placental tissue to use in treatment. They then chose two patients for treatment. One was an alert and cooperative 16-year-old boy who was confined to a wheel chair. Since the age of 12 he had been subject to disabling involuntary movements as the result of his disease. The other patient was a 51-year-old woman, cooperative but tense. Gaucher's disease had fractured and destroyed some of her bones and created low back pain. Without effective treatment, the patients would have continued to suffer from liver, bone and neurological damage.

Each patient received an enzyme injection. They both tolerated it well, with no sign of fever or other obvious side effects. The enzyme then made its way to the patients' livers. By 72 hours after enzyme therapy, fat in the patients' livers and red blood cells decreased considerably.

These results raise several questions about the future of enzyme therapy. Will enzyme therapy turn out to evoke immunologic reactions in recipients because the enzyme material contains other proteins as well? There is a chance this might happen. However, Brady and his team hope to get enzymes so pure that other proteins will be eliminated. Then, what is the possibility of extending enzyme therapy to inborn errors other than Fabry's and Gaucher's diseases?

In the past Brady and other investigators have suggested that only those two diseases out of dozens of fat-storage diseases would be treatable by enzyme therapy. In other words, even if enzymes for the other diseases were purified enough, they would have trouble getting into the brain to remove fats there. However, as the journal editorial points out, getting enzymes to a patient's liver might reduce fats in the brain as well. □

What activates egg cells? Calcium

An egg cell is an organism's investment for the future. It usually is endowed with a rich deposit of nutrients, is produced and protected by an elaborate system and is ready to burst forth with physiological activity at the first sign of fertilization. But what is this first biochemical signal that puts a waiting egg cell into metabolic gear? If cell biologists knew this, they might better understand the initiators of cell metabolism, differentiation and growth.

Four biologists now believe they have determined the universal factor that turns on cell metabolism during fertilization. Richard A. Steinhardt of the University of California at Berkeley, David Epel and Edward J. Carroll Jr. of the Scripps Institution of Oceanography and Ryuzo Yanagimachi of the University of Hawaii School of Medicine report this universal factor in the Nov. 1 NATURE. They found that intercellular stores of calcium (probably contained in or on membranes) can turn on cell metabolism if they are released into the cytoplasm. This release takes place after sperm penetration, but the team found that the release also occurs when the cells are treated with a calcium ionophore, a substance that allows doubly charged positive ions to pass through lipid membranes that normally would not allow the passage.

Steinhardt and Epel earlier this year induced activation of unfertilized sea urchin eggs with the ionophore. The whole group has now induced activation in unfertilized sea star, amphibian and mammalian eggs with the same substance. When the eggs were exposed to the ionophore, calcium stored internally was released. This event immediately preceded the cell's activation—the elevation of the fertilization membrane, the increase of respiration, protein synthesis and DNA synthesis—and led the team to conclude that the release of intercellular calcium is central to the activation of egg metabolism and perhaps cell metabolism in general.

Steinhardt is a neurophysiologist, and although this may seem far afield from embryology, he explained the connections. "We are actually trying to dissect the program of activation, and are interested in ions controlling metabolism." The permeability of nerve-cell membranes to positive ions has been established as the main factor in their ability to transmit bioelectric impulses. "Potassium activation in nerves has been linked to increased calcium inside cells, but it is hard to study this in nerve cells. Egg cells are a much easier cell model to study, so we looked for the phenomenon in eggs first."

The team did see changes in egg cell plasma membrane permeability following treatment with the ionophore and release of calcium (C^{++}). They observed an initial influx of sodium followed by increased permeability to potassium. These changes are qualitatively similar to those seen during nerve-cell metabolism and transmission, and may show intracellular calcium to be a factor in the control of cell metabolism, growth and differentiation, Steinhardt says.

Once the role of ions in egg cell activation has been studied thoroughly, Steinhardt says, he will apply the basic information to the study of nerve growth and learning. □

Lasker awards five researchers

During the past 29 years, the Albert Lasker Medical Research Awards have become America's most prestigious awards for biomedical research. One of this year's Nobel Prize winners, George Palade, was a former Lasker awardee (SN: 10/19/74, p. 244).

Now the recipients of the 1974 Lasker Awards have been named. They are Sol Spiegelman of Columbia College of Physicians and Surgeons, Howard M. Temin of the University of Wisconsin, Ludwik Gross of the Veterans Administration Hospital, Bronx, N.Y., Howard E. Skipper of the Southern Research Institute, Birmingham, and John Charnley of Manchester University in England.

Spiegelman has received a Basic Medical Research Award for his outstanding contributions to molecular biology. He was the first to successfully synthesize an infectious viral RNA molecule. Such synthesis showed that copies of molecules containing genetic information could indeed be made in the lab. He also helped develop the molecular hybridization technique, and showed that the technique can be used to detect the presence and operation of genes, specificially viral genes, within cells (SN: 1/27/73, p. 56).

Temin has received a Basic Research Award for advances in understanding the RNA cancer viruses. His experiments showed the existence and operation of the now-famous reverse transcriptase enzyme, which can synthesize molecules of DNA from molecules of RNA, and which may explain how RNA cancer viruses can incorporate their genetic information into host cells (SN: 11/6/71, p. 317).

Gross has received a Basic Medical Research Award for his work on cancer viruses (SN: 5/29/65, p. 341). He was the first to discover a leukemia-inducing virus in mice. His discoveries include the transmission of these viruses from one generation of animal to the next and the activation of the viruses by radiation and other stimuli.

Skipper has received a Basic Medical Research Award for his studies of the metabolic actions of anticancer drugs in normal and tumor-bearing animals. He developed quantitative biologic tumor models to clarify tumor inhibition and regression. He showed the curability of cancer in several animal systems (SN: 12/21/68, p. 626).

Charnley has received a Clinical Medical Research Award for his development of total hip replacement. Some 50,000 patients, especially arthritis patients, receive Charnley-type hip replacements annually. □