

New Trends in
BIOLOGICAL
CHEMISTRY

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In Honor of Professor Kunio Yagi
on the Occasion of
the 70th Birthday Anniversary

Edited by

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With 186 Figures and 88 Tables

JAPAN SCIENTIFIC SOCIETIES PRESS
Tokyo

SPRINGER-VERLAG

Berlin Heidelberg New York London Paris
Tokyo Hong Kong Barcelona Budapest

JAPAN SCIENTIFIC SOCIETIES PRESS, 1991

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Supported in part by the Ministry of Education, Science and Culture under Grant-in-Aid for Publication of Scientific Research Result.

Published jointly by:

JAPAN SCIENTIFIC SOCIETIES PRESS Tokyo

ISBN 4-7622-4648-4

and

SPRINGER-VERLAG Berlin Heidelberg New York London Paris

Tokyo Hong Kong Barcelona Budapest

ISBN 3-540-53935-2 SPRINGER-VERLAG Berlin Heidelberg New York

ISBN 0-387-53935-2 SPRINGER-VERLAG New York Berlin Heidelberg

Sole distribution rights outside Japan granted to SPRINGER-VERLAG

Printed in Japan

Preface

In 1989, on June 24th, 1989, to be exact, Professor Kunio Yagi celebrated the 70th anniversary of his birth. In appreciation of his long list of scientific and social contributions to the development of biological chemistry, his senior students — Professors M. Harada, T. Hayakawa, H. Hidaka, Y. Katsumata, M. Koike, T. Nagatsu, J. Okuda, S. Tsuboi, and myself—decided to hold an international symposium to honor him. We invited more than 30 outstanding scientists, some of whom are his intimate friends, to participate in the symposium entitled "New Trends in Biological Chemistry", which took place August 23–25, 1989, at the Nagoya Kanko Hotel, Nagoya, Japan. The meeting was held under the auspices of the International Union of Biochemistry and the Ministry of Education, Science and Culture of Japan, following another international symposium ("Bioenergetics: Molecular Biology, Biochemistry, and Pathology") which was also held to honor Professor Yagi.

This book is, in principle, the proceedings of the former symposium. However, each speaker was asked to submit a paper in the form of a mini-review covering important progress in biochemistry, including his or her own accomplishments. Accordingly, the book contains highly comprehensive and up-to-date information on highlights or important findings that have recently been made in their respective

areas. The contents thus state the development of biological chemistry reached thus far in this century, and indicate the direction of research which will lead to further progress, as well as new trends in this broad field.

The editor is convinced that this book will serve to encourage young scientists to continue the advancement of biochemical knowledge into the new century, progress in which will inevitably lead to many improvements in the quality of human life through our better understanding of the intricacies of biological chemistry.

January 1991

Takayuki OZAWA

Birthday Greetings to Kunio Yagi

E.C. SLATER

Department of Biochemistry, University of Southampton, Southampton, U.K.

It is my honour and pleasure, Kunio, to speak to you and to talk about you on this occasion of your 71st birthday, according to Japanese custom, and 70th, according to Western custom.

The programme this evening sets aside twenty minutes for this speech. This is pretty long, Kunio, except when one is presenting a scientific paper—then it is much too short for the speaker, if not for the audience. I hope that you can stand 20 minutes of hearing about yourself and about things that you know much better than I do.

A little less than seventy years two months ago—on June 24, 1919 to be precise—you were born in Yokohama, but you do not remember that. I was then nearly two and a half years old living in my birthplace, Melbourne, Australia, but I do not remember that either.

Were we fortunate to have entered the world in the late 1910's? I think that we were, although it did not perhaps strike us that way in our boyhood and youth. We grew up and went to secondary school during the great world economic depression that caused so much social upheaval and led to the outbreak of what became World War II, first in Europe when you were 20 years old, spreading to the FAOB area two years later.

We were both lucky to survive the War, Kunio, mainly by virtue of the fact that, at its outbreak, we had received sufficient scientific

training to make us more useful to our communities doing other things than shooting at one another.

You were trained as a medical doctor—to save life and help the injured—not to take it. You graduated as a medical doctor in 1942 and spent some time in a Japanese naval hospital, together with Osamu Hayaishi, so he tells me.

Whereas I was able, soon after the end of the war, to go to Cambridge, England to start a career in a field that later became known as bioenergetics, you had to experience taking up your career again in devastated Japan. In 1946, you were appointed Lecturer in the Faculty of Medicine, University of Nagoya, and the following year you obtained the degree of Doctor of Medicine. In 1948, you were appointed Associate Professor of Biochemistry.

Although for our generation it was not all a bed of roses in our youth—worse for you than for me, I am sure—I still maintain that we were lucky to be born when we were, since the 1950's were a wonderful time to live in as a biochemist. We were able to watch our friends (and even participate a little) unravelling the mysteries of the basic life processes (except thought), insofar as they can be described in the language of chemistry. It was a time of unheard of expansion in biochemistry, new laboratories were built, lots of money became available for equipment (which was then less sophisticated and much cheaper than now) and for training of graduate students, and there were opportunities galore for graduates for post-doc training and faculty positions. Our generation did not have to suffer the later cutbacks that quickly led to a surplus of well-trained and highly dedicated biochemists, many of whom could not be given the opportunity to develop their talents in biochemical research; and even the luckier ones had great difficulty in obtaining sufficient funds. Of course, some of us (perhaps you to a lesser extent, Kunio) also suffered from the cut in the support of research in our laboratories in the latter phase of our careers.

Not all those of our generation received the level of support for research that we enjoyed during the most fruitful years of our life, scientifically speaking. We were fortunate to be living in relatively prosperous countries that were, moreover, free from political upheavals such as the "Cultural Revolution" in China that set back scientific research there for half a generation.

To use one of your favourite sayings, Kunio, it was not so bad.

Both of us started our *biochemical* careers in nutrition, which was

in the 1930's the exciting new field of biochemistry. My first two papers in a non-Australian journal were on riboflavin (I wonder if you have ever read them, Kunio), but moved away from nutrition when I went to Cambridge. You remained faithful and published many papers on riboflavin and on other nutritional topics and became a leading figure in nutritional research, receiving in 1961 the Prize of the Vitamin Society of Japan.

Unlike most young Japanese scientists in the 1950's, you did not go to the United States as a post-doc. Perhaps you will tell us why, Kunio, you chose instead the Institut de Biologie Physico-Chimique in Rue Pierre et Marie Curie in Paris in 1955. We must have been close to meeting then, Kunio, because in that same year I moved from Cambridge to Amsterdam, only a few hours away by train from Paris. After, I think, two years in Paris you moved to Hugo Theorell's laboratory in Stockholm where you made the step from riboflavin to flavoproteins. At about that time, my friend Jean Rosenberg from the institute in Paris told me about a lively young Japanese in Paris who had written a book on flavins.

Maybe we met during my first visit to Japan in 1957 to attend the International Symposium on Enzyme Chemistry in Tokyo and Kyoto. I have looked up the Proceedings of that meeting which was published as IUB Symposium Series, Vol. 2. The name Yagi does not appear in the list of authors, probably because you had just returned from Europe. However, it was customary in those days when symposia were less frequent than now to publish discussion comments, and the Proceedings make it clear that you were very active in the Discussions. It appears that you and I jointly questioned Tom Singer about his use of phenazine methosulphate as acceptor for succinate dehydrogenase.

The 1957 meeting was your first, somewhat tenuous, connection with IUB. In 1958, you presented a paper to the 4th International Congress of Biochemistry in Vienna on the phosphorylation of riboflavin by intestinal alkaline phosphatase. Would you like to tell us about this, Kunio?

Continuing my search for firsts, I found your first paper in *Biochimica et Biophysica Acta* in 1959 on the mechanism of D-amino acid oxidase. Takayuki Ozawa is co-author. This was followed by a whole series in *BBA* on this enzyme, one of which has been selected to be reprinted, with a comment by you and contemporary photographs of

you and Takayuki, in *BBA 1,000*, to be published four weeks from tomorrow.

Returning to your career, Kunio, you were appointed to the chair of Biochemistry and Director of the Institute of Biochemistry, Faculty of Medicine, University of Nagoya in 1962, in which position you remained until the ridiculously early retirement age of 64, but since then you have been Director of the Institute of Applied Biochemistry in Gifu, which, to my regret, I have never visited:

In 1965, we held in Amsterdam what we called the First Symposium on Flavins and Flavoproteins, clearly predicting a second and, in fact, the 10th Symposium will be held in Italy next year. You were one of the stars of the first meeting, showing beautiful colour slides of crystals of D-amino acid oxidase in both its oxidised and semiquinone forms (if I remember correctly) and of brightly coloured charge-transfer complex. This was the first time that we saw you in formal Japanese banquet costume and heard you sing the songs of your country in a restaurant (long since disappeared) overlooking Rembrandtplein in Amsterdam. Given your fine sense of history, it must have given you great satisfaction to have followed in the footsteps of the first Director of the Institute of Biochemistry in Nagoya, Leonor Michaelis, by demonstrating stable semiquinones and also crystallizing a Michaelis enzyme-substrate complex.

It was during and after this meeting that many of us here this evening got to know you and to experience your wonderful, indeed legendary, hospitality in Nagoya.

In 1967, you were a member of the Organizing Committee of the 7th International Congress of Biochemistry in Tokyo, which gave the opportunity for those of us who had been at the symposium ten years earlier to view the tremendous developments in Japan and particularly in its biochemistry during the previous decade.

In 1973, you were President of the Annual General Meetings of the Vitamin Society of Japan and of the Japanese Biochemical Society. I attended the latter in Nagoya. It was during this meeting that you first started to serve IUB as founding member of the Financial Appeal Committee, now called the Special Members Committee. It was then, too, that you as President of the Japanese Biochemical Society Annual Meeting charged me to call on Tony Linnane to be President of FAOB. During this meeting also, the 50th Anniversary of the Founding of the

Institute of Biochemistry in Nagoya in 1923, with the appointment of Leonor Michaelis as Director, was commemorated. You had the very nice idea of inviting the two daughters of Michaelis to attend this celebration. As young girls, they had lived in Nagoya with their parents, but had not until your invitation revisited Japan.

In 1977, you were President of the First FAOB Congress in Nagoya. Professor Sang Sup Lee will speak further about your services to FAOB and I shall confine myself to those to IUB. First, I should mention the symposium entitled *New Horizons in Biological Chemistry* held in Nagoya ten years ago on the occasion of your 60th birthday. In the same year, you were elected to the Council of IUB and in 1981 you became Treasurer and served in that function until last year. IUB owes a great debt to you for your devoted services as Treasurer for seven years, during which the financial resources of IUB trebled. You are still serving IUB as a member of the Special Members Committee responsible for Asia and Oceania. I should add that, for 12 years from 1976 to 1988, you were President of the Japanese National Committee for IUB. You are also an active member of the Editorial Boards of two IUB journals—*Biochemistry International* and *Journal of Biotechnology and Applied Biochemistry*—and served for three years as a member of IUB's flagship journal—*TIBS*.

I am less informed about meetings in Nagoya after 1979, but I am sure that they followed the pattern of the three that I did attend, as will the one in a few days time—beautifully organized and with wonderful hospitality. The extra-curricular activities after the scientific sessions are not for public record.

Kunio, you became known for your work on flavoproteins, but your interests are much wider, especially since you have retired, as those of us who receive bundles of reprints at frequent intervals can testify. Your recent interest in lipid peroxidation and its association with ageing is well known.

When your friends gather and your name is mentioned, Kunio, everyone smiles—not in any derogatory sense, on the contrary, because they are recalling your friendly smile, your bubbling enthusiasm for your work and your friendliness towards your colleagues. How well I remember your speech at that Farewell Dinner in 1965 in Amsterdam which I have already mentioned. You greeted a colleague with whom you had many scientific disagreements over the years with the words "My friend, the enemy".

You have received many formal recognitions of your achievements: I mention foreign membership of the Brazillian, Polish, USSR and Czechoslovak Academies of Science, honorary membership of the American Society of Biochemistry and Molecular Biology, the Indian Society of Biochemistry and the Japanese Biochemical Society, and Corresponding Foreign Member of the Société de Biologie, France. You have won many prizes and received other honours in France, Poland and Czechoslovakia as well as in Japan. Among the latter, the Prize of the Japan Academy of Science in 1982 deserves special mention.

We honour you this evening, Kunio, for your services to biochemistry in Japan and internationally, but above all as a good friend.

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