

on a hot metal surface, such as a frying pan or the metal sheets used by McDonald's and many other fast-food franchises. The surface of the meat gets very hot. On the other hand, in an oven broiler the heat must travel through the air to reach the hamburger, or even a metal broiling pan, so the surface never gets above 150°C (300°F).

The researchers decided to look for mutagens in beef when they found that bacteria grown on media containing beef extract had an unusually high number of genetic changes.

So far the researchers have not tested other types of meat. They feel the most important immediate goal is to identify the mutagenic compound and the reaction that produces it. They have already isolated a "fairly pure" extract of the cooked beef and report that it appears to be among the most potent mutagens found. A chemical analysis (chromatograph) of partially purified material shows it is different than benz(a)pyrene, the mutagen from charcoal-broiled meat.

Identifying the mutagen is necessary before doing tests to determine whether the substance causes cancer in animals. About 90 percent of the known mutagens produce tumors in animal tests. "It may be that the mutagen is a known compound, and we'll be able to buy it, but that isn't likely," Kreibel says. He expects that they will eventually need to synthesize it.

The research group emphasizes that as yet the risk to human health is of unknown magnitude. But just in case, you may want to broil your burgers. □

Carcinogen hearing

A "comprehensive policy" for regulating potential carcinogens in the workplace is the subject of a two-month-long hearing that began in Washington this week. In its seven-year history, the Occupational Safety and Health Administration has been able to enact human-exposure standards for only 20 of the estimated 2,000 chemical carcinogens. As a result, the agency proposed last October to categorize all toxic chemicals into one of four groups until separate standards can be generated for each. Temporary standards would be set for entries in the top two categories.

The OSHA proposal — 100 pages long — would class chemicals by health risk. Those that caused cancer in humans, in two mammalian test species, or in repeated tests of one species, would enter "category I." Chemicals reported to be carcinogenic, but that lacked firm corroborative evidence, would make up category II. Two optional groups — III and IV — would contain chemicals requiring further "data development" and chemicals that are suspected carcinogens but not found in "American workplaces."

More than 150 public groups and 49 OSHA witnesses will testify this summer.

Toxoplasmosis: Worse than thought

Toxoplasmosis is a common parasitic infection of humans and other mammals. Although the infection generally runs a mild course in children and adults, it can produce devastating effects on an unborn child's nervous system, resulting in mental retardation, hearing defects or visual loss (SN: 4/12/75, p. 242). The probability of a woman in North America having a child with congenitally acquired toxoplasmosis is one in 10,000.

One characteristic of toxoplasmosis is that it has never been known to seriously afflict more than one child in the same family. The reason, scientists believe, is that if a woman is infected with *Toxoplasma* while carrying one child, she will either build immunity against the infection that will protect any subsequent child in her womb, or she will not build immunity, and the latent infection will kill any subsequent children she conceives, resulting in miscarriages.

Now, two reports in the April ARCHIVES OF OPHTHALMOLOGY document for the first time the occurrence of toxoplasmosis striking not one but several children in the same family. That siblings of an afflicted child were infected can probably be explained by one of the following situations: The siblings acquired toxoplasmosis in the womb of a woman who had built sufficient immunity to *Toxoplasma* during her first pregnancy to protect them from miscarriage, but not enough immunity to protect them altogether from *Toxoplasma*'s ravages, or the siblings were infected by *Toxoplasma* some time after birth, and this infection was severe enough to damage their eyes. Regardless of which explanation is correct, though, the cases show that *Toxoplasma*'s ability to seriously hurt humans is more insidious than previously thought.

In the first report, Peter Lou, an ophthalmologist at the University of Toronto, and his colleagues describe three teenage siblings who have toxoplasmic-type eye damage. One, a 19-year-old girl, has perfect visual acuity, but shows a toxoplasmic-like scar on the retina of her right eye. Another, an 18-year-old boy, has a toxoplasmic-type scar on the retina of his left eye and for the past four years has suffered poor vision in that eye. The third, a 17-year-old girl, has a toxoplasmic-like scar on the retina of her right eye and has recently experienced a recurrence of blurred vision in that eye.

In an attempt to determine how all three of these siblings incurred toxoplasmic damage to their eyes — a probability of only one in a million — Lou and his co-workers used X-rays. But the X-rays did not reveal any skull calcification, a sign of congenitally acquired toxoplasmosis. The investigators then examined the eyes and

measured the immune status of the afflicted siblings, their mother, father and three younger brothers. Only the afflicted siblings showed toxoplasmic-afflicted eyes and signs of toxoplasmic infection. So it looks as if the afflicted siblings neither got their infections in the womb nor acquired them after birth from other family members. So how did they become infected? Possibly from persons outside the family.

In the second report, George A. Stern of the Francis I. Proctor Foundation for Research in Ophthalmology in San Francisco and Paul E. Romano of Northwestern University McGaw Medical Center in Chicago report on two siblings with toxoplasmic-type scars of the retina. One, a 14-year-old girl, has had a history of poor vision from birth, is mildly retarded and was found by Stern and Romano to have toxoplasmic-like eye damage. Her six-year-old brother also has had poor vision from birth, shows moderate psychomotor retardation and was found by Stern and Romano to have toxoplasmic-type eye damage. That both children have had poor vision from birth and demonstrate some mental retardation suggests that their toxoplasmosis was congenitally acquired. So does the fact that both they and their mother show an immune reaction against *Toxoplasma*. In addition, their mother had five miscarriages between the births of the two children.

"We believe that the mother in our study probably acquired toxoplasmosis during her pregnancy with the child in case one," the researchers conclude, "and that her latent disease caused abortions in later pregnancies and the infection of the child in case two." □

Science fair gets grant

The General Motors Foundation has awarded Science Service, Inc., a five-year, \$500,000 grant to help support the International Science and Engineering Fair.

The grant will be used to help provide awards through the ISEF's two-part system. All of the high-school-age students entering the competition (sometimes called "the Olympics of science fairs") are eligible for the General Motors Grand Awards, which honor first- through fourth-place winners in each of 11 categories. In addition, the schools of the first-place winners receive a cash award for the purchase of scientific equipment or books.

The first-place-winning students become eligible for the Nobel Prize Visit Award, in which two winners receive all-expense-paid trips to attend the Nobel Prize ceremonies in Stockholm, Sweden.

The ISEF is held annually in a different U.S. city, with more than 400 contestants picked from about 200 preliminary competitions in the United States and abroad. □