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Vinyl Chloride,

Birth Defects Linked

By Judith Randel
Star-News Staff Writer

Accumulating evidence is heightening the suspicion that the plastic polyvinyl chloride — already linked to unexpectedly large numbers of a rare form of liver cancer — may also be implicated in causing birth defects.

The evidence is regarded as preliminary but is sufficiently disquieting to be prompting a flurry of scientific investigation, both in and out of government, in the United States and a number of other countries where billions of tons of the plastic are made for many purposes each year.

In every case, so far, the damage is apparently caused by inhalation of vinyl chloride gas. The gas is used in the manufacture of the solid plastic known as polyvinyl chloride and is released in the form of residues.

At the Ohio State Department of Health in Columbus, for example, Dr. Peter Infante of the division of chronic diseases, here in the last several weeks examined the vital statistics records of the three communities in the state where there are vinyl chloride plants.

HIS EXAMINATION of the records has disclosed that, while the 1970 to 1973 rate of such defects in the state as a whole was 11 per 1,000 live births, the rate in the three communities — Ashtabula, Lake Avon and Painesville — was almost twice as great. In a telephone interview, Infante stressed that causes

unrelated to vinyl chloride may explain the differences. But he emphasized that the possibility that exposure to the chemical may be responsible is also very real. He is now in the process, he said, of determining the precise nature of the birth defects in question to see if there is any pattern of uniformity.

Meanwhile, Dr. Irving J. Selikoff of the Mount Sinai School of Medicine in New York, told the environment subcommittee in the Senate yesterday that a graduate student colleague had examined the white blood cells of 11 men working in vinyl chloride plants and found abnormal chromosomes in more of the samples than would have been expected when the findings were compared with those of 10 men matched for age and other factors who had not been occupationally exposed to the chemical.

Chromosomes are the units in the nucleus of every cell — including the eggs and sperm — that transmit bodily characteristics from

one generation to the next. Thus, if the chromosomes of either parent are not intact, there is a real possibility that any offspring of the union will have a birth defect as a result.

Selikoff has done much of the scientific detective work linking vinyl chloride to angiosarcomas (the rare cancers) of the liver. He has also recently questioned men at two plants — one owned by Union Carbide, the other by the Dow Chemical Co. — where polyvinyl chloride is made about the stillbirths and miscarriages experienced by their wives.

"I FEEL an uneasiness because of the apparent increase in these stillbirths and miscarriages," Selikoff told a reporter after yesterday's hearing. "There are plants where many chemicals are made so that exposure to substances other than vinyl chloride or indeed factors unrelated to employment may be to blame. Nevertheless, this is a lead that must be pursued."

Should proof positive develop that vinyl chloride causes birth defects, many scientists would not be surprised. It has become increasingly apparent from the work of several laboratories that substances which cause cancer frequently are capable of damaging the fetus as well.

Moreover, some of the data on angiosarcoma — the cancer linked to plastic manufacture — suggests that a heightened risk of tumors may have existed from birth.

One of every four cases of angiosarcoma in Sweden occurring between 1950 and 1969, for example, was found in babies. And, in addition, the work of Dr. Cesare Maltoni of Italy, the scientist who did much of the original laboratory work on vinyl chloride in animals, clearly demonstrated that when pregnant rats were exposed to the gas, many of the pups developed angiosarcomas.

More recently, scientists at the University of Stockholm in Sweden have been using strains of salmonella bacteria to determine whether exposing them to vinyl chloride causes changes in their genetic traits. The technique, developed by Dr. Bruce Ames at the University of California, Berkeley, is regarded as particularly sensitive in detecting out biological behavior in lower organisms that is predictive of similar biological behavior in man.

THE SWEDISH work has been published in English. It reports that exposure to

which could cause changes in the dietary requirements of bacteria and the conditions under which they will grow. So another way, this means that the chemical acts on some of the genes of the organisms, permanently changing the structure of the proteins for which they act as blueprints in cells.

Asked about the Swedish study yesterday, Ames said that he and Dr. Joseph Wagoner at Berkeley — working with Dr. Victor Gammmon of the newly formed Research Institute — have been doing experiments similar to those performed in Stockholm. The results are preliminary, he reported, but seem to point to vinyl chloride as a substance capable of damaging the genes.

The key question, Ames said in a telephone interview, is whether human exposure to the chemical reaches the germ or reproductive cells so that they are altered when a pregnancy is conceived.

Yesterday's Senate hearing did not resolve this issue. However, Dr. Joseph Wagoner, a government scientist for both the National Institute of Occupational Safety and Health and the Center for Disease Control in Atlanta, reported that a study will soon get under way which may provide the answer.

The study, he said, is to be made for beauty parlor personnel who have had long and constant exposure to hair sprays. Vinyl chloride was contained in the

propellants of many hair sprays from about 1958 until earlier this year when its potential dangers became known.

Meanwhile, another witness at the hearing — Dr. Robert Schaffner of the Food and Drug Administration — told of recent evidence that — besides being inhaled — some vinyl chloride may have gotten into the food supply.

TESTS HAVE shown, Schaffner reported, that the chemical is capable of "migrating" out of plastic liquor bottles or flasks into alcohol and out of the plastic containers in which food products, such as some cooking oils, have been sold.

Standards soon to be published in the Federal Regis-

ter, he said, will require manufacturers to produce plastic food containers free of hazardous levels of the chemical. But the problem, he admitted, is that many such materials have been produced for years. No feeding studies have been done on animals to demonstrate whether taking vinyl chloride by mouth is as dangerous as breathing it appears to be, he explained, but the possibility cannot be ignored.

All of this caused subcommittee Chairman Sen. John V. Tunney, D-Calif., to comment: "There has to be a better way of terminating potentially toxic materials in food — the way so, as in this case, when no tests have been done in advance on the possible impact on public health."