days and then transferred to mouse foster mothers. Of 312 fertilized eggs, 211 embryos survived laboratory incubation and 46 pups were born of foster mothers.

Last winter, the researchers got their first positive results. Five of the mouse pups contained the rabbit form of beta-globin, as well as the mouse form, in their red blood cells. Two of these mice were subsequently mated and at least five of their eight offspring inherited the rabbit gene and made the rabbit protein.

The rabbit protein was identified with immunological methods, Wagner told SCIENCE NEWS. The method does not allow the scientists to measure the amount of protein present, but Wagner says they observed a "strong" reaction with antibodies from mice immunized against rabbit beta-globin. Wagner says they also detected small amounts of a new hemoglobin. The rabbit product may not be completely compatible with the mouse proteins also present in the red blood cells. "The mice seem to be slightly anemic," Wagner says.

These results open up a range of intriguing questions. The scientists suspect the rabbit gene is integrated into the mouse chromosome, but they do not know where is the rabbit gene under appropriate control, expressed at the proper time in development and expressed only in red blood cells? Wagner says they have looked at a few mouse tissues and do not find the beta-globin, so expression of the rabbit gene seems to be "tissue-specific."

But Wagner plans to leave most of these questions to others: "Our interest is not specifically in the area of the globin system. We see this as just a demonstration that there can be production of a foreign protein. There are a lot of applications,"

The most likely application to human medicine is not the direct correction of human defects, but rather creation of experimental animal models of critical diseases, Wagner says.

The Ohio scientists have a special interest in yet another aspect of genetic engineering. "Application of this technique to animal breeding could dramatically shorten the time necessary to selectively breed species of animals with improved food-producing characteristics," Wagner says. Their next project will be to clone genes of agricultural interest, such as growth and milk-promoting hormones, and transfer them first into mice and then into cattle. □

Cancer biochemistry data questioned

Waves of excitement rippled through the scientific community coast-to-coast a few months ago generated by results issuing from a Cornell University laboratory. The research there (SN: 3/21/81, p. 180) tied together classical biochemistry and modern molecular biology to address a major question: what causes a cell to be cancerous? Now failure of scientists in that laboratory and others to get the same results has put a damper on the excitement, and discrepancies in the data have led to suspicion that at least some of the experiments were "wrong." Claims made in scientific papers that appeared in July are being withdrawn by Efraim Racker, the senior investigator in the research, and other papers not yet in print are being withdrawn.

Suspicion focuses on a graduate student, who has been asked by Racker to stop his experiments at least temporarily. The graduate school "wheels are grinding" to decide what to do about the doctoral degree he was due to receive. In addition to the unsuccessful attempts to reproduce the work, doubts were fostered by Volker Vogt, another member of the Cornell team, who found evidence that materials were mislabeled, if not deliberately doctored. In a letter to SCIENCE (to be published Sept. 18), Racker says also that Vogt found in reviewing an experiment the data "...were incompatible with the experimental procedure." Additional discrepancies were discovered with the help of other tumor virus laboratories.

Just how much of the research will be proved false remains to be seen. Racker and Vogt have already begun repeating the experiments "from scratch." Racker says, "We are now checking all published data and it will take us many months before we know what is correct."

The research describes a cascade of reactions, one enzyme adding a phosphate group to activate the next enzyme in the chain. One of the most exciting aspects of the research was a claim that two of the enzymes in this cascade are similar, if not identical, to enzymes produced by animal viruses that cause cancer.

The work claimed that in all the reactions of the cascade a phosphate group is attached to the amino acid tyrosine, instead of serine as in most other reactions. At the end of the chain, a phosphate group was thought to be added to a protein, called sodium potassium ATPase, that acts as an ion pump.

Racker says he has already confirmed the transfer of phosphate to a tyrosine of the sodium-potassium ATPase and has repeated parts of other experiments. But many of the results have not been verified so far. "We suspect that some of the data dealing with cells transformed by various tumor viruses are incorrect," the researcher says.

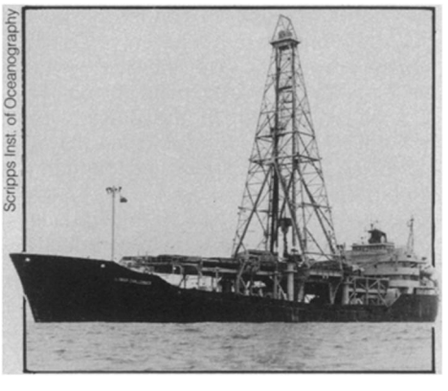
Meanwhile other scientists who had gained new perspective on their own experimental results from the Cornell theory must figure out how much of their thinking to reject. In the end, the theory or parts of it may hold even if the original data do not. □

NSF plans new role for *Glomar Explorer*

The National Science Foundation (NSF), in a move both to cut costs and combine two separate deep ocean drilling programs, has proposed a plan that would consolidate the Deep Sea Drilling Project and the ambitious new Ocean Margin Drilling Program (OMDP). Under the proposed plan, the former CIA submarine salvage ship, the *Glomar Explorer,* will replace the *Glomar Challenger.* The *Explorer* will undertake drilling throughout the oceans as well as on the ocean margins as previously planned. Combining the two programs also may help resolve ongoing disputes in the scientific community over which objectives for ocean drilling should have the highest priority.

The *Challenger,* which is nearing its 14th year of operation, will continue to be used for drilling until about 1983. By 1984, the *Explorer* will be converted to a drillship capable of riser and nonriser drilling, although the riser will not be added until 1987. (A riser, the casing around the drillpipe, and other equipment are needed to control pressures that would be encountered if the drill bit accidentally hit oil and gas deposits.) A pause in drilling of about six months to one year is expected.

Operating costs for the *Challenger* are about $16 million per year; costs for the *Explorer* will be about $40 million per year (1981 dollars) when it goes into operation, and about $60 million per year once the riser is added. The NSF, Congress, foreign partners, and oil companies participating in the OMDP will decide by early next summer whether to approve the proposed plan, said Allen Shinn, who in August became director of NSF's new Office of Scientific Ocean Drilling. The consortium of oil companies had agreed to pay for half of the OMDP. Under the new arrangement, Shinn said, its share would be about one-fourth of the *Explorer*'s total operating costs. Informal feedback from the scientific community and from foreign partners generally has been positive, and response from the oil companies mixed, Shinn reports. "I'm encouraged overall," he said. The current planning phase covers the next ten years. □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