up, the cell regenerates it. Cancer cells, the researchers suggest, may be less efficient at regenerating glutathione than are normal cells.

They also tested 14-generation-old cells in ozone, and found structural damage at 0.5 ppm, suggesting that "aging increases the sensitivity of normal lung cells to ozone," possibly accelerating processes similar to those that cause cellular damage. □

Italians offer breathing substitute

The main reason we breathe, says Theodor Kolobow of the National Institutes of Health, is not to provide the body with vast quantities of oxygen but to remove high concentrations of carbon dioxide from the blood. Using that concept, he and 11 Italian researchers headed by L. Gattinoni at the Istituto di Anestesiologia e Rianimazione in Milan have successfully treated six cases of acute respiratory failure, using a modification of a procedure already judged by U.S. researchers to have been a failure.

The original technique involved placing patients with acute respiratory failure on mechanical ventilators and bypassing their blood to an artificial lung that removed carbon dioxide and added oxygen. In 42 patients at nine medical centers, researchers found "neither a significantly increased respiratory recovery nor a greater long-term survival" than in 48 patients treated with conventional mechanical respiration.

The major difference between the original technique and the Italian modification is the hook-up to the gas-exchanger. The Americans removed venous blood, routed it through the artificial lung, and returned it to an artery. The Italians have been taking and replacing blood from veins. This modification makes carbon dioxide removal easier, and allows a lower mechanical respiratory rate.

During the procedure, patients' natural breathing is stopped with curare and an artificial respirator gently sends air into the lungs one to three times per minute. The procedure is used for a few days until the patients' lungs are judged adequate to resume functioning.

Kolobow says the modified technique, which allows lungs to "rest," may change the 90 percent mortality rate of lung failure to 90 percent survival, but U.S. researchers are doubtful.

Michael Snider of the Massachusetts General Hospital, one of the researchers who evaluated the original procedure, says, "The idea of resting the lung is an attractive idea, but it is as yet unproven in animal models or clinically."

"Some conditions are self-limiting," he says. "The only difference may be in the selection of patients." □

An energy bank for developing nations

More for the world's poor. That's the topic of a 92-page energy report prepared by the World Bank and issued this week.

This year developing nations will spend almost $50 billion for imported oil. By 1990 that figure could more than double even if those nations average a seven percent annual growth in the rate of energy production. How to stem the developing world's reliance on imported energy and its growing need for energy-assistance funds is the report's theme.

Up to 30 percent of the developing world's predicted energy tab could be eliminated by 1990 by maximizing both conservation and energy production from sources such as oil, gas, coal, hydropower and wood, the report says. And it outlines ways for saving 15 percent of the energy needed by those nations without sacrificing their economic growth during the coming decade.

Many of the bank's suggestions invoke economic policy considerations, such as pricing energy to reflect its replacement costs or taxing energy products to encourage conservation and a switching of fuels. It also earmarks "efficient import substitution through expansion of domestic production of energy" as a principal task for developing nations over the next 10 years.

Altogether it sets a mammoth task for the largely strategy-shy developing world. Where nations will acquire the expertise to adapt, develop or import skills and technology to accomplish these aims was a dominant theme in discussions at the United Nations Conference on Science and Technology for Development a year ago (SN: 8/18/79, p. 126). Since no flurry of concrete answers emerged from those discussions, it is left to speculation how oil-importing developing countries would use the $450 billion that the World Bank pegs as necessary for expansion of their domestic energy programs throughout the next 10 years.

Perhaps most significant, however, is the report's role as a vehicle to float the idea of creating a special affiliate of the World Bank to handle just energy. Already the largest source of public assistance for developing energy resources, the bank has committed $4.5 billion to such projects since 1978. And it has broached the idea of offering $25 billion in loans over the next five years through its proposed energy affiliate to encourage domestic energy production in developing nations. □

A hypothalamic hormone in the retina

Tucked away in the dark recesses of the human skull is a cluster of cells known as the hypothalamus. Hormones released by these cells influence the release of hormones from the brain's pituitary gland, which in turn influence the release of hormones throughout the body. Hypothalamic hormones can thus be called the executive hormones of the brain and body.

But hypothalamic hormones do more than act as executive hormones. They have been found not only in the hypothalamus but in other areas of the brain and body, and they have been found to perform duties unrelated to their hormonal roles. And now one hypothalamic hormone — thyrotropin-releasing hormone (TRH) — appears to be involved in vision, say Enio Martino and colleagues of the University of Chicago in the July PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

TRH was first found to play a role in the regulation of pituitary thyrotropin secretion and, in turn, in the regulation of thyroid hormone secretion in the body. During the 1970s it became apparent that TRH is involved in elevation of mood, excitation of behavior, stimulation of muscle activity and inhibition of the electrical activity of some neurons. TRH was also found in other areas of the central nervous system, and in the placenta, skin, pancreas and retina. It was this latter discovery, plus the finding that levels of TRH are highest in the retina during the day and lowest during the night, that prompted Martino and co-workers to compare the developmental pattern of retinal TRH with that of TRH in other organs and to investigate the effects of dark and light on this developmental pattern.

The researchers raised rat pups in either normal light-dark conditions or in total darkness, then measured the TRH in their hypothalami, retinae and pancreae. They found that under normal light-dark conditions the levels of TRH in these three organs did not develop in the same manner, suggesting organ independence in the regulatory control of TRH accumulation and possibly synthesis. Hypothalamal and retinal concentrations increased from birth to 23 and 30 days of age, respectively, accompanied by a marked decline in pancreatic TRH over the same period. However, while pups raised in the dark showed a normal developmental pattern for hypothalamic and pancreatic TRH, this was not the case for retinal TRH: No TRH whatsoever could be detected in the retinae of rats raised in darkness.

These findings, Martino and his team conclude, suggest that TRH development in the retina is independent of that in other organs and is totally dependent on light exposure for development. These findings, taken together with what is already known about TRH, suggest that TRH plays a crucial role in retinal functioning, perhaps as a neurotransmitter. □

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