biological sciences natural sciences

From our reporter at a national symposium on immunity at the University of Minnesota

Turning off cancer cells

Contact between two normal cells usually results in inhibition of cell growth and division. Malignant cells do not show such growth regulation. Many scientists think that perhaps there are unique molecules on the membranes surrounding the two cells that make contact and turn off cell division. Robert E. Scott of the University of Minnesota has reason to believe that glycoproteins, proteins containing sugar, may be the crucial turning-off molecules.

Scott and his team have found that unique particles in the cell membrane increase three to five times in number immediately before a cell divides, then decrease drastically right after the cell makes DNA and divides. Since the membrane particles in a nondividing red blood cell appear to be glycoproteins, Scott speculates that certain specific glycoproteins could well be the molecules in the membrane that increase before a cancer cell divides.

Other researchers have also discovered that glycoproteins extend all the way through the cell membrane. As a result, glycoproteins on the membranes of two normal cells might make contact and touch off a physical or chemical reaction that transmits a message across the membranes into the cells, telling them to stop dividing. "A defect in such a control might explain the cause of malignancy," Scott says.

Antigen isolation and organ transplants

A glycoprotein that serves as a transplant antigen—causing the cell to reject foreign tissue—has been isolated from the cell membrane of the mouse. The accomplishment, one of the first of this nature, is by Stanley G. Nathenson and his colleagues at the Albert Einstein College of Medicine in New York. Since they began their isolation efforts eight years ago, Dean Mann of the National Cancer Institute and John Fahey of the University of California at Los Angeles have used their technique to extract a glycoprotein from the membranes of a human tumor cell line also believed to serve as a transplant antigen.

Many organ transplant surgeons, particularly heart surgeons, are reluctant to try any more transplants until the rejection problem is improved. "Understanding the chemistry of the transplant antigen," Nathenson notes, "should help investigators find ways to prevent the rejection problem."

Similarities between fetus and cancer cell

Although many researchers are seeking viral and chemical causes for cancer, Norman Anderson and J. H. Coggin of the Oak Ridge National Laboratory in Tennessee believes that viruses and chemicals only turn on genes in later life that normally express themselves in the fetal period. In other words, it is these fetal genes gone haywire that really earmark the cancer process.

Anderson and Coggin are struck by the properties shared by the fetus and cancer cell—invasion of host tissue without immunologic rejection, rapid growth and their discovery that fetal antigens can be used to immunize some animals against tumors.

Crocodiles from birds?

That birds and crocodiles are closely related has long been recognized, and it has been assumed that they both descended independently from the Thecodontia, the reptile predecessor of dinosaurs and flying reptiles.

Alick D. Walker of the University of Newcastle upon Tyne in England, however, believes that the kinship between birds and crocodiles is even closer. In the June 2 NATURE Walker makes a detailed comparison of crocodilian and bird skulls and the skull of *Sphenosuchus,* a crocodile from about 180 million years ago. He concludes that the skull of *Sphenosuchus,* though technically crocodilian, was derived from a form with many bird-like features. He suggests that crocodiles may have descended from an unknown stock of tree-dwelling reptiles which eventually gave rise to birds. "Living crocodiles seem, to a surprising extent, to represent a 'frozen' stage in the evolution of birds."

Life cycle of a phytoplankton

The abuandance of phytoplankton, minute marine plants, in tropical seas has been found by some researchers to vary seasonally and by others to remain constant.

In the May 12 NATURE, D. M. Steven and R. Glombitza of McGill University in Montreal report results of 65 collections of phytoplankton samples taken at two-week intervals from a spot west of Barbados. They found that the abundance of one species, *Trichodesmium thiebaudii*, at a depth of five meters fluctuated regularly, with a period of 105 to 120 days.

Large numbers of healthy *Trichodesmium* were observed at depths of 50 and 100 meters two weeks before surface abundance increased, and when the organism was abundant at the surface it was scarce at lower depths. The researchers suggest that the organism's surface population may be regenerated periodically from a seed population at depths where there are essential nutrients unavailable at the surface. Plants in the seed population may absorb enough nutrients to sustain them for a while at the surface.

They signal with a wiggle

Many insects have been found to have surprisingly complex societies based on ingenious systems of communication. Two researchers at Tel-Aviv University Medical School have been studying communication among *Vespa orientalis* F, a species of wasp prevalent in Mediterranean basin lands. The larvae of the species develop within individual cylindrical cells in the nest. They are dependent for food on the adult workers of the wasp colony and call workers to feed them by contracting within their cells so that their mandibles rub against the wall, producing a scraping sound.

In the June 2 NATURE, J. Ishay and E. M. Landau report that the contractions of the wasp are rhythmic. One larva, for example, contracted every 3.3 seconds. The pause between contractions varied from one individual to another. The researchers believe the rhythm used by an individual larva may signify its age or the intensity of its hunger, or may simply serve to identify it.