BIOMEDICINE

Clinical trials and the psyche

Randomized clinical trials in which certain persons receive an experimental form of treatment and others get conventional treatment or serve as controls are a valuable tool of modern medical science. But they raise certain ethical questions. Robert C. Benfari and his colleagues at Harvard University School of Public Health have now attempted to answer the question of whether being deprived of a new, presumably superior form of treatment might make control subjects anxious, depressed or subject to psychosomatic complaints.

In 1974 and 1975, approximately 1,200 men were identified by the School of Public Health as high heart disease risk subjects. Half of them were randomly allocated to their physicians for their usual source of medical care, and half were sent to a special intervention program. All of the men are now being followed to see whether the latter group will suffer fewer heart disease deaths than the former. Meanwhile, Benfari and his co-workers have studied the same two groups of men psychologically to see whether the group not getting experimental care might be suffering more anxiety, depression or psychosomatic complaints than the group getting it. And the researchers report in the October American Journal of Public Health that they have found no differences between the groups.

"The negative findings in this study," they say, "have important ethical implications for the conduct of clinical trials."

Don't drink to your health

Blood cholesterol levels are a major risk factor in the development of heart disease. Alcohol, in the form of wine, beer and spirits, has been reported to lower levels of low density lipoprotein, the "bad" cholesterol, while raising those of high density lipoprotein, the "good" cholesterol.

This may be true, says the American Heart Association Nutrition Committee, but it is not grounds for changing (or justifying) one's drinking habits, and it is not conclusive evidence that drinking offers protection from heart attacks. And although it is certain that alcohol affects lipid metabolism, the committee said, "... it is likewise clear that the effect varies with the dose, the individual and the conditions of exposure." This leaves its meaningful health effects "somewhat clouded."

Choline and Alzheimer's disease

Researchers are slowly piecing together the puzzle of Alzheimer's disease, a devastating and common form of senile dementia. (SN: 4/28/79, p. 284). Recently, studies have focused on the effects of increased dietary choline on memory and thought in these patients. Both choline and acetylcholine have been linked to memory and cognitive function. So far, results have shown that increased dietary choline does raise acetylcholine levels in the brain, but samples have been too small to judge the effects on mental processes.

Now, Barry Reisberg and colleagues at New York University Medical Center are doing a double-blind, placebo-controlled crossover study on the effect of a daily 12 gm dose of choline chloride on Alzheimer's patients. The preliminary analysis of the first group of 20 patients has been completed, and Reisberg told Science News that the results are "not favorable, not in the direction of major efficacy for choline chloride in this dose" (also see p. 264).

Reisberg plans further studies using lecithin (a major source of choline) and possibly other agents to enhance the cholinergic system. He emphasizes that long-term studies are necessary, since the disease is chronic and a substantial amount of time is needed to note changes in its progress.

EARTH SCIENCES

Unburying Appalachian secrets

A new concept of Appalachian geology — that the mountains formed not by vertical thrusting but when a thick slab of crust was shoved horizontally westward (SN: 6/9/79, p. 372) — may mean that the area for possible natural gas exploration in the region should be doubled in size, according to U.S. Geological Survey geologists. Leonard Harris and Kenneth Bayer of the USGS in Reston, Va., presented their re-evaluation of the Appalachian region's oil and gas potential at a recent regional meeting of the American Association of Petroleum Geologists.

Geologists have previously divided the Appalachians, which stretch from New York to Alabama, into two parallel parts: the eastern part, called the Blue Ridge or Piedmont, which was believed to be composed entirely of a jumble of igneous and metamorphic rock and devoid of any petroleum-bearing sedimentary rocks, and the western part, called the Eastern Overthrust Belt, which is made of sedimentary rocks and is currently being explored for natural gas. They revised their view of the Blue Ridge or Piedmont half of the range this summer, however, when Fred Cook of Cornell University and co-workers discovered that the sedimentary rock layer visible in the western half of the range also lies unbroken, but buried, beneath the 5,000- to 10,000-feet-thick igneous and metamorphic rocks of the Piedmont. And because the 10,000- to 20,000-feet-thick, 60- to 100-mile-wide buried belt of sedimentary rock is nearly as large as the currently explored area, the potential exploration area doubles in size, Harris said. In addition, he noted, "...changes in our understanding of the Appalachian overthrust belt will have a far-reaching effect on the search for petroleum in other areas with similar structure."

Putting a spin on climate and life

About 1.5 billion years ago, judging from growth patterns on shells and corals, the earth probably spun on its axis about two to two and a half times faster than it does today. A day may have been nine hours long, a year 800 to 900 days.

That spin rate, according to B.G. Hunt of the Australian Numerical Meteorology Research Centre in Melbourne, had dramatic effects on climate, and, in turn, on the evolution of life. In the Sept. 20 Nature, Hunt describes a computer model reconstruction of the atmospheric circulation of a fast-spinning earth.

According to Hunt's model, the primary consequence of a nine-hour day would have been a drastic reduction in the strength of surface winds. This would have reduced vertical mixing in the oceans, producing a shallow warm layer. The net result, says Hunt, would have been a general warming of the tropical oceans and atmosphere, colder polar regions and a larger zone of aridity that was closer to the equator.

All in all, he says, the conditions were good for a prolonged ice age and bad, except very near the equator, for the evolution of higher forms of life. Reduced ocean upwelling would have carried fewer nutrients to the surface, discouraging the evolution of animals larger than one cell. The amount of biological activity, limited by the coldness and aridity, would mean little N_2O, NH_3 and CH_4 was released into the air. Such compounds are necessary for the production of ozone; creation of an ozone layer, because of its ultraviolet light-screening ability, is believed to have paved the way for the development of land forms of life. According to Hunt's theory, nothing but the hardiest forms of life — such as the blue-green algae found today in the Arctic — could have survived until the earth's rotation slowed, increasing surface wind strength and making larger areas of the earth habitable. His theory may, therefore, answer those biologists long baffled as to why life, which first appeared about 4 billion years ago, did not begin to diversify until about 600 million years ago.