

diately. In one type of experiment, a large part of the kidney was immersed in the fixative; in a second type, small pieces of the kidney were cut out and subsequently immersed. Glutaraldehyde and osmium tetroxide were used separately or combined as fixatives. The best results were obtained with a combination of the two fixatives, although it did not represent the very best preservation. An analysis of these specimens is under way.

As a second project, the microcirculation was studied in order to establish the fine structural details of the arterial and the venous capillaries. It was found initially, that the urinary bladder of the frog represented an ideal situation where the microcirculation could be studied advantageously in vivo, since the bladder wall contains a monolayer of small blood vessels. However, it was subsequently discovered that the fixatives applied directly at the surface of the bladder would cause the smooth muscle components of the wall to contract, and thus distort the microcirculatory pattern observed.

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ULTRA STRUCTURE OF 1) THE ABDOMINAL SKIN OF THE FROG, AND 2) FISH CHROMATOPHORES

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During the summer of 1965, two projects were carried out, one dealing with the microcirculation of the abdominal skin of the frog, the second with fish chromatophores.

During the winter of 1964, the study of the microcirculation continued on rabbits in order to improve the preparation technique by using a double technique: examination and filming of the living material, and then fixation of the material and restudy of the same site, first with phase contrast microscopy, and then with low and high magnification electron microscopy. This technique was used in studying the circulation of the abdominal skin of the frog, where the capillary network is embedded in the dermal connective tissue, and thus does not move upon application of the fixative. During the first several weeks, the microcirculation was also studied in the wings of bats. However, it turned out that the circulation could not be stopped momentarily by the local application of several kinds of fixatives, and as a consequence, study of this animal had to be abandoned.

Various types of chromatophores were studied in the marine teleost Fundulus heteroclitus. Light and dark adapted fish were used, and the dorsal scales of males were removed from the living fish and immersed in glutaraldehyde or osmium tetroxide. Initially, the epidermal melanophores were studied during pigment dispersion and concentration. Subsequently, xanthophores and iridoleucophores were fixed for detailed studies. A peculiar, flat chromatophore was discovered in the dermal connective tissue which did not respond readily to a light or a dark background. This type of chromatophore had central enclosures of probably crystalline nature, since they were colorless when observed with direct light, but gave a blue reflexion when observed with incident light.