence for cold fusion, or at least some unknown nuclear phenomenon, is too great to ignore.

"New, positive results in excess heat production and nuclear product generation have been presented," Chu said in a statement prepared jointly with John Appleby of Texas A&M, the other co-chairman. "Based on the information that we have, the effects cannot be explained as a result of only artifacts, equipment, or human error." Teller was impressed enough to issue a personal written statement to the press. "Numerous interesting and partially contradictory results on cold fusion are in disagreement with the solidly established nuclear theory of fusion," he wrote. "There is a possibility to reconcile the results with the theory."

In his release, he offered a highly speculative scenario in which an "as yet undiscovered neutral particle" acts as a catalyst to remove neutrons from deuterium atoms and transfer them to other atoms, resulting in a new type of nuclear process. And he suggested that one way to test this hypothesis would be to run cold fusion experiments using uranium-235, because uranium's response to absorbing a neutron is well known.

But beyond that, few details from the meeting were available since it was closed to the press. Appleby said at a press briefing that they did not want to fall into the trap of releasing reports to the media that had not been carefully reviewed, something that was all too common in the early days of the cold fusion saga.

According to a few workshop participants who spoke with *Science*, several researchers are still seeing excess heat from fusion cells similar to the ones originally described 7 months ago by Stanley Pons and Martin Fleishmann at the University of Utah. The anomalous heat measurements are coming not only from researchers who have already announced positive data, such as Appleby's team, but also from new entries to the field, such as Richard Oriani at the University of Minnesota. "Anomalous heating appears to be real," Appleby said. "If the temperature turns out not to be an artifact, then nuclear phenomena are involved. There is no other explanation."

If nuclear phenomena are involved, there should be nuclear by-products, such as neutrons and tritium, in addition to the excess heat production. Several of the workshop participants had reported seeing these by-products in the past, only to have their experimental procedures questioned. These scientists now say that they have refined their techniques to eliminate various sources of error and have run blank controls, and still they detect these products.

But cold fusion research is still bedeviled by a major problem—the difficulty in detecting excess heat and nuclear by-products in the same experiment. A second frustrating obstacle has been the now-you-see-it, now-you-don't nature of the cold fusion experiments. Most researchers report that some of their experimental cells will work and others not, apparently at random, and even the working cells work only part of the time.

The question remains of where funding for further series of experiments will come from. The Electric Power Research Institute is providing some money this year and could spend up to $2 million next year if experimental results are promising, but neither the Department of Energy nor the National Science Foundation has any plans for a cold fusion program. However, Paul Werbos of NSF's Division of Electrical and Communications Systems, which co-sponsored the workshop, said at the press briefing, "When we get recommendations [from the meeting participants], then we will look at the possibility of funding."

■ ROBERT POOL

*NSF/EPRI Workshop on Anomalous Effects in Deuterated Materials, Washington, D.C., 16 to 18 October.