

Retaining memory in older people

Transient memory loss in the elderly can be partially reversed. But the biochemical basis of the reversal is still unelucidated

by Joan Lynn Arehart

In spite of the age-old yearning for the Fountain of Youth, there is a marked lack of research toward retaining vitality in later years. Nonetheless some clinically promising work in this field is going on. Over the past two years, for example, Eleanor Jacobs and her research team at the Buffalo, N.Y., Veterans Administration Hospital have found they can reverse transient memory loss—or senility—in older patients by giving them periodic oxygen treatments in a hyperbaric chamber.

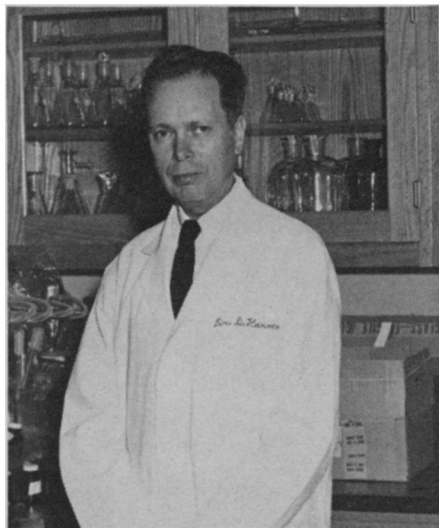
So far, the group has treated 80 patients, 70 of them with varying degrees of temporary success. Several treatments were required before any improvement was noticed, but after that, recall was enhanced from a few weeks to a few months. Of the 10 failures, five were chronic alcoholics. If anything, the oxygen treatment for them seemed to intensify memory loss.

At a national health and aging conference in New York City last week, Jacobs reported that her group's greatest success so far has been with patients with arteriosclerosis—hardening of the brain blood vessels. She does not know yet what physiological and biochemical mechanisms underlie the technique's success. Memory, of course, depends first on learning, then on memory input and storage retrieval—like a computer. With oxygen treatments the arteriosclerotic patients seem to improve in storage retrieval. "Possibly the oxygen consolidates memory traces, whatever they are," she speculates. "No one has ever seen a memory trace." But there is mounting evidence that memory molecules exist (SN: 11/6/71, p. 308).

Jacobs tends to believe, however, that oxygen only activates biochemical factors in brain tissues and cells and that these more basic factors allow memory traces to be consolidated and made

more permanent. She is now testing her patients stringently before and after oxygen treatments to get a better idea of which physiological and biochemical factors are changed.

A contingent accomplishment announced at the meeting, sponsored by the Huxley Institute for Biosocial Research, may also eventually shed light on what senility is and how oxygen counters it. Chemist-internist Denham Harman of the University of Nebraska School of Medicine has found that free radicals—molecule fragments that continually bombard an organism's cells as the cells go about their normal lifetime activities—are involved in the formation of a fibrous protein called amyloid. With advancing age amyloid is found in increasing amounts in brain blood vessels. Amyloid is also present in nearly all senile plaque. Plaque is an area of cellular degeneration in brain tissue. And if two things have been definitely shown to correlate with memory loss,



Univ. of Nebraska

Harman: Free radicals may be the key.



Buffalo VA Hospital

Jacobs (r.) gives patient oxygen in hyperbaric chamber.

they are the presence of plaque and degenerative changes in brain blood vessels.

Harman thus believes free radicals, by damaging brain cells and blood vessels throughout an organism's normal life span, may cause senility. He also believes that free radicals, by damaging an organism's over-all body cells and vessels, may cause aging in general. These theories are far from confirmed experimentally, though.

For some time, however, the Omaha scientist has been able to extend the natural life span of mice some 25 to 30 percent by putting antioxidant chemicals, such as BHT or vitamin E, in their diets daily. It is his conviction that antioxidants exert their age-expanding effect by countering damage to the mice tissues by free radicals. If free radicals thus underlie senility as well as general aging, perhaps antioxidants could reverse or prevent senility in humans, and Harman intends to explore the possibility. In any event Harman, like Jacobs, is confident that there must be some biochemical link between oxygen reversal of senility and antioxidant effects on general aging. The key may well lie in cells' mitochondria, where oxygen transfer and energy production take place.

Meanwhile more and more patients stand to benefit from Jacobs' pioneer work. In the past few months some half dozen other research groups in the United States have started clinical experiments with oxygen treatments for senility. Jacobs is also now applying hyperbaric oxygen to college professors age 60 to 65 to determine whether senility can be warded off. And Robert Krop of the Veterans Administration Hospital in Gainesville, Fla., has helped elderly emphysema patients with memory deficits by putting them on normal atmospheric oxygen. □