life sciences notes

METABOLISM

Rat arthritis calmed by diabetes

British researchers have found that induction of diabetes in rats with chronic arthritis apparently almost alleviates the arthritis. Researchers at the University of Aston, Birmingham, say indirect evidence indicates the same thing might be true of human arthritis.

They say rats are given arthritis by injecting them with killed human tuberculin cells. Diabetes is then induced chemically or by interference with the pancreas, the site of insulin synthesis. It is theorized that diabetes reduces the arthritic inflammation by interfering with glucose metabolism and inhibiting cellular activity.

Still to be explained is the fact that elevated blood sugar, in the absence of faulty glucose metabolism, still has a marked effect on the arthritis.

POLLUTION

Waste phosphorus removed

Minute quantities of phosphorus in sewage effluent are capable of over-fertilizing rivers and streams and causing algae blooms lethal to marine life. Phosphorus is an essential ingredient in detergents and a sewage plant, unable to extract the element, may discharge many tons of it a month.

Now engineers at the Pennsylvania State University, University Park, announce pilot-plant testing of a simple, 99 percent effective way of removing the phosphorus. Aluminum sulphate is mixed with the waste water as it enters the plant's aerator; there it precipitates the phosphorus, which joins the other sludge in the settling tanks. Prof. John B. Nesbitt says aluminum sulphate is entirely compatible with the microorganisms necessary in sewage processing.

GENETICS

Chemicals may cause mutations

Radiation has been much touted as a threat to future generations because it causes genetic mutations. Now it appears that some of the man-made chemicals being dumped onto the environment may have the same effect (SN: 6/17/67, p. 568).

A group of scientists met late last month at Oak Ridge National Laboratory in Tennessee to discuss the possibility of chemically caused mutations in man.

Dr. James F. Crow of the University of Wisconsin, one of those attending the meeting, says chemicals have been shown to cause mutations in bacteria and fruit flies. Dr. Richard F. Kimball, director of Oak Ridge's division of biology and organizer of the conference, says some of the man-made environmental pollutants probably are mutagenic in humans.

Naturally occurring chemicals, like natural radiation, may be responsible for a few mutations. The hazard, as for man-made radiation, Dr. Crow says, is that the artificial product can be far more active chemically, thus resulting in a many-times-greater degree of exposure to the mutagen.

The conference was concerned mainly with the development of better research procedures for investigating mutagenesis on the cellular level and monitoring mutations in human populations. Lines of needed research were mapped and the possibility of a larger meeting discussed.

CONTAMINATION

Salmonella found in drain cleaners

The use of so-called enzymic drain cleaners has been banned in federally inspected meat and poultry plants by the U.S. Department of Agriculture.

The cleaners contain bacteria which produce fat-dissolving enzymes; a culture is set up in the drain and fats cannot build up and clog the pipe. The bacteria used are supposed to be non-pathogenic. But salmonella, capable of producing severe gastrointestinal infection, were found in 26 of 68 samples of drain cleaners. The contaminated samples were submitted by 9 of the 28 firms queried by the USDA.

The enzymic cleaners also are used in schools and hospitals. Their main advantage is that they are non-corrosive. Lye, commonly used for the same purpose, is both corrosive and caustic.

CANCER

Role of L-asparagine in tumors

The enzyme L-asparaginase holds hope for cancer therapy because it breaks down the amino acid L-asparagine, needed by all cells for protein synthesis. Some cancer cells don't make their own, and starve to death when the blood-borne supply is cut off by the enzyme. The disappointment is that a great many cancer cells do make their own L-asparagine in abundance and are resistant to the enzyme.

Researchers at Cornell University and the Sloan-Kettering Institute in New York report in the May 3 SCIENCE that the often abnormally high level of L-asparagine synthesis in the resistant tumors may indicate that some cancer cells used asparagine for some metabolic process peculiar to them, besides protein synthesis. Dr. Bernard Horowitz and his coworkers say if this is so it may be possible to exploit this peculiarity in cancer therapy, "for example, by selective inhibition of asparagine utilization and biosynthesis in tumors."

SAFETY

Weed-killer may cause fires

Sodium chlorate, used mainly in the South and in California as a weed-killer and defoliant, is like saltpeter in that it can provide oxygen for burning. It is worse in that it does so almost with no prompting. Friction alone is enough to cause fire when chlorates are mixed with organic materials. The Public Health Service has issued a warning that people handling the substance should not allow solutions of it to dry on their clothes, nor should the dry salt be in contact with flammable material.