

fluorescence in bone sections under ultraviolet light at a wavelength of 490 angstroms is evidence of such a phenomenon, Martin and colleagues report.

But Henry Dion of Parke, Davis & Co., a pharmaceutical firm, is not convinced that the fluorescent material in the Nubian bones is tetracycline: The observed yellow-green glow could be the fluorescence of other chemicals with the same structural core as tetracycline — four hexagonal carbon rings linearly fused. National Institutes of Health researcher Walter W. Stewart, who has developed fluorescent dyes, adds that more objective and definitive evidence could be provided for the tetracycline theory by obtaining an emission spectrum, in which the light emitted by the fluorescent material is analyzed to determine the amount of energy given off at each wavelength.

Should the fluorescence that Martin and colleagues observed be due to large doses of tetracycline, it could explain the extremely low rates of infectious disease, which can be detected by the incidence of certain bone inflammations, found among the Sudanese Nubians. In addition, it could also explain the known evolution of R (resistance) factors — cytoplasmic elements responsible for the spread of drug resistance among bacteria — among several ancient populations that lived before the antibiotic era. □

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## Diet danger detailed

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The Last Chance diet may have lost its last chance.

Researchers from the University of Rochester in New York recently placed six healthy, obese volunteers in a clinical research center on a liquid diet and carefully monitored their health. The findings support what has long been suspected — the diet can be fatal. Three of the six volunteers suffered “potentially life-threatening” heart arrhythmias, or irregular heartbeats, as early as 10 days after they began a 300-calorie-per-day, vitamin- and mineral-supplemented liquid protein diet, the scientists report in the Sept. 25 *NEW ENGLAND JOURNAL OF MEDICINE*. “Use of the liquid protein diet should be terminated pending further investigation of the causes and prevention of cardiac toxicity,” they recommend.

Liquid protein diets have been used widely since the publication in 1976 of a book called *The Last Chance Diet*. But in 1977 when about 100,000 people went on the diet, at least 60 unexplained deaths occurred. While heart arrhythmias have been implicated in protein diet-related deaths (SN: 7/29/78, p. 70), this study is the first clinical demonstration of such problems. The researchers caution that 24-hour heart recordings, rather than routine, periodic electrocardiograms, are required to detect serious problems during the course of the diet. □

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## ‘Me generation’ of cancer cells

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Self-sufficiency may explain why some cancer cells outstrip their neighbors and proliferate beyond control. All cells require a variety of hormones or growth factors to prosper, but George J. Todaro suggests that certain cancer cells are able to produce regulatory chemicals for themselves. While normal cells are kept in bounds by a dependence on hormones produced by other cells in the body, those cancer cells can be oblivious to that restriction on growth.

Epidermal growth factor is one compound often required for cell proliferation. This string of 53 amino acids is produced in the mouse salivary gland and other as-yet-unidentified tissues. Some cancer cells do not bind epidermal growth factor (EGF), Todaro told the International Symposium on Aging and Cancer last week in Washington. He suggests that those cells make their own growth factor and use it to boost their proliferation.

In experiments at the National Institutes of Health, Todaro has purified a growth factor from mouse cells made cancerous by murine sarcoma virus. When that factor, which Todaro calls sarcoma growth factor (SGF), is added to some types of cells growing in laboratory culture, it gives them some properties of cancerous cells. The cells revert to their normal characteristics when the factor is washed out of the culture.

Although SGF binds to the same cell membrane receptor as EGF, the two are clearly distinguishable, Todaro finds. The factors differ in size and electrical charge and bind different antibodies and binding proteins. In addition, mouse sarcoma cells do not make EGF, and EGF does not make normal cells act as if they are cancerous.

Some human cancers appear to behave in a similar self-promoting style, Todaro finds. Todaro has isolated from human tumor cells a growth factor that can bind to the EGF receptor and shares other characteristics with mouse SGF.

Todaro sees EGF as one of a family of factors necessary for cell growth. It is not clear whether the tumor-produced factors are absent in normal tissue; Todaro suggests they might be active normally during embryonic growth. Todaro envisions the growth stimulating compounds as being one of the factors in the progression of events that, triggered by a viral or chemical carcinogen, allow normal cells to become cancerous. He says the “inappropriate” hormone production by tumors, observed clinically, may overcome growth restrictions and thus be quite appropriate from the tumor’s point of view.

Recognition of the importance of growth factors and hormones in supporting cell proliferation has come largely from attempts to grow cells in laboratory

media in which all the components are known (SN: 12/3/77, p. 377). The search for appropriate growth media facilitates discovery of new hormones and unexpected hormonal requirements, Gordon Sato of the University of California in San Diego told the Washington symposium.

By looking at the growth requirements of human cancer tissue, Sato hopes to find clues for therapies. He recently has identified five factors, including insulin and EGF, necessary for growing cells of a type of human lung cancer. He has also determined conditions under which the cancer cells differentiate into normal epidermal cells. If such terminal differentiation could be induced in patients, the cancer would be defeated, he says.

So far, most types of cells in the body cannot be grown in a chemically defined medium. As the growth requirements are worked out for more cells, comparisons between normal and cancer cells will become possible. Todaro predicts that tumor cells will be found to be independent of some factors needed by their normal counterparts, because the cancer cells will be found to produce the growth-permitting factors themselves. □

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## Toxic shock culprits

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Medical discoveries, like whodunits, often unfold in bits and pieces, and identification of the culprits behind the toxic-shock syndrome is no exception. The latest installment came last week from the Center for Disease Control in Atlanta.

The toxic-shock syndrome was first described in 1978 by James K. Todd of the University of Colorado and colleagues. It usually strikes women younger than age 30 and is characterized by high fever, vomiting, diarrhea, severe prolonged shock and low blood pressure. It can be fatal. Although the incidence of the syndrome is low — about three victims per 100,000 persons — it appears to be increasing, the CDC announced last May (SN: 5/31/80, p. 343). In July, the syndrome was linked to the use of tampons (SN: 7/5/80, p. 6). And now it has been associated with the use of a particular brand of tampon called Rely, the CDC reported last week.

The CDC researchers studied tampon use among women who contracted the syndrome during July and August. They found that Rely tampons were used twice as often by those women as were other tampon brands. In response to the study, Procter and Gamble, the manufacturer of Rely, has removed the product from the market until the Food and Drug Administration, which oversees the safety of medical devices, can review the data to determine if regulatory action against Rely or any other brand of tampon is warranted. The researchers suspect that the syndrome is caused by a bacterium that is introduced into the body via a tampon. □