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BIOLOGY AND MEDICINE (CONT'D)

RESEARCH (CONT'D)

Biochemistry

Plant Biochemistry--It has been demonstrated by ion-exchange chromatography and by paper chromatography that acid treatment of sedoheptulose results in a mixture of four compounds. Two are the expected sedoheptulose and sedoheptylosan, but the other two are unknown. The formation of extraneous compounds is undesirable for biological tracer work with this new sugar. Thus, the extent of formation, the separation and isolation, and the identification of these compounds were investigated. The new compounds were tentatively identified as a furanose anhydride of sedoheptulose and a furfuraldehyde derivative of sedoheptulose. Small scale isolation of all these compounds was effected by chromatography. Results on the chemistry of the seven-carbon sugars are analogous to those reactions for the more common hexoses, such as glucose and fructose. It was demonstrated that only one of the above four compounds from the acid treatment of sedoheptulose, namely the furfuraldehyde derivative, is responsible for the orcinol test which is specific for the seven carbon sugars. This permits more quantitative analysis of amounts of this sugar.

Biophysics

Pathology and Physiology--Observations, one year after exposure, suggest that the threshold dose with 2.5 Mev neutrons for inducing cataracts is approximately 1×10^9 n/cm² for mice, 1×10^{10} n/cm² for rats, and more than 1×10^{10} n/cm² for rabbits. Rabbits and rats exposed to 333 r of Co⁶⁰ gamma radiation have failed to develop opacities of the lens 16 months after irradiation. Mice, guinea pigs, and rats have developed severe cataracts within 6 months after exposure to 240 rep of cyclotron-produced neutron radiation. The lens of the mouse appears considerably more radiosensitive than that of the rat or guinea pig. Within the first six months after X radiation, the opacity changes are mild in these species, even at the LD₅₀ level, indicating a consistently high relative biological effectiveness (RBE) for neutrons. Attempts are being made to establish precise dosimetry in a new exposure chamber at the cyclotron.

Mound Laboratory - Biology

An experiment on the effects of single doses of polonium of the life span of rats has been completed, and the data are being analyzed to determine whether dosage, sex, or age at injection influenced survival. The males were more susceptible to polonium damage than the females. Males receiving 0.75 or 0.51 microcurie per kilogram body weight had significantly shorter life spans than either the controls or the 0.25-microcurie group. Females at 0.75 microcurie per kilogram body weight showed a suggestion of a shortening of life span although it was not clearly significant. The two lower levels apparently did not affect the life span.