



IUBMB NEWS

Issue 2

October 2016



President's Message

IUBMB aims to promote research and education in Biochemistry and Molecular Biology. In this regard, over the years we have channelled great efforts into the research aspects of our science. We now consider it timely to turn our attention to educational initiatives.

To address this aim and in collaboration with FEBS, we are organising a conference on Education in Biochemistry and Molecular Biology, to be held in Rehovot (Israel) in September 2017. The conference seeks to provide a think-tank setting in which to draw up ideas to improve the current approach to teaching these subjects, and to generate a series of recommendations to be shared with the educational community. In this regard, this conference will serve to propel the changes that are required to bring education in biochemistry and molecular biology at all levels into the 21st century.

Another important aspect of education is to provide young scientists from developing countries the opportunity to attend international congresses and meetings. IUBMB is firmly committed to this endeavour and devotes significant financial resources to this end. Given that the number of applications from African countries is very low, I wish to encourage our young African colleagues to apply and benefit from IUBMB travel awards and Wood-Whelan fellowships.

IUBMB is also launching a new activity, namely Focused Meetings. This initiative seeks to bring scientists together to discuss cutting-edge advances in a given field. IUBMB will be the main sponsor of these gatherings and will provide funds to facilitate attendance by young scientists. I urge you to keep abreast of the news regarding these events and to participate.

These are exciting times for the Molecular Life Sciences, and IUBMB is set to embrace the challenges that lie ahead.

Finally, it is with great sadness that I report the recent passing of three stalwart supporters of the IUBMB for many years: Osamu Hayaishi (President, 1973-1976), E.C. (Bill) Slater (Treasurer, 1971-1979, and President, 1988-1991), and Jacques-Henry Weil (General Secretary, 2000-2009). Obituaries of Professors Hayaishi and Slater are reprinted in this newsletter. Since Professor Weil passed away very recently, on October 5, his obituary will be included in the next IUBMB newsletter.

Joan J. Guinovart, PhD
President, IUBMB

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miami
2017
winter
symposium
ELSEVIER

DIABETES:

TODAY'S RESEARCH TOMORROW'S THERAPIES

JANUARY 22-25, 2017 HYATT REGENCY MIAMI, USA

IUBMB 2016 Conference in Vancouver, Canada

The Canadian Society for Molecular Biosciences (CSMB) served as the national host for the 2016 IUBMB conference, in partnership with IUBMB and the Pan-American Association for Biochemistry and Molecular Biology (PABMB). The conference was held July 17-21 at the Vancouver Convention Centre, located on the waterfront of the beautiful Vancouver Harbour, adjacent to the main Vancouver downtown area, Stanley Park and with a great view of the nearby Coastal Mountain range.

Over 500 researchers from around the world attended this meeting, representing more than 50 countries. Canadians amounted to almost 40% of the attendees, and participation was especially strong from Pacific Rim nations, including 49 from Latin America and 113 from Asia and Australia. We were very pleased by a high level of engagement with the special Young Scientists' Program, and had 38 graduate or postdoctoral researchers attending both the main conference, plus a special pre-meeting series of YSP events conducted at the University of British Columbia campus. This included very popular shared presentations on research being conducted by the trainees, plus career counselling and tours of research facilities. Travel support for many of these students was provided through a generous contribution by the Tang Prize Foundation, plus YSP funding through IUBMB.

The main conference was structured around 8 Plenary sessions, plus 28 Concurrent Sessions and 4 special purpose Workshops. Special invited speakers included two Nobel Laureates: Drs. Harald zur Hausen, Deutsches Krebsforschungszentrum and Andrew Fire, Stanford University, who spoke about their work in the areas of nutritional risk factors for cancer and regulatory RNA, respectively. We also had 5 Gairdner award winning speakers, including Drs. Tom Pollard (Yale University), Michael Young (Rockefeller University), Tak Mak (University of Toronto), Ulrich Hartl (Max Planck Institute) and Nahum Sonenberg (McGill University). In addition, there were 2 winners of IUBMB Conference Award speakers (Drs. Alexandra Newton, University of California, San Diego; and Nahum Sonenberg, McGill University) and 5 CSMB award winners (Drs. Morag Park, McGill University; Laurence Pelletier, University of Toronto; Filip van Petegem, University of British Columbia; Esther Verheyen, Simon Fraser University; and Gerry Wright, McMaster University). Topics that were covered by these and many other speakers were under the main conference themes of Signalling Pathways in Development, Disease and Aging, and included sessions on Membrane Proteins and Channels,

Cancer Signalling Pathways, Regulation of RNA and Proteins, Signalling and Immune Function, Circadian Rhythms, Cell Death and Aging, plus many others.

Workshops were very well attended, and included sessions on Education in the Biochemical Sciences, the Art of Science Communication, an Update on Research Funding, and Writing Skills in Science. Not only was this an IUBMB Conference, it also served as the annual conference for both CSMB and PABMB, plus it provided a venue for the Annual General Meetings for the latter two Societies. Finally, the conference benefited greatly from over 50 exhibitors and sponsors, with booth spaces that operated in the same hall as the many poster presentations and where coffee breaks and refreshments were provided.

In summary, we were extremely pleased with the very high quality of the science that was presented at this meeting and with the high level of international participation. Dr. Jorge Babul, Past-President of PABMB, indicated that when he attends these conferences he often feels like a warrior on behalf of science, fighting to keep the traditions of open communication, funding and international excellence moving forward. The next IUBMB Congress will be held in Seoul, Korea, in 2018, and we wish our colleagues there every success in maintaining those same traditions.

Randal N. Johnston, PhD
General Secretary,
Canadian Society for Molecular Biosciences
IUBMB 2016 Conference Chair



Stanley Park, Vancouver, British Columbia, Canada



Mohamad Gad, The German University, Cairo, Egypt (centre) with Joan Guinovart, IUBMB President (left) and Andy Wang, IUBMB President-Elect (right) at the IUBMB booth during the Vancouver Conference



Alexandra Newton, University of California, San Diego, after delivering the EC (Bill) Slater Lecture entitled "Reversing the paradigm: Protein kinase C as a tumor suppressor" at the 16th IUBMB Conference in Vancouver, pictured with Joan Guinovart



Nahum Sonenberg, McGill University, Montreal (centre), after delivering the IUBMB Lecture entitled "Dysregulation of mRNA translation by signalling pathways in cancer and neurodevelopmental diseases" at the 16th IUBMB Conference in Vancouver, pictured with Joan Guinovart (left) and Israel Pecht, Secretary General of FEBS (right)



Susan Taylor, University of California, San Diego (left) after delivering the Ed Wood Lecture entitled "PKA: Dynamic assembly of macromolecular signaling complexes" at the 40th Anniversary Congress of the Croatian Society of Biochemistry and Molecular Biology in Split, Croatia, receiving the IUBMB Medal and Certificate from Zrinka Kovarik, President of the Society



Nekpen Erhuse (left) and Stella Olubodun (right) from the University of Benin, Nigeria at the poster session with Michael Walsh, IUBMB General Secretary (centre) during the Vancouver Conference

Young Scientists' Program, Vancouver 2016



Thirty-eight young scientists from 28 different countries participated in the YSP prior to the Vancouver Conference: Argentina, Australia (3), Brazil, Canada (3), Chile (2), Croatia (3), France, Germany, Hungary, India, Italy, Malaysia, New Zealand, Nigeria, Norway, Peru, Poland, Portugal, Russia, Singapore, Slovenia, South Africa (2), South Korea, Thailand, U.K., Ukraine (4), USA.

Attendees arrived and registered at the Totem Residence at the University of British Columbia Campus on Thursday, July 14 and attended a reception at "The Nest" in the Student Centre. Short talks and posters were presented by all participants at the Life Sciences Centre on July 15 and 16. Prof. Natalie Strynadka (Department of Biochemistry, UBC) presented a Keynote Lecture entitled "Structure of the Bacterial Type III Secretion System" on July 15 and Dr. Rachel Fernandez (Department of Microbiology, UBC and Associate Dean for Graduate Student Professional

Development and the Postdoctoral Fellows Office) gave a talk on "Career Advice".

During the afternoon of July 15, a tour of the Genome Sciences Centre was laid on and included observing the workflow of sample handling in a major sequencing centre, bioinformatics capabilities, computer storage and server facility and sequencing capability. Following some free time in central Vancouver, a dinner reception was hosted by StemCell Technologies, a local company with part of their facilities in the same building as the Genome Sciences Centre.

On the afternoon of July 16, the participants enjoyed a walk around the UBC campus and were provided with passes to use the Vancouver transit system. Some attended a local soccer match in the evening. Accommodation was provided at the Marriott Pinnacle, three blocks from the Vancouver Convention Centre, site of the Conference.

Vincent Duronio, PhD
Chair, YSP 2016

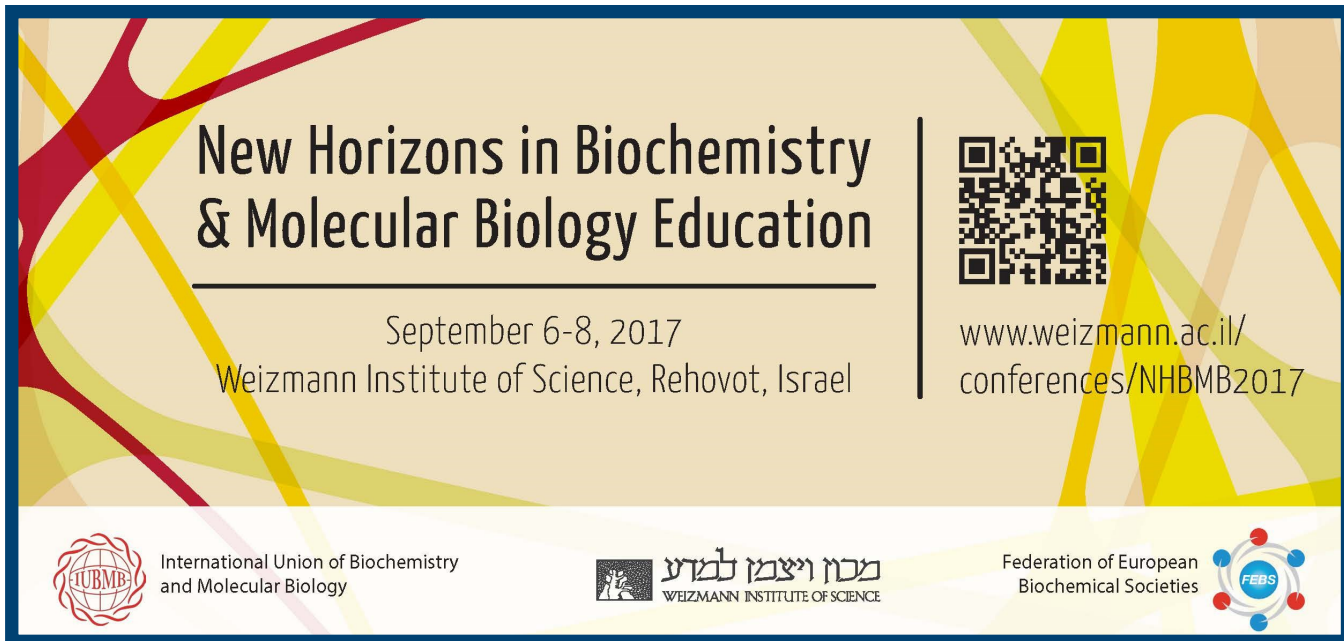


TANG PRIZE FOUNDATION AWARDEES 2016

NAME	COUNTRY OF ORIGIN
Jose Diego Botezelli	Brazil
Ana Branco	Portugal
Daniela Calzia	Italy
Alison Clare	New Zealand
Amanda D'Espessailles	Chile
Zoe Gillespie	Canada
Simab Kanwal	Thailand
Sayema Khanum	Bangladesh
Silvia Ravera	Italy
Kyungsoo Shin	Canada


IUBMB TRAVEL FELLOWS – VANCOUVER CONFERENCE 2016

NAME	COUNTRY
Léo Aubert	Canada
Nileeka Balasuriya	Canada
Rabah Dabouz	Canada
Emilie Ernoult	Canada
Susanna George	Canada
Olha Lisakovska	Ukraine
Sherin Nawaito	Canada
Antonietta Pietrangelo	Canada
Sergey Sedykh	Russia
Ji-Young Seo	Korea
Saki Sultana	Canada
Deepak Balaji Thimiri Govinda Raj	Norway
Yanti Yanti	Indonesia
Abdulmottaleb Zetrini	Canada
Yangjing Zhang	Canada




New Horizons in Biochemistry & Molecular Biology Education


September 6-8, 2017
Weizmann Institute of Science, Rehovot, Israel



www.weizmann.ac.il/conferences/NHBMB2017




International Union of Biochemistry and Molecular Biology



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Federation of European Biochemical Societies



Save The Date

September 6-8, 2017

Another way to think about disease

by Gregory A. Petsko

Arthur J. Mahon Professor of Neurology and Neuroscience and Director, Helen and Robert Appel Alzheimer's Disease Research Institute, Family Brain and Mind Research Institute, Weill Cornell Medical College, Belfer Research Building Room 1030, Mail Box 240, 413 East 69th Street, New York, NY 10021, USA

The National Institutes of Health of the United States, the largest public funder of biomedical research in the world, comprises 27 distinct Institutes and Centers. Each of these has its own mission, reflected in its name and the kind of disease-related research it supports: The National Cancer Institute, the National Eye Institute, the National Heart, Lung and Blood Institute, and so on. Some have broader missions, such as the National Institute of General Medical Sciences, which is charged with supporting basic research in the life sciences, but most have a focus on either a particular disease (cancer, allergy and infectious diseases) or a particular tissue/organ system (eye, digestive and kidney systems). The total NIH research budget is unequally allocated among the various entities, with the National Cancer Institute getting the largest yearly total.

This organization reflects both the historical origins of the NIH and the political pressures brought to bear on the government by powerful individuals (e.g., Mary Lasker) or specific patient constituencies (e.g., HIV/AIDS activists). Although that sounds like a poor way to develop a research funding infrastructure, in a democracy it is not inappropriate for citizens to have some say over how their government spends its money, and for the most part the choices have reflected legitimate societal needs.

But the organization of NIH – and, by extension, the organization of where biomedical research dollars go – also reflects something deeper. It is a mirror of the way academic medical centers themselves are organized and the way medicine is traditionally taught.

Go to most medical schools in the United States and examine both them and their affiliated hospitals and you will find that, like NIH, they have departments of oncology for cancer care and research, neurology for diseases of the brain (except Alzheimer's disease and psychiatric illnesses, which are often treated and studied in psychiatry departments), cardiology departments for heart disease, and so on. They will, of course, also have basic research departments such as biochemistry, genetics, pharmacology, cell biology and neurobiology, but some basic researchers will often have a home in a clinical department (I know of some structural biologists who are based in departments of anatomy, for example, and I have an appointment in Neurology, despite not being a physician). But for physician-scientists and other researchers with a strong disease focus, their academic department will usually be one that is dedicated to research and care associated with that disease, or that organ/tissue.

Superficially, this would seem to be both unsurprising and sensible. It reflects not only the way biomedical research is funded, but also how medical students learn. In most medical curricula, there are cardiac units and renal units and oncology units and so forth, where the biology of the organ/tissue and the diseases that afflict it are studied in

the context of each other. This system has been in effect for about a hundred years. It was the standard of instruction not only in the United States but also in most of the world through the whole of the twentieth century.

Yet I think we would do well to ask whether this organization – Balkanization, if you will – of biomedical research and teaching will serve us as effectively in the twenty-first. It has become almost trite to say that medicine is undergoing a revolution as dramatic as any in its history, but just because it is trite does not mean it is not true. Consider the field of cancer research and treatment, to take just one example. First, the basic cell biology discoveries of the '70s and '80s are now being translated into inhibitors of specific oncogenes that are drivers of tumor proliferation and survival (e.g., Gleevec, which inhibits the Bcr-abl and C-kit protein kinases, and has revolutionized the treatment of many cases of chronic myelogenous leukemia and gastrointestinal stromal cancer, respectively). Note that the same drug is effective against cancers of the blood and cancers of the GI tract, diseases that are usually studied and treated in completely different academic departments.

Even more exciting, perhaps, is the more recent discovery of factors that suppress the adaptive or innate immune responses in host immune cells, such as CTLA-4, PD1, and XBP1. For generations, physicians had dreamed of harnessing the awesome power of the immune system to kill tumors. Yet most attempts to do that by upregulating immunity have ended in failure. It turns out that the key to the problem wasn't stepping on the gas, it was identifying and then releasing the brakes. CTLA-4, PD1, and XBP1 are some of the brakes. More are being found every day, and inhibiting them turns the immune system loose. The result has been the first therapies ever for metastatic melanoma, and the approach is also proving powerful in lung cancers as well. Unquestionably many other cancers can be targeted by this approach, and cancer immunotherapy is now the hottest area of pharmaceutical research. Please note that immunology, which is often combined with microbiology in an academic medical center department, is never traditionally combined with oncology.

And of course much has been made of the fact that we are entering an era of precision medicine (a term I much prefer to "personalized medicine") in cancer treatment. This has been driven not just by readily available genome sequencing (which identifies tumor drivers in individual patients) but also, as I said, by fundamental discoveries in cell biology, biochemistry and immunology – all of which are located in different departments from any cancer department, as well as from each other. Cancer has benefited the most so far, but other diseases will join it in the near future.

The progress that has been made to date would seem to indicate that the traditional disease- and organ/tissue-centric organization of medicine and research is working just fine, but actually I don't think it is. There are two reasons why.

The first, and more important to my mind, is that most significant medical breakthroughs have had their origins in the observations of a scientific-minded, curious, observant physician. The history of medicine is the history of doctors and their patients. As we transition from a focus on

infectious diseases to one of intrinsic problems with human biology such as cancer, neurodegenerative diseases, diabetes and so forth, all diseases that are much harder to find treatments for, those aware physicians need to know more basic biomedical science than ever before.

They also need to understand more than just one disease. One of the most significant recent developments in medicine is the recognition that there are a plethora of comorbidities: that having one disease greatly increases, or in some cases actually decreases, your risk of developing another very different one. That can only be the case if the fundamental pathways and processes that are involved in these diseases are linked. An organ- or disease-centered view of medicine and biomedical research will not give these comorbidities the attention they deserve.

For example, melanoma patients are about six times more likely to develop Parkinson's disease than age-matched controls. The converse is also true: Parkinson's patients have a greatly increased risk of melanoma. Yet Parkinson's patients are, surprisingly, at a lower than normal risk for nearly all other cancers, and survivors of non-melanoma cancers have a reduced risk of Parkinson's. Even more remarkably, Alzheimer's patients are at a reduced risk for nearly all cancers *including* melanoma, and cancer survivors, regardless of how they were treated, experience a significantly lowered risk of developing Alzheimer's.

Another example is the tripartite relationship between Parkinson's disease, hematopoietic cancers, and certain lysosomal storage diseases. Gaucher disease is an autosomal recessive lysosomal storage disease caused by destabilizing mutations in the GBA gene, which codes for glucocerebrosidase. Gaucher carriers have no symptoms of the disease at all, yet they are about seven times more likely than normal controls to develop Parkinson's disease. The biggest genetic risk factor for Parkinson's disease may well be to be a Gaucher carrier. And that is not all: Gaucher patients and carriers have an enormous increased risk of multiple myeloma and B-cell lymphoma, cancers of plasma cells that secrete antibodies. Why these relationships hold is not understood, though some intriguing explanations have been offered.

I could list many others. Diabetes is linked to several other diseases, as are autoimmune diseases such as rheumatoid arthritis. Such comorbidities were typically first recognized by physicians. The importance of training more doctors who can do that is obvious.

But equally obvious, I would claim, is necessity that biomedical researchers be similarly broadly focused, for the potential of a deeper understanding of the mechanisms that link these disorders is likely to lead to novel targets and therapeutic approaches. To take but one example, perhaps our search for a treatment for Parkinson's disease should include the newest targets and treatments for melanoma. To take another, is a treatment for Gaucher disease also a candidate cure for B-cell lymphoma?

Yet, given the way science is taught and funded, finding and exploiting more of these disease linkages looks far from straightforward. Take the cancer researcher who wishes to explore the Alzheimer's inverse comorbidity. To which agency should she go for funding? The National Cancer Institute or the National Institute for Neurologic

Disorders and Stroke? The National Institute of Aging or the National Institute of General Medical Sciences? I would have no idea, and my guess is she wouldn't either. Inter-institute initiatives do take place from time to time, but there are nowhere near enough of them and, like everything else, they are underfunded. And then try to find people who could review such a proposal...

The second reason I believe that our old-fashioned disease- and organ-centered system is serving us less well today than it used to is that it ignores the reality that pathways, processes and molecular targets are often common to more than one disorder, and that the road to new treatment strategies can only be navigated by people who understand that and know how to exploit it.

It is generally accepted that the diseases remaining to be cured present much harder scientific problems than the infectious diseases that were the focus of much of medicine in the 20th century. Innovation in medicine requires innovative thinking, and excessive specialization is not going to foster such thinking as often as we need. The future belongs to the generalists.

Modern biomedical research, at both the basic and clinical levels, needs to move beyond the single disease or single tissue/organ centeredness of the past and embrace a more system-wide view. And this has to start with the training of our physicians and our scientists. In too many academic medical centers the oncologists are in one building and the neurologists are in another and the endocrinologists are elsewhere and so forth. They don't go to each other's seminars and they often don't find opportunities to talk to one another about the work they do or the patients they see. I have no problem with departmental affiliations; they are good for some kinds of community-building and necessary for some of the education we have to do. But think of what could come from having the cancer *researchers* next to the neurodegenerative disease researchers and the cell biologists on the next floor. Think of seminar programs that embrace all departments and that are accessible to anyone in terms of the background information presented. Think of courses in the pathways and processes that are common to more than one disease instead of only those concentrating on a single illness. Some medical colleges are already doing these things (my own, Weill Cornell Medical College, is one). We need many more.

And can we please have more funding programs that cut across the various city-states that make up organizations like the NIH? One of the reasons for the success of the Howard Hughes Medical Institutes and the Wellcome Trust is that they have a very catholic view of the work they support, and they provide a forum where investigators who work on very different systems – and very different ailments – can meet. If we are truly to study the connections between diseases and the molecular phenomena that link them, we need the kind of support mechanisms that promote research, both basic and clinical, that truly has no silos.

Of course, we will undoubtedly find more questions than answers when we think of disease in this way. I suppose we could regard that as job security - if any job is secure these days.

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RETROSPECTIVE

Osamu Hayaishi (1920-2015)

by Shuh Narumiya

Osamu Hayaishi, emeritus professor of Kyoto University, died in December at the age of 95. A leading international figure in biochemistry, Hayaishi discovered oxygenase, ADP-ribosylation and the sleep-inducing action of prostaglandin D₂.

Hayaishi was born on Jan 7, 1920, in Stockton, Calif., where his Japanese father, who had studied medicine in the U.S., ran a clinic. The family moved from California to Germany and then settled in Osaka, Japan, where Hayaishi grew up. He graduated from Osaka University Medical School in 1942, served as a medical officer in the Japanese navy during the war and joined the lab of microbiologist and virologist Tenji Taniguchi at Osaka University.

Living conditions in severely damaged, postwar Osaka were miserable, and the university's laboratory facilities were hopeless. Hayaishi spent much of his time in Taniguchi's employ reading scientific literature until the day he received an unexpected visit from Yashiro Kotake, a biochemist known for his study of tryptophan metabolism in mammals. Kotake gave Hayaishi a bottle of tryptophan purified from casein lysates — a precious gift at the time. Hayaishi had read about an enrichment culture technique to isolate soil bacillus with adapted enzymes for added organic compounds and began culturing

soil samples with tryptophan. He enriched a strain of pseudomonas, which degrades tryptophan completely to carbon dioxide, water and ammonia via kynurenine, anthranilic acid and catechol. He prepared bacterial extracts and found in them an enzyme that catalyzed conversion of catechol to cis,cis-muconic acid as the reaction product. He named it pyrocatechase. Using Warburg's manometer, Hayaishi found a concomitant consumption of equimolar molecular oxygen with the conversion. At this point he suspected that consumed molecular oxygen was incorporated directly to the substrate, but experimental proof of his assumption was

years away.

Hayaishi published his findings in 1949, attracting the attention of David Green at the University of Wisconsin. Green invited Hayaishi to be a postdoctoral fellow, and Hayaishi crossed the Pacific to join him in Madison. Hayaishi spent eight months with Green before moving to the laboratory of Roger Stanier at the University of California, Berkeley. Stanier also studied tryptophan metabolism in pseudomonas, and the two men struggled together in vain to extract tryptophan-metabolizing enzymes. One rainy evening in Berkeley, Hayaishi met National Medal of Science winner H.A. Barker, who advised him to use alumina to grind the bacteria. It worked. Hayaishi was able to extract enzymatic activities that reconstituted metabolism of tryptophan to catechol and consumed molecular oxygen concomitantly. After four months with Stanier, Hayaishi joined the lab of Nobel Prize-winner Arthur Kornberg. Kornberg, whom Hayaishi had first heard speak at a Federation of American Societies for Experimental Biology meeting, had offered him a position before Hayaishi moved to Berkeley. Hayaishi worked with Kornberg at the National Institutes of Health as a postdoctoral fellow and later at Washington University as an assistant professor.



Osamu Hayaishi gives a lecture at the University of Tokyo in 2012. TAKAOSHI MIZO

Appointed chief of the toxicology section of the National Institute of Arthritis and Metabolic Diseases in 1954, Hayaishi led a team that tested his long-held hypothesis on pyrocatechase. Using O-18 isotopes, he found that oxygen atoms incorporated in the product came entirely from O₂ and not at all from H₂O. His discovery and a concurrent independent discovery by Howard Mason

at the University of Oregon Medical School of incorporation of an atom of molecular oxygen into a substrate by mushroom phenolase were milestones in the understanding of how oxygen is utilized in biological systems. Until then, scientists believed that biological oxidation occurred exclusively through the dehydrogenation process that German Nobelist Henrich Wieland had discovered decades earlier. Hayaishi named the group of enzymes catalyzing incorporation of molecular oxygen into organic substrates "oxygenases."

In 1958, Hayaishi returned to Japan and became a professor and chairman of the Department of Medical

Chemistry at Kyoto University Faculty of Medicine. He said of the move, "My salary in Kyoto was one-thirteenth of that (at) NIH. More(over), the experimental facilities were miserably shabby."

As Hayaishi got to work reconstructing the department, a flood of young people eager to learn modern biochemistry joined him. Hayaishi was as gifted a mentor as he was a scientist. He organized a lunchtime seminar where all members in the laboratory gathered and critically discussed papers. Hayaishi called the seminar a dojo and trained those in attendance through serious discussion. He still loved being close to the bench and made a daily round in his laboratory. When writing a paper, Hayaishi invited the authors to his office and carried out several rounds of review by examining the paper's findings and logical flow and correcting his researchers' English word by word.

Hayaishi inspired and trained several hundred people during his 25-year tenure in Kyoto and his several years of joint-appointments at Osaka University and the University of Tokyo. More than 130 of them became university professors or department heads.

Hayaishi and his researchers extensively studied structures and properties of oxygenases and came to a conclusion about the presence of the enzymatically activated form of oxygen in the ternary complex of the enzyme heme-oxygen-substrate. The study of oxygenase initiated by Hayaishi has developed enormously, and we now know that oxygenases are involved in the formation of various bioactive substances, cytochrome P450-catalyzed xenobiotic disposition, and the sensing of oxygen tension.

Hayaishi's study on oxygenase also led him to create new fields of research, including work on ADP-ribose, a discovery derived from his study on the oxygenase-driven tryptophan metabolism to nicotinamide adenine dinucleotide, or NAD, and made in parallel with Paul Mandel at the University of Strasbourg and Takashi Sugimura at the National Cancer Center of Japan. Hayaishi also discovered the diphtheria toxin-catalyzed ADP-ribosylation of aminoacyl transferase 2 and thus clarified the toxin's action mechanism. He was the first to

demonstrate that the bacterial toxin is an enzyme. Hayaishi also discovered indoleamine 2,3-dioxygenase and its induction by interferon, which is now known as one of the major immunosuppression mechanisms.

The last area of Hayaishi's research, sleep induction by PGD₂, began a few years before his retirement from Kyoto University. By characterizing enzymes in PG biosynthesis, Hayaishi found that PGD synthase and PGD₂ are enriched in the brain. He unexpectedly found that intracerebroventricular injection of PGD₂ induced sleep in animals. His subsequent works revealed that PGD₂ acts on its receptor in the leptomeninges surrounding the brain and transmits its signal from there to the sleep-regulation center in the hypothalamus. This mechanism of sleep induction by PGD₂ fascinated Hayaishi. He maintained an active group to pursue the topic and enjoyed discussing it with the lab members up until two years ago, when he fell ill.

Hayaishi retired from Kyoto University in 1983 and founded the Osaka Bioscience Institute. Hayaishi served as the president of the International Union of Biochemistry from 1973 to 1976, received numerous awards and prizes and was a member of several academies, including the U.S. National Academy of Sciences.

The principles discovered by Hayaishi are known now to operate in many physiologically important processes, and the science he created has influenced nearly all areas of bioscience and medicine.

A man of great charm, Hayaishi leaves behind his wife of 69 years, Takiko; their daughter, Mariko; two grandsons and six great-grandchildren. The academic community, his friends, colleagues and students, have lost an inspiring scientist who embodied the spirit of the field.

Shuh Narumiya (snaru@mfour.medkyoto-u.ac.jp) is a professor and the director of Medical Innovation Center of Kyoto University School of Medicine.

Special Discount for Friends of IUBMB to attend the Miami Winter Symposium on Diabetes: The Friends of IUBMB are being offered a unique discount to attend the upcoming Miami Winter Symposium on Diabetes. You will receive a \$50 discount when registering for the meeting - please use the discount code MSW201750 at the following link: <http://www.miamiwintersymposium.com/>. In addition, if you register before November 7 you will save an additional \$100, for a total saving of \$150.



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DIABETES:
TODAY'S RESEARCH TOMORROW'S THERAPIES

JANUARY 22-25, 2017 HYATT REGENCY MIAMI, USA

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OBITUARY

E. C. (Bill) Slater: An Appreciation

by William J. (Bill) Whelan
 Department of Biochemistry and Molecular Biology
 University of Miami
 Miller School of Medicine, Miami, FL



E.C. (Bill) Slater died in March 2016, at the age of 99. Australian by birth, he spent most of his life in Europe. He is survived by his wife Marion, who celebrated her 100th birthday in May.

This is a personal account of the life and times that Bill and I shared together, over fifty years. Other

biographical and autobiographical accounts available are one written by his pupil, Piet Borst, published in these pages (1), another in these pages by Bill (2), on how he became a biochemist, and a magisterial autobiography (3), meticulous in its detail and detachment, in which he is very frank about his own shortcomings.

Reference 2 relates how Bill grew up in Australia, became an organic chemist, was thwarted by World War II in moving to England to gain a Ph.D., became a biochemist, and at war's end went to study with Keilin in Cambridge and became a bioenergeticist. In 1955 he was appointed director of the Laboratory of Physiological Chemistry of the medical faculty at the University of Amsterdam and proceeded to learn the Dutch language.

Bill had a powerful influence on the development of biochemistry in The Netherlands. He brought this fledgling discipline to the forefront and his pupils spread the message. In his role as Editor-in-Chief of *BBA*, he was world renowned and as a scientist he was equally renowned as one of the foremost bioenergeticists of the second half of the twentieth century.

My first connections with Bill were in the 60s when I was the first secretary general of FEBS and Bill a member of the Council of the International Union of Biochemistry (IUB). This brought us into occasional contact, even when I moved to Miami in 1967.

The contact became formal when I became the general secretary of the IUB in 1973. Bill was already the treasurer. We worked together for the six years until Bill stepped down. Together we established *TiBS*, the first, and very successful *Trends* journal, and a source of income and publicity for the IUB. We both later served as presidents of

the Union, Bill serving as (acting) treasurer, for a second time, during my term of office.

In 1979, we embarked on an odyssey that had broad implications for international science. At the end of the cultural revolution, mainland China began to rejoin the scientific unions it had resigned from when they admitted Taiwan. As a condition, the People's Republic of China (PRC) demanded the expulsion of Taiwan, and some other unions began to agree. I received a similar request. It happened that the IUB had changed its definition of member (Adhering Body) so that both the PRC and Taiwan were eligible. This was the basis of our reply to the PRC.

It helped that one of the PRC negotiators was a longtime colleague of Bill's, from their days, 30 years earlier, in Cambridge.

The Taiwanese biochemists were astounded, and deeply suspicious. Bill and I spent what seemed like a fruitless week in Taipei, but on the morning of our departure I noticed the letterhead of one of the academicians, which read, at the end of the address, Taipei, China. I took out a yellow pad, that I still have, and wrote: "For the time being, there will be two Adhering Bodies from China." That was the basis of an ultimate agreement, widely copied by other unions, and the overall union council, ICSU. The full story was published in *TiBS* by Bill and me (4).

Bill's stay in Amsterdam came to an unexpected end when the government retroactively lowered the retirement age for university faculty. In sharp contrast, at precisely the same time the opposite happened in the USA, to my lasting gratitude, where, at the age of 91, I am still at work.

In Bill's case, it decided him to move to England, off the south coast, near the University of Southampton, where he took a position in biochemistry, and remained for several years. That he lived by the water in Lymington, allowed him to sail alone in the Channel in his yacht for days at a time. This article is headed by a photo of Bill in his sailing cap, taken from Ref. (1).

With the death of Bill Slater, we have lost a distinguished, and principled scientist, a scientific statesman, and a dear friend.

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- [3] Slater, E. C. (1997) An Australian biochemist in four countries. *Compr Biochem* 40, 69-135.
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Biochemical Society International Award - Call for Nominations

New for 2018, the International Award will be presented annually and recognizes distinguished and independent interdisciplinary research that illustrates the importance of the molecular biosciences in the advancement of life sciences research. The research should have been conducted outside of the UK and Ireland by a scientist of any nationality. The recipient will be expected to act as an ambassador for the Biochemical Society's international activities. The award aims to recognise the achievements of early to mid-career scientists who are within 20 years of PhD completion.

Nominees that have completed their PhD more than 20 years ago but who have had a career break, e.g., through family commitments, illness or other good reasons, will be considered by the Awards Committee.

The recipient of the award will be invited to deliver a lecture at the 24th IUBMB and 15th FAOBMB Congress in Seoul, Korea, 4-8 June 2018 or at a Society conference. The award winner's travel, accommodation, conference registration and subsistence costs will be covered by the Society. The Award recipient will be invited to submit an article to a Society-owned publication, receive a £2,000 honorarium and certificate.

FEBS Congress 2017:

The Israeli Society for Biochemistry and Molecular Biology is the organizer of the 42nd Congress of the Federation of European Biochemical Societies (FEBS) on September 10-14th, 2017, entitled "From Molecules to Cells and Back". This Congress will be held in the multi-cultural and historical city of Jerusalem at the well-known international convention center "Binyane Hauma". The center is located at the entrance to Jerusalem and is only an hour away in

one direction from Tel Aviv, the city that never sleeps. An hour in the other direction brings you to the famous Dead Sea. Leading researchers in life sciences already confirmed their participation. More information can be found at: <https://2017.febscongress.org/>.

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Puerto Varas, Chile

April 2-6, 2017

Contacts:

Christian González-Billault (chrgonza@uchile.cl),

Carsten Janke (carsten.janke@curie.fr),

Don Arnold (darnold@dornsife.usc.edu)

Molecular Aspects of Aging and Longevity

Athens, Greece

October 16-19, 2017

Contact:

Stathis Gonos (sgonos@eie.gr)

<http://www.iubmb2017aging.org>

Aminoacyl-tRNA Synthetases in Biology

Clearwater Beach, Florida, USA

October 29-November 2, 2017

Contact:

Christopher Francklyn (Christopher.Francklyn@uvm.edu)

www.AARS2017.com





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A simple method for expression and purification of Shiga toxin 1 (Stx1) with biological activities by using a single-promoter vector and native signal peptide, *Biotechnology and Applied Biochemistry*, 10.1002/bab.1398

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The editorial office staff would like to invite you to help **select the next cover of Biochemistry and Molecular Biology Education!**

The cover image will be chosen from five molecular graphics created by Donald Voet with PyMol using PDB files. Please help us by reviewing the images!

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