

# Meetings

## Fish Immunogenetics Research

Early in this century, medical scientists in Japan pioneered hematological, immunogenetic, and serological studies of fish. About 25 years ago, the work was undertaken and amplified by biologists, particularly by a number of Japanese and U.S. investigators working in the fields of commercial fisheries and university research. The work may be categorized as: morphological studies of the blood corpuscles of various fishes, physiological and pathological studies of fish blood, and immunogenetic studies of the races and phylogeny of fishes.

Although the fish faunas on both coasts of the Pacific Ocean are in part closely linked, and although biologists in both Japan and the United States are active in the field of fish-blood research, until recently there have been few formal efforts to engage in investigations on an international basis.

From 16 to 20 November 1964, a planning meeting for hematological, immunogenetic, and serological studies of fish was held at the East-West Center of the University of Hawaii, Honolulu, under the auspices of the United States-Japan Cooperative Program in Science. Participants included five Japanese scientists, seven United States scientists, a representative of the National Science Foundation, and an interpreter from the State Department. Cochairmen of the meeting were L. M. Sprague (U.S. Bureau of Commercial Fisheries, Honolulu) and Yasuo Suyehiro (University of Tokyo). The meeting was divided into six working groups, which made specific proposals.

Group No. 1, composed of Nobuyuki Kawamoto (University of Nihon), G. J. Ridgway (U.S. Bureau of Commercial Fisheries, West Boothbay Harbor, Maine), and J. E. Wright (Pennsylvania State University), suggested that Ridgway and Wright cooperate with Ryozyo Yuki (Hokkaido University) in fundamental studies of the inherited

characters of serum proteins of fishes and on serological studies of salmonoids. Specific areas of cooperation included: (i) exchange of reagents and reference material, (ii) maintenance by Ridgway and Wright of rainbow trout of known inheritance to serve as reference populations, (iii) exchange of ideas and information and (iv) travel to Japan and the United States for collaborative research.

Group No. 2, composed of Takashi Hibiya (University of Tokyo), Suyehiro, and Wright, in considering studies of the blood of cultured fishes, agreed that the primary area of common interests concerns the relation between growth and reproduction in cultured Salmonidae, particularly *Salvelinus fontinalis*; of particular interest are such blood characteristics as hematocrit values, hemoglobin measurements, and quantitative and qualitative measurements of serum components. The influences of water quality, nutrition, age, sex, season, disease, and stress on these blood characteristics are to be determined and related to growth and reproduction. The main practical object of this research is to determine through blood studies the best artificial feed for cultured fishes.

Group No. 3, composed of Suyehiro, Sprague, and Ridgway, considered studies of the serology and immunogenetics of the carp *Cyprinus carpio*, one of the most geographically cosmopolitan fresh-water fishes; both domestic and wild carp are found all over the world. Easily adapted to laboratory conditions, it is an ideal animal for studies of serum-protein variations that occur in various strains or races (subpopulations), as well as for genetic studies of the patterns of inheritance of blood-group antigens. It was agreed: (i) to compare serum-protein constituents from carp collected in various geographic areas in the United States and Japan, with analysis to be carried out largely by Japanese scientists, and (ii) to carry out basic studies of the

inheritance of red-blood-cell antigens by use of classical techniques developed in studies of man and of cattle and other domestic species.

Group No. 4, consisting of J. E. Cushing (University of California, Santa Barbara), Suyehiro, and A. M. Vrooman (U.S. Bureau of Commercial Fisheries, La Jolla, California), proposed that, in view of their common interest in conducting serological studies on mackerel, scientists in both countries cooperate closely in the development of reagents and techniques. The group recommended that a start be made on cooperative studies on gobioid fishes by the exchange of live specimens of the haze, *Acanthogobius flavimanus* (T. & S.), from Japan, and the mudsucker, *Gillichthys mirabilis* Cooper, from California. Vrooman and Cushing have investigated the mudsucker sufficiently to show that normal guinea pig serum recognizes an individual erythrocyte antigenic variation, a discovery that could form the basis of expanded serological investigations of the gobioid group.

Also proposed was a cooperative study of the pearl oyster and other bivalves. Under this study, Cushing would spend a summer in Japan learning the techniques of pearl culture, knowledge of which would make possible study of the relative effectiveness of transplants of different kinds of mantle and other tissue among oysters. Modifications of this technique would also be useful in transplantation experiments on other forms of marine invertebrates. Finally, it was agreed that the Japanese should collect eye lenses of identified mackerel and send them to Vrooman, who would prepare electrophoretic patterns of them as well as patterns from identified U.S. mackerel.

Group No. 5, composed of Kazuo Fujino (U.S. Bureau of Commercial Fisheries, Honolulu), James Joseph (Inter-American Tropical Tuna Commission, La Jolla, California), and Akimi Suzuki (Tokai Regional Fisheries Research Laboratory, Tokyo), discussed population genetics of Pacific bigeye and albacore tunas with reference to studies of erythrocyte antigens. It was agreed to emphasize basic studies on relations between blood groups and other biological factors that may play important roles in microevolutionary development of different subpopulations. The purpose would be to monitor the effects that these biological factors may have on the interpretation

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of serological findings as they are related to population identification. Big-eye tuna were chosen as the initial object of the studies because blood-grouping and other basic information is available; moreover, this is one of the largest pelagic fisheries in the world. It was agreed that cooperation must take the form of frequent exchange of reagents, erythrocytes, and information. The principals are to meet when practicable in Hawaii and Japan to standardize reagents and techniques of testing.

Group No. 6, composed of Fujino, Suzuki, and Vrooman, proposed further efforts toward cooperative studies of the erythrocyte antigens of U.S. and Japanese sardines.

The meeting as a whole recommended that a symposium on immunogenetic and serological methods be held at the 11th Pacific Science Congress (Tokyo, 1966). The meeting noted that exchange of scientists and students between the two countries is essential for the promotion of a co-operative program; asked that such materials as blood, serum, and other tissues be exchanged; recommended the training of young scientists in the fields of fish hematology, immunogenetics, and serology in Japanese and U.S. universities; and sought to encourage active participation of workers in these fields in meetings of national and international societies. Documents relating to current research in both countries were distributed and briefly discussed.

Participants not members of the working groups were Heihachiro Miyayama (Japanese Ministry of Education), N. P. Neureiter (National Science Foundation), and Ichiro Nishimura (U.S. Department of State).

LUCIAN M. SPRAGUE

U.S. Bureau of Commercial Fisheries,  
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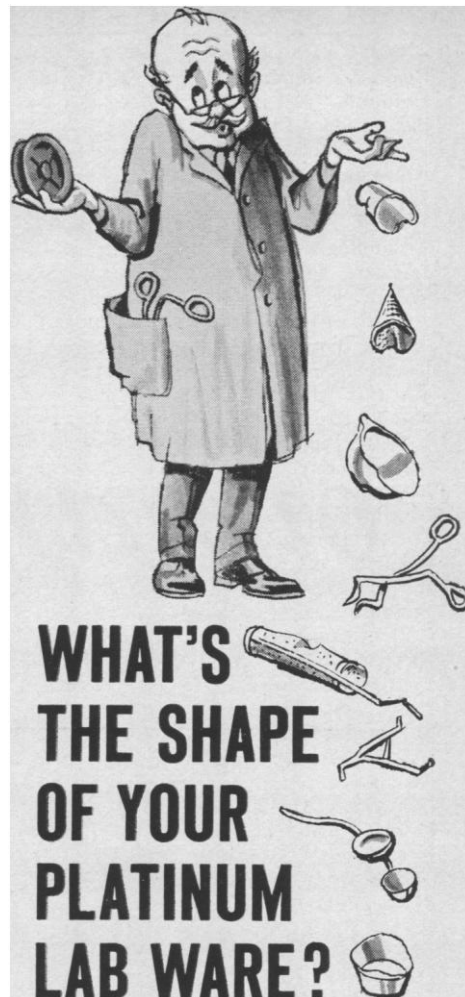
### Forthcoming Events

#### June

3-5. Canadian Soc. of Plant Physiologists. 6th annual, Univ. of New Brunswick, Fredericton. (R. G. S. Bidwell, Dept. of Botany, Univ. of Toronto, Toronto, Ont.)

3-5. Manufacturing Chemists' Assoc., 93rd annual. White Sulphur Springs, W.Va. (MCA, 1825 Connecticut Ave., NW, Washington 20009)

3-5. Advances in Biomedical Computer Applications, New York, N.Y. (T. D. Sterling, Dept. of Preventive Medicine and Industrial Health, Univ. of Cincinnati, Cincinnati, Ohio 45219)



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