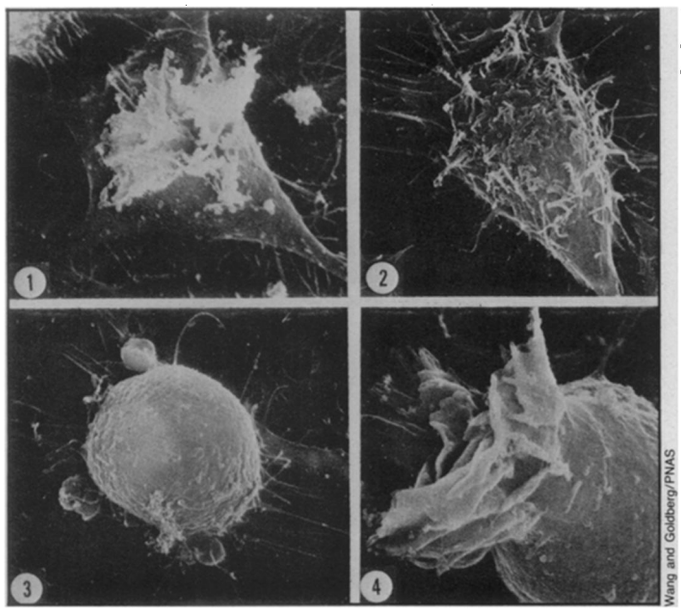
sponse, they found. "Evidence indicates that few people take such pronouncements from psychics or amateurs seriously. On the other hand, when reputable scientists known to be experts on earthquake prediction agree among themselves on the interpretation of data being used to predict a specific earthquake, the prediction will be taken quite seriously by the majority of people."

Haas and Mileti found no evidence to indicate that the first credible prediction of a damaging earthquake will cause panic or anything resembling it. "Nor," they add, "will there be complete apathy."

In an epilogue, Haas and Mileti say some of the more complex issues raised by earthquake prediction will take several years, perhaps longer, to resolve. They suggest prompt and serious consideration. "If we fail to resolve soon some of the more difficult problems, the earthquake prediction technology will come back to haunt us." □

Cancer unfolding: Seeing a cell go bad



Transformation of a normal cell into a cancer cell.

Throughout the world researchers are attempting to solve one of the most baffling mysteries of 20th century science—how a normal cell is alchemized into a cancer cell, one that multiplies without control and ends up killing the body. Slowly but definitively they are unmasking some of the intricacies involved. For instance, dramatic insights into how one cancer virus—the Rous sarcoma virus—turns cells into cancer cells is reported in the November PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES by Eugenia Wang and Allan R. Goldberg of Rockefeller University.

The Rous sarcoma virus causes cancer in chickens, thanks to one gene that it possesses. This gene, known as the SRC gene, is known to trigger various alterations in a target chicken cell. It can cause a loss in cell membrane proteins, sabotage the movement of chemicals through the cell membrane, thwart normal cell growth and movement and even produce changes in cell shape and in the actin (muscle protein) filaments present in cell cytoplasm. Wang and Goldberg probed these latter two changes in detail, using the techniques of scanning electron microscopy, immunofluorescence and transmission electron microscopy.

They put Rous sarcoma virus in the presence of chick embryo cells and shifted the culture temperature so that the virus was able to make the cells cancerous. Using scanning electron microscopy, they observed three stages of change in cell surface during this process.

Stage one began one hour after the temperature shift and lasted two hours. Unique, flowerlike membrane ruffles appeared in the cell's nuclear region (photo 1). The flowerlike ruffles were formed by a direct upward extension of the free cell surface. During this period, the cells generally retained their normal shape.

During stage two, three to twelve hours after the temperature shift, long cellular processes retracted to the nuclear region, leaving numerous retraction fibers around the cell periphery (photo 2). The nuclear region became elevated, and numerous microvilli (tiny fingerlike projections) appeared on the cell surface. The increased retraction finally resulted in the gradual loss of cell shape. By the end of this stage, the cell appeared spindle-shaped and showed many retraction fibers.

Stage three, 12 to 24 hours after the temperature shift, was marked by a gradual conversion of the spindle-shaped cell to a completely round one (photo 3). By this time the cell was covered with small blisters, and the number of retraction fibers and microvilli had diminished considerably. At higher magnification, viruses could even be seen budding from the cell. There appeared to be no preferential location on the cell surface for virus maturation. Occasionally membrane ruffles similar to those of stage one appeared (photo 4).

Using immunofluorescence, Wang and Goldberg could distinguish no difference between the actin microfilaments in the cytoplasm of normal cells and the microfilaments in the cytoplasm of cancer cells until stage two. Then the filaments gradually shortened; their number became reduced. Transmission electron microscopy also revealed a sharp reduction in these filaments by stage three, and some of the filaments appeared to be mixed in with the cell's membrane. These intracellular changes in microfilaments coincided with cell surface changes.

How might these observed changes in cell topography and cytoplasmic filaments come about? Wang and Goldberg suggest that they are probably the result of the influence of some product made by the viral gene SRC. Specifically, the gene probably makes some protein that then attacks a cell's microfilaments. Disturbed microfilaments might then alter a cell's shape, and once its shape is altered, it might no longer interact with nearby cells nor divide and multiply normally. □

Changing of the guard —Part 1

President-elect Jimmy Carter, SCIENCE NEWS learned this week, would soon announce his first major science appointment, nominating ex-Congresswoman Patsy Mink (D-Hawaii) to be Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs. Meanwhile, reliable sources also report that outgoing President Gerald Ford will submit a National Science Foundation budget large enough to reverse a 10-year decline in support for basic research.

Mink served on the House Select Committee on the Outer Continental Shelf and chaired the Subcommittee on Mines and Mining of the House Committee on Interior and Insular Affairs. Although her appointment had not yet been made public at midweek, knowledgeable congressional reaction is generally favorable. Relations between this State Department office and congressional committees have been strained recently and one observer called her selection to the post "a real step forward."

Several pressing issues are expected to greet the new assistant secretary, including law of the sea, offshore mining regulations and oil drilling leases. Congressional pressure is mounting for the United