Chemistry

From our reporter at a conference on the public health implications of plastics manufacture, at Pinehurst, N.C.

Vinyl chloride: Workers' diseases...

When 15 deaths from liver cancer among vinyl chloride workers were reported within a short time, scientists began looking for answers. Although the deaths were a tragic "surprise" at the time, systematic analysis of health, injury and mortality records has revealed predictive disease patterns among the workers. At the plastics conference, sponsored by the National Institute of Environmental Health Sciences, Irving Selikoff and Hans Popper from the Mt. Sinai School of Medicine in New York presented evidence of these predictive patterns.

Selikoff studied 257 men who worked at a vinyl chloride plant starting in 1946. Some were still working at the plant, some had died, and others he traced to different jobs and different locations. He analyzed their health records, examined and interviewed them. He found several disease patterns appearing in statistically significant numbers of workers, presumably related to contact with vinyl chloride.

Clubbing and blueing of the fingers, hard scaly patches on the skin and liver and spleen changes were fairly frequent, he found. Popper studied the liver changes and reported finding fiberous lesions and liver enlargement in workers exposed for as few as one and one half years.

With this emerging information on disease patterns, workers with these symptoms can be watched closely, treated and if necessary, removed from further vinyl chloride exposure, Selikoff and Popper say.

...records of cancer mortality

Alerted to a rare form of cancer death among vinyl chloride workers, many people wondered if the overall mortality patterns of these workers were unusual. A researcher from the Harvard School of Public Health, Richard Monson, found the answer among the mortality records of 161 white males who had worked in two vinyl chloride plants.

He compared the actual causes of their deaths with those statistically "expected" for men of their race, age, region and occupation. He found 41 deaths due to cancer where only 27.9 were expected, an increase of 46 percent. The figures do not prove conclusively that vinyl chloride causes many types of cancers, Monson said, but they do indicate an increased risk associated with proximity to the chemicals used in polyvinyl chloride plastic manufacture.

Deaths among plastics workers

Researchers in government, academia and industry are trying to anticipate future health hazards associated with plastics production. If specific disease and mortality patterns exist among vinyl chloride workers, what about the estimated 2 to 3 million workers who produce other plastics?

Thomas J. Mason, a fellow at the National Cancer Institute, studied the incidence of cancer among the white male populations of certain U.S. counties. These counties all have factories in which plastics, synthetic rubbers and natural and synthetic fibers are produced, and which employ high percentages of the male county residents. Mason found that residents of these counties run a greater risk of dying from certain cancers than the residents of other counties of similar size, region and urbanization.

Biomedicine

Mapping immune-response genes

Scientists have long suspected that one of the reasons people vary in their susceptibility to various diseases is a genetic one. For instance, the genes in their lymphocytes might make antibodies that are defective in fighting diseases, or antibodies that encourage diseases such as allergies and autoimmune diseases. But identifying such genes has been a challenge, since they can be identified only indirectly by linking the incidence of certain diseases in families with the presence of specific gene products.

In 1972, Bernard Levine and his co-workers at New York University reported the first human response gene. They found that hay fever and production of IgE antibody to antigen E (the cause of hay fever) correlated closely with the expression of certain histocompatibility antigens in successive generations of seven families. Histocompatibility antigens are those that cause organ transplant rejections; they are located on lymphocytes and other cells in the body. These data indicated that the immune response gene for antibody IgE and hay fever susceptibility was closely linked with the genes that code for histocompatibility antigens.

A group of immunologists at the University of Minnesota Hospitals, headed by M. N. Blumenthal, has now mapped the gene that codes for antibody IgE and hay fever susceptibility. They have found that the gene is closely linked with the second of the two loci on the number six chromosome that codes for histocompatibility antigens. But the immune response gene falls outside of the histocompatibility locus, not inside, which is the opposite of where immune response genes are located in mice.

"I believe," says E. J. Yunis, one of the investigators, "that this is the first time that an immune response has been mapped in man."

A new pituitary hormone

The pituitary gland, a quarter-sized gland tucked away discreetly in the brain, is the producer of hormones that act throughout the body. They include growth hormone, luteinizing hormone, prolactin, vasopression, oxytocin and others. Denis Gospodarowicz and his colleagues at the Salk Institute for Biological Studies have now isolated an ovarian cell growth factor (OGF) from the pituitary glands of cattle. They present evidence in the June PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES that allows them to conclude that the hormone is distinct from other known pituitary hormones.

Two chromosomes rule interferon

Interferon, a glycoprotein produced by the body in response to a virus attack, is being explored as a preventative against colds and other viral infections (SN: 8/3/74, p. 69). Meanwhile Y. H. Tan and his co-workers at Yale University report in the PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES that the chromosomes that make interferon are numbers two and five. The assignment of interferon to these chromosomes, they believe "represents the first assignment of an inducible phenotype [gene product] to more than one chromosome."

There are several possible explanations for two chromosomes controlling interferon production. For instance, each chromosome may contain genes that code for interferon subunits.