S.I.P. NEWSLETTER

Society for Invertebrate Pathology Editor: H.E.Welch

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THE INTEGUMENTS OF ANIMALS AND PLANTS AS CHALLENGING MODEL FOR COMPARATIVE PATHOLOGICAL RESEARCH WITH SPECIAL REFERENCE TO PROBLEMS OF ONCOLOGY

by

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Guest Speech presented at the First Annual Meeting of the Society, September 3, 1968, Ohio State University, Columbus, Ohio, USA.

Mr. President, Ladies and Gentlemen:

The title of the subject of our discussion this afternoon is listed in our program. I shall try to explain as briefly as possible what this topic signifies, and why its properly a matter for our joint consideration.

As we all know, pathology is based on histology. There is equally sound reason to assume that the discipline of comparative pathology must likewise be based on comparative histology, supported by biochemistry and biophysics. The question of what is, and what is not, scientifically comparable with regard to normal and abnormal tissues from the animal and plant kingdoms must be a chief concern of comparative pathology. This problem is fundamental to this newly developing discipline. It will be my main concern today to offer a brief review of the comparability of the tissues of representatives of both kingdoms and to explore the question of why the integuments, of both animals and plants, are those types of tissues which offer the broadest and most viable basis for histologic comparison.

The integuments are phylogenetically ancient tissue structures. On the one hand they show a very wide distribution and several special functional adaptations in certain groups, such as breathing, absorption, temperature control, sensory functions, and secretion; on the other hand, these tissues, due to their basic, common characteristics, provide excellent models for fundamental research in comparative pathology. The main purpose of the integuments is, of course, the separation of body content and environment in the case of each individual animal or plant.

We are all aware of work that has been done in the comparison of cells under normal and pathologic conditions, but we are still more or less lacking in comparisons of suitable and truly comparable histologic material for the purposes

of research in comparative pathology. For a number of years, Dr. Nigrelli and I have been working together toward the establishment series on comparative pathology. As we just indicated, the integuments as models offer the widest possible basis of comparison with respect to the tissues of both kingdoms. They form, as it were, the base line for the determination of other, comparable tissues of both kingdoms and may point the way for future investigations in comparative normal and pathologic histology. Certain theoretical and practical evaluations must be undertaken, however, to establish firmly the requisite, a broad base for the discipline of comparative histopathology.

I think it is clear to all of us here that the fact that invertebrates, including the vast numbers of species of insects totalling more than all other animal phyla put together and nearly double the number of plant species, make the subject of our discussion today one of very special interest to our society. Our group represents the skills needed for scientific analysis and comparison of the integuments and histologic structures of invertebrate phyla to enable us to play a very important role in the further development of comparative pathology.

What we need now, it seems to me, is to seize upon the "bold approach" suggested earlier by our distinguished president; to review our findings hitherto in comparative invertebrate histology, as they bear upon the subject of our discussion today; to study the theoretical and practical relationships of animal and plant integumental tissues, both normal and abnormal, from the comparative point of view; and to find ways and means of establishing the necessary working relationships with, and encouraging the interest of our fellow researchers in the separate realms of vertebrate histology and pathology, and of plant histology and pathology. I have reason to believe that efforts of our association in this direction will meet with warm response and lead to fresh approaches to the problems of the cell, normal and abnormal, which are of paramount interest to us all. It is even possible - despite today's special problems in research support - to imagine that granting agencies may see fit to divert the necessary funds to support such joint investigations as we suggest.

I may suggest, then, that the purpose of the new approach for comparative pathology is to explore hitherto perhaps untravelled avenues which may lead eventually to a better understanding of the diseases of organisms in general and of special groups in particular. I suggest further that in the future we may have to continue to concern ourselves with the pathology of a single species, such as man, or with the pathology of many species of a particular group, such as the vast world of insects. Above and beyond this, however, comparative pathology must be concerned ultimately with basic problems of disease itself, on a foundation of relevant, comparative research involving a far wider range of organisms than appear to have been exploited hitherto.

Let us consider for a moment inflammatory conditions which may occur in different tissues in different organs of an animal. If we adopt a new direction in comparative pathology, as suggested earlier, it may well be found that studies of such conditions may be more rewarding if undertaken in tissues or structures common to the majority of species in both the animal and plant kingdoms; on the basis of findings thus obtained, we may then devote our attention to the specific case. Or, we could consider neoplasia such as may be found in the midintestinal gland of invertebrates, or in the liver of vertebrates. Such a comparative course toward a general understanding of a particular disease group from the point of view of comparative pathology may be of substantial assistance to us later in acquiring a specialized understanding of particular, individual conditions. Once again, the prerequisite to this plan of action is the determination of the comparability of the different types of tissues of both animals and plants; we have proposed the thesis that the integuments in both plants and animals having true tissues offer the broadest basis of comparison. A volume now in course of preparation with joint authorship by A.C. Braun, M. Nordmann, H. Trebbin and H.E. Kaiser on the subject of: "Animal and Plant Neoplasms, Comparative Pathology and Incidence" is scheduled for publication next year by Johns Hopkins University Press.

As has been the case in other biological sciences, the pathology of man and the vertebrates, especially the domesticated animals, has shown the greatest development. The pathology of invertebrates developed, as we know, especially in relation to their control, particularly for economic reasons. Plant pathology has remained something of a "sideline", developed in relation to its economic importance, especially in agriculture. That is the reason why we are much better informed about economically important plants and especially the higher plants, in addition to the fungi and bacteria, in relation to their pathology. The fact remains, however, that the basic concepts of thinking in the field of pathology have been developed chiefly by human pathologists; and the initial effort was to try to adapt these ideas to the other, developing fields of pathology, such as our own. This development has provided us with the materials, then, for the initial establishment of comparative pathology. We had a firm basis for a beginning. Now we are ready for the next step, which may lead to a synthesis of knowledge attained in many different, but related disciplines, and the basis for a great "leap forward", if we are fortunate.

It is essential, in achieving a proper evaluation of our field of interest, to remain in close contact with neighboring, pertinent areas of investigation. Here, two concepts may be dominant in our thinking. One is the assumption that in the integument we have the best available material for comparative study of both normal and pathological conditions. The second idea is that a common denominator must be found in the applied methods of our research, just as the integumental tissues may serve, as it were as "common denominators". It is suggested that a "multi-methodology", to coin a word, may be the solution to the methodological question. We have, of course, not one but many possible methods in dealing with normal or abnormal tissues. These include the different kinds of light microscopy, electron microscopy and other types of microscopy; chemical methods, such as the different kinds of chromatography, spectroscopy, mass spectroscopy and other biochemical methods; as well as investigation by appropriate biophysical methods for study of pathologic conditions in the different species. No individual investigator will be in a position to make use of all these, and other methods, but we should consider, perhaps, the idea of "team work" of different investigators within the framework of our society and in association with similar groups in other societies with related interests. There is an important element of economy in such "team" projects; there are often expensive instruments to be acquired and maintained.

There is neither time nor need to discuss the integuments in detail this afternoon. They will receive detailed treatment in my forthcoming "Textbook of Functional Histology", now in press with The C.V. Mosby Company, St. Louis. Here we need consider only the phylogenetic development of the integumental principle, and the common characteristics of the integuments in regard to their morphology. We may consider the human skin as an example of vertebrate integument; the integuments of the insects as highly important representatives of the invertebrates; and finally the principles of the epidermis of higher plants. Let us review for a moment the phylogeny of the integuments. It occurs as ectoplasm or cell wall in the Protista. The next step is quite similar, in which more cells or nuclei appear, but the condition of a tissue is not yet attained. The third and most important step is characteristic of the majority of animals and plants with true tissues, where we may observe the integuments as developing into lining membranes. The common principle lies in the main or basal cell layer, which is itself the basic principle of each integument of multicellular organisms with true tissues.

Mitosis occurs frequently in this layer, and in man the newly produced cells are displaced into the layers above. The integument of the invertebrates is generally a single-layered structure. If we look at the insects, we see that their epidermis is a uni-layered epithelium. Different cell types also occur besides the normal epidermis cells. The typical plant epidermis is also uni-layered; this holds true whether we speak of the epidermis of the stems, the roots, the leaves, the flowers, the fruits, or the seeds. It is important to recall that the epidermis of plants is characterized by

meristematic potentialities, or, in general terms, the ability to form cell divisions. Although in all three principal types of integuments, certain specializations occur, they are similar in principle and hence comparable. Although many points of interest with regard to the special characteristics of the integumental tissues of plants and animals, could be adduced, with special reference to their comparability, it would far exceed the bounds of my present objective, which is basically to invite attention to a direction in which our society's research endeavors can move with confidence and integrity. We can state with some degree of assurance, on the basis of our own studies, and a careful review of the literature available to us, (Medlars) that true comparability of tissue structures of representatives of both kingdoms does exist, and that we may proceed with their investigation with reasonable anticipation of success, if we bear in mind at all times the requirement for the application of a multi-method, comparative, and ultimately, synthetic approach.

A functional understanding of the development of diseases is without doubt the most pressing problem facing the discipline of pathology, and especially of comparative pathology in our time. Only continuous observation of the condition of disease; in its development and course, can help us learn more about the functional processes involved. The integument offers us an optimal opportunity to reach this goal using the comparative method, because in the study of its tissues, the use of different methods and continuous observation is experimentally relatively easier than for other types of structure.

On different occasions I have pointed out that, for example, the study of the phases of multiphase carcinogenesis may well be one of the most important goals of comparative oncology; for this work, too, the integuments are particularly well suited.

We have briefly reviewed the reasons for suggesting that attention be directed toward the use of the integuments of animals and plants as challenging models in research in the fields of comparative pathology, histology and especially oncology. We have indicated, that much work needs to be done in establishing the parameters of comparability, but we have also expressed the belief that once undertaken with a multi-method, coordinated "team" approach, together with out colleagues in vertebrate and plant pathology and histology, we may be rewarded with new insights into the nature of the normal and abnormal cell. All this will take time, organization and financial support. This afternoon I am honored by the opportunity to suggest to this distinguished audience that the Society of Invertebrate Pathology is in an especially favorable position to examine my basic thesis for its validity and viability and, if found promising to recommend appropriate action. It is my sincere hope that interest in what seems to me to be a promising approach to a vital problem. A real interest may be stimulated among some of us, and that as time goes on, a broad, multi-disciplinary program may develop in which our society will play a significant role.

I would be happy to entertain any questions from the audience.

Thank you very much.

Vice-President, Professor C. Vago, Contributes to New Book.

Vice-President Vago is one of a number of SIP members who will be contributing to a new book, Vol. 42. - Insect Viruses - in Current Topics in Microbiology and Immunology, Springer Verlag. 1968, 192 pages DM 36 -: U.S.$9.00.

S.I.P. ANNUAL MEETING

Call for Symposia Topics

Announcement

The Society for Invertebrate Pathology will be meeting with the AIBS on August 17-22, 1969, at the University of Vermont, Burlington, Vt. A formal call for submitted papers will be forthcoming in the near future. However, at this time we are canvassing the membership to inquire as to whether any individual or group is interested in organizing special symposia, workshops, or seminars to deal with some aspect of invertebrate pathobiology. If such is the case, the Program Chairman would like to be informed before March 22, 1969, so that such events can be scheduled so as not to conflict with other events on the program. If you are hoping to plan a special conference, please send the information to:

Dr. Thomas C. Cheng
Department of Zoology
University of Hawaii
Honolulu, Hawaii 96822,
U.S.A.

We will do our best to publicize your program if it is of interdisciplinary interest.

ANNUAL MEETING WILDLIFE DISEASE ASSOCIATION

The 1969 Annual Wildlife Disease Conference will be held June 16-20, 1969, at the United States Department of Agriculture's National Animal Disease Laboratory in Ames, Iowa, U.S.A. Special symposia are being organized on Leptospirosis, Pasteurellosis, Progress in the Immunization of Fish, Progress in the Chemotherapy of Wildlife, Progress in Toxicology in Wildlife, and Progress in Physiopathologic Techniques. Interested SIP members should contact Dr. G.L. Hoffman, Eastern Fish Disease Laboratory, Kearneysville, W. Virginia, 25430, U.S.A.

CENTER FOR PATHOBIOLOGY, UNIVERSITY OF CALIFORNIA, IRVINE

The establishment of this Center was announced recently. It is dedicated to the advancement of the understanding of disease from the standpoint of basic science, especially the biological sciences. It serves as an informational and research unit, as well as a center for the advanced study of all manner of disease in all types of animals and plants. It is an autonomous unit in the School of Biological Sciences, and is associated with the Department of Organismic Biology. Enquiries should be directed to Dr. Ed Steinhaus. Members who have received letters on SIP letterhead will note that the Secretary made a mistake in the name of this Center. Our apologies.

PUBLICATION DATES FOR JOURNAL OF INVERTEBRATE PATHOLOGY

1967	Volume 9	Number 1	-	March
		" 2	-	June
		" 3	-	September
		" 4	-	December
1968	Volume 10	Number 1	-	February
		" 2	-	March-April
1968	Volume 11	Number 1	-	June
		" 2	-	August
		" 3	-	September
1968	Volume 12	Number 1	-	October
		" 2	-	November
		" 3	-	December

Academic Press reported a delay in the last two numbers of Volume 12, but they are expected early in January.

EDUCATION AND TRAINING OPPORTUNITIES IN COMPARATIVE PATHOLOGY

National Research Council, Washington, D.C., recently sent me a listing compiled by Dr. J.K. Frenkel of institutions providing "Education and Training Opportunities in Comparative Pathology". Forty-three professors and their speciality areas, academic programmes, degrees, and affiliations are listed. Additional copies may be obtained from Room 309, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D.C. 20418, U.S.A.

20TH WESTERN FOREST INSECT WORK CONFERENCE, (UNITED STATES AND CANADA) COER D'ALENE, IDAHO - MARCH 10-13, 1969

Panel Discussion: "Microbial Control of Forest Insects - Past, Present, and Future" is scheduled during the plenary session on March 11, 10:15-11:30 a.m. Panel Moderator will be Dr. Bohdan Maksyniuk, Forestry Sciences Laboratory, P.O. Box 887, Corvallis, Oregon 97330, and panelists will present the points of view of researchers, pathogen producers, educators, engineers and pest controllers. Several concurrent workshops will follow the above panel, including one on insect pathogens (2.5 hr.). Workshop leader: Dr. Clarence Thompson also of Forestry Sciences Laboratory.

PAYMENT FOR 1969 MEMBERSHIP

Membership renewals are due and should be paid directly to the Secretary. Regular membership is $4 and for those members who wish to purchase volumes of the Journal of Invertebrate Pathology, $10 for each volume should be added. Payment should be made in U.S. dollars. An additional $1.20, or $11.20, is required from members living outside the U.S.A. and Canada, to cover postage and handling.

NEWS ITEMS WELCOME

Information on dates of conferences, new books, new publications, new institutions, changes, topics and research themes would be most welcome. Please send to the Editor.

SOCIETY FOR INVERTEBRATE PATHOLOGY

February 21, 1969.

Dear Fellow Member / Cher confrere,

Please find enclosed the second Newsletter for this year. In it you will find an announcement of the Annual Meeting to be held at the University of Vermont, Vermont, Burlington this August. Dr. Thomas Cheng has included forms for the submission of papers and also for registration for the Conference.

I have included additional renewal and membership forms. If you have already paid your membership, please disregard these. Perhaps you could pass them on to new potential members.

vous trouverez ci-inclus le deuxième "Newsletter" de cette année. La brochure contient aussi l'avis concernant la Rencontre Annuelle devant avoir lieu à l'Université du Vermont, Vermont, Burlington, au mois d'Août prochain. Dr. Thomas Cheng vous envoie des formules permettant la soumission de papiers scientifiques et d'emegistrement à la Conférence.

D'autres formules pour nouveaux membres et renouvellement y sont aussi ajoutées. Si vous avez déjà payé votre cotisation, je vous prierais de n'en faire aucun cas. Vous pourriez alors les passer à de futurs membres.

Yours sincerely / Sincèrement vôtre,

H. E. Welch,
Secretary-Treasurer.

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FIRST AIBS NATIONAL BIOLOGICAL CONGRESS

6-10 NOVEMBER 1970

DETROIT, MICHIGAN

FOR IMMEDIATE RELEASE:

The Governing Board of the American Institute of Biological Sciences, at its recent meeting, passed a resolution to hold NATIONAL BIOLOGICAL CONGRESSES in 1970, 1971, and 1972. The First Congress will be held in Detroit, Michigan, 6-10 November 1970, under the Chairmanship of Dr. William D. McElroy of Johns Hopkins University.

The Congresses will be concerned with various Social, Educational and Scientific problems. The morning sessions will be devoted to interdisciplinary symposia covering the major scientific advances in all areas of Biology. National and International leaders in the Bio-Medical Sciences will be invited to participate in these symposia.

Afternoon sessions will be devoted to papers contributed by biologists active in specific research. Progress in areas of biology ranging from molecular, genetic and developmental biology to evolutionary, ecological and environmental sciences will be reviewed. Invitations will be extended to younger scientists to contribute original research papers that will shed additional light on the subjects covered by the major symposia.

Special evening programs, open to the public, will be designed to provide a forum in which the interrelationships of biology, technology, society and public affairs are considered. National, State and Local leaders will be invited to participate in these public meetings. Among the topics to be considered, for whose solution biological knowledge is vital, are water and air pollution, pest control, population pressures, community health, food quality and the effects of drugs on human development and behavior. We need your ideas on other topics that might be considered.

Educational and scientific programs will be arranged for local high school and college students who are interested in a career in the biological-medical sciences. In addition to lectures by outstanding scientists, there will be special programs by leading science councilors who will describe career opportunities in biology. Exhibits by book publishers and suppliers of equipment will be of interest to scientists. In addition, organized tours for students and the general public are planned in order to give them an opportunity to see the current "tools" used by the biologists.

It should be clearly understood that the National Biological Congress will not supplant the regular AIBS Meetings, which will continue to be held on college campuses in late August. As you know, the 1969 Meeting will be held at the University of Vermont, Burlington, 17-22 August, and plans are well under way for the 1970 Meeting which will be held at Indiana University, 23-28 August.

For further information, please contact Dr. John R. Olive, AIBS, 3900 Wisconsin Avenue, N.W., Washington, D.C. 20016.

SOCIETY FOR INVERTEBRATE PATHOLOGY

NEW MEMBERSHIP APPLICATION OR MEMBERSHIP RENEWAL

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Please check the appropriate box. Enclose the slip in a self-addressed envelope.
Make the remittance payable to:

Dr. H.E. Welch,
Department of Zoology,
University of Manitoba,
Winnipeg, 19, Canada.

Persons becoming members in the calendar year 1969 will be considered Charter Members.

Payment should be made in U.S. dollars. Members outside the U.S. are requested to use International Money Orders. Do not send cash. Users of UNESCO coupons please add 5% handling charges by UNESCO.