posed microbes in those fields to degrade carbofuran insecticides.

Curiously, a reverse phenomenon is sometimes seen. Instead of one pesticide predisposing soil microbes to degrade another chemical, one treatment may protect or extend the efficacy of another product. In New Zealand, according to Harvey, some farmers have been switching between Eradicane and herbicides containing the active ingredient alachlor in alternate years, and this seems to prevent Eradicane failures. Kaufman and his collaborators have seen similar protective effects by alachlor in the lab, and this protection extends to other compounds. "This looks like a benefit," Kaufman says, "but we don't know the mechanism yet."

Most industry officials argue that the phenomenon of rapid pesticide breakdown is more likely to remain a curiosity than to become an epidemic and that traditional pest management practices, such as crop and pesticide rotation, will alleviate most difficulties. Despite that optimism, however, the people affected by accelerated pesticide breakdown admit they'll be watching its incidence closely.—JEFFREY L. FOX

First Trimester Prenatal Diagnosis

A new method of prenatal diagnosis may largely replace amniocentesis

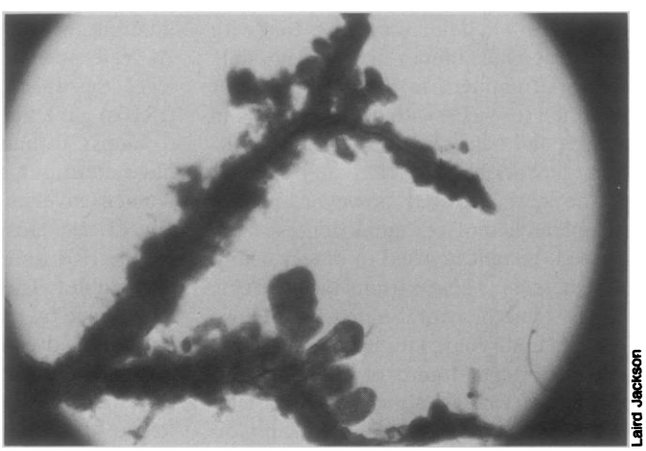
A new technique for obtaining fetal cells for prenatal diagnosis, now being tested in the United States and Europe, may largely replace amniocentesis within the next few years, clinical researchers predict. Known as chorionic villus biopsy, the experimental method permits prenatal testing during the first 3 months of pregnancy and yields results on chromosomal and biochemical disorders within days—or even hours. Amniocentesis, by contrast, cannot be performed before the sixteenth week of gestation and test results are not available for about 2 weeks.

Preliminary evidence indicates that chorionic villus biopsy is safe but the question needs further study. According to Sumner Yaffee, director of the Center for Research on Mothers and Children at the National Institute of Child Health and Human Development (NICHD), the government is aware of the need to "ascertain the safety as well as the efficacy" of the procedure. A small task force will be convened this fall to determine what needs to be done, he reports. One good possibility is that NICHD will sponsor a clinical trial or a national registry to evaluate and track developments.

The chorionic villi, which are the source of fetal cells in this procedure, are hairlike projections of the membrane that surrounds the embryo early in pregnancy. After about 10 weeks, the villi begin to disappear as part of the chorion thickens to become the placenta and the rest becomes a thin membrane. Chorionic villus biopsies, therefore, must be done between 8 and 10 weeks of pregnancy.

The new procedure is not difficult to learn, according to Maurice Mahoney of Yale University School of Medicine. "It is not a highly difficult procedure. This is a test that a lot of doctors will be able to learn and to do well."

A physician, guided by ultrasound, inserts a thin catheter into the pregnant woman's cervix and, using suction, removes a small plug of tissue from the end of one or more villi. This tissue constitutes rapidly dividing fetal cells that can immediately be analyzed for chromosomal and biochemical defects. With amniocentesis, the fetal cells are so dilute in the amniotic fluid that they must be grown for 2 weeks in tissue culture before there are enough of them for analysis.



Laird Jackson

Source of fetal cells

Chorionic villi from an 8- to 10- week-old embryo can be analyzed for biochemical and chromosomal abnormalities.

Although chorionic villus biopsies are only now exciting U.S. and European investigators, the idea behind this technique is not new. In the late 1960's, Swedish and Danish researchers demonstrated that they could get tissue from chorionic villi for prenatal diagnosis, but they did not pursue the methodology because amniocentesis was developed at about the same time and quickly became the procedure of choice.

Then, in 1975, Chinese scientists reported that they were using the technique to determine fetal sex. Since they did not have tissue culture facilities, they could not look for chromosomal aberrations or biochemical abnormalities. According to a World Health Organization (WHO) report, the Chinese abandoned their attempts to do chorionic villus biopsies because women were using the information to abort female embryos and because they could not obtain medically useful information without doing tissue cultures. The Soviets also made a brief foray into chorionic villus biopsies, reporting the results of 13 pregnancies in 1975. Like the Chinese, the WHO reports, they only used the method to determine sex.

But those scientists in the United States and Europe who knew of the Chinese and Russian results tended not to believe them, according to Joseph Schulman of George Washington University Medical School. The technique began to catch on when a group of British researchers, headed by J. M. Old and D. J. Weatherall from John Radcliffe Hospital in Oxford and R. H. T. Ward of University College in London and, inde-

pendently, a group of Italians headed by Georgio Simoni and Bruno Brambati of the University of Milan reported encouraging results. Their work was published in major medical journals within the past year. Only a handful of investigators in this country are now using chorionic villus biopsies to diagnose birth defects, but about two dozen research groups have expressed interest in learning the technique.

The greatest advantage of chorionic villus biopsy is that it is done in the first trimester of pregnancy, when it is safer to abort should a woman chose to do so. Although only a few rare biochemical defects can be treated in utero, many investigators think that the field of fetal medicine will burgeon in the near future.

The potential that chorionic villus biopsy offers for improving fetal treatment is its most exciting aspect, according to Yaffee of NICHD. Laird Jackson of Jefferson Medical College agrees. Chorionic villus biopsy, he says, "will significantly change the outlook for the possibility of treatment. It will spur research in the area." (Nearly 200 disorders, many extremely rare, can now be detected in utero.) Schulman suggests that with chorionic villus biopsy it will be possible to start treatment in the first trimester and then to check with amniocentesis in the second trimester to see if the treatment is working.

The new method, however, cannot completely replace amniocentesis because it cannot be used to detect neural tube defects. These serious birth defects occur when the neural tube fails to close early in embryonic life, leaving an opening in the spinal cord or skull. A fetal albumin, called alpha-fetal protein, pours out of the opening into the amniotic fluid where it can be detected. The Food and Drug Administration recently approved a test kit that will enable obstetricians to offer a multistage test for these birth defects, culminating with amniocentesis for those women who have indications from a blood test and sonogram that they may be carrying a fetus with a neural tube defect.

Chorionic villus biopsy is still very much an experimental procedure and many questions about it are still unanswered. For example, to approach the question of safety, it is necessary to know how many fetuses normally spontaneously abort after 8 to 10 weeks of pregnancy. Says Mahoney, "In the first trimester about 20 percent of embryos spontaneously abort. But a lot of those are already dead at 8 weeks. No one knows the loss rate from 8 weeks on." However, Mahoney remarks, "Already people are satisfied that you don't have huge risks with chorionic villus biopsies." A few of the 100 or so embryos that have been diagnosed with the technique later aborted, but whether they would have aborted anyway is impossible to determine.

Another question is whether the embryonic tissue obtained with chorionic villus biopsy is biochemically identical to the fetal cells obtained with amniocentesis. Researchers strongly suspect it is but no one knows for sure. They are currently double-checking their negative diagnoses by doing amniocentesis in the second trimester.

In addition to the scientific questions about the technique there are ethical dilemmas. Who should be offered the method while it is still such a very new experimental procedure and how should physicians learn to perform it? So far, chorionic villus biopsy has only been offered to women with strong family histories of rare genetic diseases such as Tay-Sachs disease, Niemann-Pick disease, or Gaucher's disease.

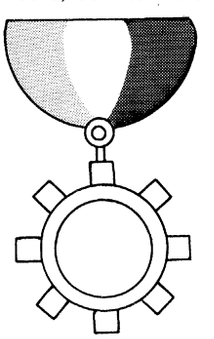
The problem of how to become skilled at the technique is being resolved in different ways at different institutions. At Yale and at Jefferson Medical College, the Institutional Review Boards (IRB's) gave the researchers permission to biopsy women who were planning to have abortions anyway, as long as the women gave informed consent. At Michael Reese Hospital in Chicago, however, the IRB found such experiments unacceptable. There, researchers gained experience by practicing on women who had blighted ova—a condition in which the embryo dies early in pregnancy but, says Eugene Pergament of Michael Reese, "The chorion is the last to go." Blighted ova are common enough that the physicians at Michael Reese see one or two cases a week. When they do chorionic villus biopsies on these women, they frequently can find out why the embryos died. In over 70 percent of the cases, says Pergament, there were chromosomal abnormalities. This information is valuable to the women in planning future pregnancies.

Still, says geneticist Leon Rosenberg of Yale, the list of unanswered questions does not mean that scientists are not optimistic about chorionic villus biopsy. "I am as excited about the potential as anyone. I just think it is very important that we not get stampeded and that we systematically determine the risks and applicability of the method very soon. Potentially [the discovery of chorionic villus biopsy] is a *major* event," he says.—**GINA KOLATA**

Medal of Technology to Debut Next Year

If all goes according to plan, the first recipients of the new National Medal of Technology will be honored next spring. Modeled on the National Medal of Science, which is awarded for scientific achievement, the new medal is meant to give presidential recognition to those responsible for successful applications of science and technology.

In the announcement of Administration plans for the awards, President Reagan was described as eager to give innovators their due. The details, however, have taken some time. The idea for the medal was embodied in the Stevenson-Wydler Technology Act of 1980 which was thus named as a kind of going away present for its chief sponsors, Senator Adlai Steven-



son of Illinois and Representative John W. Wydler of New York, who both retired from Congress that year.

Machinery for selecting the winners is being established in the Department of Commerce. A national evaluation board with members drawn from industry, government, professional organizations, and universities will prepare a list of nominees* in priority order for the Secretary of Commerce who will be responsible for making his own nominations to the President. The process differs from that employed in awards of the National Medal of Science principally in that a presidentially appointed committee makes nominations for the science medal directly to the President.

Another difference is that U.S. com-

*Nominations will be sought from industry, professional organizations and academia, and unsolicited nominations will be accepted from those who follow nominating instructions obtainable by writing to the Assistant Secretary for Productivity, Technology, and Innovation, U.S. Department of Commerce, 14th Street and Constitution Avenue, NW, Washington, D.C. 20230.