ABSTRACT SECTION

The Identification of Nonionic Surfactants by Paper Chromatography

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(Marion Nottingham, Teacher)

Two solvents, which permit the paper chromatographic identification of nonionic surfactants, were used. The differences in R_f value and the responses to color tests serve to divide the nonionics into classes, and even measure the approximate length of the polyoxyethylene group.

A Study of Short-range, Proton-proton Interaction with a Magnetic-resonance Accelerator

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(Severian D. Vaughn, Teacher)

By use of the "Coulomb Penetration Factor" and the radial functions for pure Coulomb scattering, the theoretical proper, scattering angles are 43.6°. The experimental result obtained by using a small cyclotron (magnetic-resonance accelerator) differed from the theoretical figure by 6.1°, according to the magnitude and direction of the interaction. The experimental results, in light of theoretical calculations, indicate that interaction between protons exists and that such interactions take effect only at very short distances.

Frequency Limits of Neuromuscular Transmission in Extraocular Muscles

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The ability of the extraocular nerve-muscle system to transmit impulses at rapid frequencies was studied by comparing the responses of limb muscles and extraocular muscles *in vivo* and in saline solution. Intracellular muscle activity was observed by using micropipette electrodes and an oscilloscope. Mechanical responses were registered by a transducer attached to a pen recorder. Stimulation frequencies of 300-400/sec produced maximum tension, with no failure observed at frequencies of 100-150/sec. Results indicate that the nerve-muscle function may fail before muscle fibers do, and that the mechanisms responsible for failure of neuromuscular transmission in diseased muscles may also occur in normal muscles activated at unnaturally rapid rates.

Effects of Radiation on Plant Tissues

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Barley seeds, plain and mercury-treated, were exposed to varying doses (20, 30, 40 and 50 thousand roentgens) of radiation from cobalt 60, with half of them wet and half dry. One group (control) was not irradiated. The seeds were germinated on moist filter paper and, after 3-weeks growth, the irradiated leaf and root tissues were compared microscopically with the controls. Increase in radiation intensity was accompanied by decreased leaf and cell size, increased cell-wall thickness, and reduced number of secondary roots, root hairs, and chloroplasts. The mercury prevented growth of molds and excessive radiation damage.

Investigations into the Mechanism of Cardiodepression Induced by Ephedrine During the Development of Tachyphylaxis

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The influence of atropine and diphenhydramine and of changes in calcium ion concentration on the cardiodepression induced by ephedrine during the development of tachyphylaxis was examined in isolated guinea pig atria suspended in oxygenated Chenoweth-Koelle solution at 36 C. After atria had equilibrated, cumulative doses of ephedrine (1×10^{-6} to 3×10^{-4} g/ml) were administered to control atria and to atria previously treated with atropine or diphenhydramine. Atropine and diphenhydramine were administered in a dose sufficient to block the actions of acetylcholine and histamine, respectively. Neither acetylcholine nor histamine release is apparently involved in the cardiodepression induced by ephedrine during the development of tachyphylaxis, since pretreatment with the specific blocking agents failed to alter the course of tachyphylaxis. In other atria, to determine the influence of calcium ion concentration upon the development of tachyphylaxis to ephedrine, the calcium concentration was reduced to one-fourth or increased to four times the normal concentration in the nutrient solution. Changes in the concentration of calcium ion were found to have very little effect upon the development of tachyphylaxis to ephedrine or the cardiodepression induced by the drug. The mechanism leading to the depressant phase of action of ephedrine remains to be defined.

KA-131, the Bowling Alley Site, a Late Prehistoric Site in Kay County, Oklahoma

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Two of 3 excavations were headed by the author, who discovered the site. Standard archeological techniques, under the guidance of professional archeologists, were used. All cultural debris recovered was catalogued for analysis. The sparse cultural deposits were taken from a maximum depth of 4.5 ft. The presence of some large dart points indicates that the site was occasionally occupied by archaic, nomadic hunters who left little evidence of their presence. The major occupation of the site took place about 1250 ± 50 A.D. by a late prehistoric culture similar to that of the Smoky Hill Site in Kansas and the Optima focus in the Panhandle. The occupation was apparently sustained and had a horticultural economy supplemented by hunting and gathering. Occupation of considerable duration is suggested by the presence of trash pits, but other details of structures were not found. The presence of a rather wide variety of lithic materials suggests contacts, trade or movement, with widely dispersed areas on or bordering the Southern Plains (See: Sudbury, B. 1968. Bull. Okla. Anthropol. Soc. 17.).