About Amano’s Symposium on Enzyme Applications

Fifteen years have passed since the inauguration of Amano’s Symposium on Enzyme Applications. Over the years, I have had the honor and pleasure of working with the late Professor Sueharu Horinouchi, selecting awardees, planning symposium programs and organizing the events. During the first few years, we were both inexperienced. We had many people kindly support us while causing them worry and made it through somehow.

There are many symposiums similar to “Amano’s Symposium”. However, “Amano’s Symposium” is unique in various aspects. Firstly, it is sponsored by a private company, which is very rare for symposiums of this kind. Also, this symposium gathers together representatives from both academia and industry. Moreover, we have a multidisciplinary program that covers not only science and technology, but also subjects of the humanities. We select awardees not only on the basis of their achievements, but also in consideration of the application potential of the ideas presented. I believe that these unique characteristics account for the successful continuation of the Symposium.

In the last 15 years, some 70 scientists have been awarded. I am deeply pleased that these research results have led to products and technologies that benefit society, and that the awardees have continued to work actively in their respective fields. The commitment and enthusiasm of one company, Amano Enzyme, as translated into the organization of this unique event, encourage— and I believe will continue to encourage— young researchers in related fields. It is my hope that the Symposium will continue contributing to the

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The 1st Symposium
May 26, 2000

[Special Lecture] Exploration and industrial use of microorganisms as catalysts as catalysts
Hideaki Yamada (Kyoto University)

Award lecture
- The structure and function of quinoprotein glucose dehydrogenase
  Mamoru Yamada (Yamaguchi University)
- Analysis of maturation activation process of thermophilic
  Bacillus TB-90 urease
  Makoto Hidaka (The University of Tokyo)
- Functional analysis of chitin metabolism related enzymes in mycelium
  growth and morphological formation of filamentous fungi
  Hiroyuki Horiiuchi (The University of Tokyo)
- Structure and function studies of aspartate kinase
  Makoto Nishiyama (The University of Tokyo)
- Escherichia coli Gamma-glutamyltransferase from Escherichia coli
  and its application
  Hideyuki Suzuki (Kyoto University)

The 2nd Symposium
June 1, 2001

[Special Lecture] From zymology to biotechnology
Teruhiko Beppu (Nihon University)

Award lecture
- Development of the optically active alcohol production system using
  genetic engineering
  Michihiko Kataoka (Kyoto University)
- New actinomycete cyclic dipeptide dehydrogenase useful for the
  production of bioactive compound
  Hiroshi Kanakai (Okayama University)
- Functional analysis of nitrate reductase for material production and development of
  a promoter for expression of nitrate
  Michihiko Kobayashi (University of Tsukuba)
- Development of enzymes involved in biogenesis of active-form sulfur
  and active-form selenium
  Hisaaki Mitani (Kyoto University)
- Molecular conversion of CO₂ by microbial decarboxylase catalyzing carbon
  fixation
  Toyoko Yoshida (Gifu University)

[Reporting Lecture] Amano New Specialty Enzyme, protein
  glutaminase; possible applications in food industry
  Shotaro Yamaguchi (Amano Enzyme Inc.)

The 3rd Symposium
June 14, 2002

[Special Lecture] Acetic acid bacteria enzyme and its application
Osao Adachi (Yamaguchi University)

Award lecture
- Molecular dissection of transcriptional factor regulating genes of
  carbohydrate metabolism enzymes in filamentous fungi
  Masashi Kato (Niigata University)
- Modification of actinomycete chalcone synthase type polyketide
  synthase
  Yasuo Ohnishi (The University of Tokyo)
- Enzymological research on synthesis and modification of flavonoid in plant
  Toru Nakayama (Tokyo University)
- Improvement of protease functions by pro-sequence engineering.
  Hiroshi Taken (Fukuoka Prefectural University)
- Optimization of production system for biodegradable plastic by using
  enzyme evolution.
  Seichi Taguchi (Meiji University)

[Reporting Lecture] Characteristics of beta-glycosidase from Penicillium
  multicolor and its industrial application
  Kazutaka Tsurumaki (Amano Enzyme Inc.)

The 4th Symposium
June 6, 2003

[Special Lecture] From microbial enzymes to functional proteins
Hidehiko Kumagai (Kyoto University)

Award lecture
- Improvement of quinoprotein alcohol dehydrogenase based on the
  three-dimensional structure
  Hirohide Toya (Yamaguchi University)
- Elucidation of aldolase metabolite pathway in microbe and its
  application to organic synthesis
  Yasuo Kato (Toyama Prefectural University)
- Genome-based drug discovery using glycopolysphosphodiester
  phosphodiesters in microbes
  Noriyuki Yanaka (Kochi University)
- Structural and functional analysis of anti-tumor enzyme L-methionine
  gamma-lase and its application to cancer treatment
  Kenji Inagaki (Okayama University)
- Activity control of epidermal transglutaminase
  (protein cross-linking enzyme) and its application
  Kyotaka Hikomi (Niigata University)

[Reporting Lecture] Utilization of microbial enzymes in pharmaceutical
  intermediate manufacturing and future prospects
  Yoshihiko Hirose (Amano Enzyme Inc.)
This year marks the 15th anniversary of the inauguration of the Amano’s Symposium on Enzyme Applications, which commenced in 2000. On this occasion, we would like to present the scientists who received the awards at each of the past Symposia along with the titles of the work awarded, as well as the speakers’ names and titles of the Special Lectures.

**Symposium**

**The 5th Symposium**
June 11, 2004

[Special Lecture] New dawn of food processing, transglutaminase
Noriki Nio (Ajinomoto Co., Inc.)
Hiromu Kusui (Ajinomoto Co., Inc.)
Kohichi Umeda (Amano Enzyme Inc.)

**Award Lecture**
- Fundamental analysis of enzymes involved in N-substituted formamide metabolism and their application to the production of useful substances
  Yosuke Harada (University of Tsukuba)
- Application of pigment-dependent dehydrogenase from hyperthermophilic bacterium to electrode sensor
  Haruhiko Sakuraba (The University of Tokyo)
- Discovery of new physiologically functions of secretory phospholipase A2 and analysis of its molecular mechanism
  Manabu Arioka (University of Tokyo)
- Enzyme production system employing methanol-induced gene expression in yeast and its molecular basis
  Yasuyoshi Sakai (Kyoto University)
- Constructing highly efficient system for synthesizing fine chemicals using bioprocess of asymmetric reduction
  Nobuya Ito (Toyama Prefectural University)

**The 6th Symposium**
June 10, 2005

[Special Lecture] Cell-free transcription/translation system – improvement in efficiency and its application to protein engineering
Tsuneo Yamane (Chubu University)

**Award Lecture**
- An investigative method to improve enzymes applicable to material conversion
  Kimitaka Isobe (Iwate University)
- Development of functional anaerobic microorganisms as catalysts for functional lipid production
  Jun Ogawa (Kyoto University)
- Analysis of heat-resistant chitin metabolism system in thermophilic bacteria
  Toshiaki Fukui (Tokyo Institute of Technology)
- Synthesis of new glycosides using multifunctional glycoside transferase
  Shigeyuki Kawai (Kyoto University)

**The 7th Symposium**
June 9, 2006

[Special Lecture] Manufacture of yeast extract by using enzymes
Yoshiki Aoyagi (Kohjin Co., Ltd.)

**Award Lecture**
- Development of salinity-tolerant glutaminase from Aspergillus oryzae
  Kazuki Yoshimura (National Institute of Advanced Industrial Science and Technology)
- Functional analysis of PLP-dependent dehydratases and its application to material production
  Masaru Wada (Hokkaido University)
- Elucidation of solid structure and reaction mechanism of isopululanase
  Takashi Tomozuka (Tokyo University of Agriculture and Technology)
- Generation of artificial heme enzyme containing functional synthetic heme to obtain highly active oxidizing catalyst
  Takashi Hayashi (Osaka University)
- Improvement of cell-free protein synthesis system and its application to protein engineering
  Hideo Nakano (Nagoya University)

**The 8th Symposium**
June 13, 2007

[Special Lecture] Manufacture of functional oils and fats by enzymatic interesterification with lipase
Haruyasu Kida (Fuji Oil Co., Ltd.)

**Award Lecture**
- An investigation of collagen-degrading enzymes produced by thermophilic bacteria for material recycle
  Kunihiko Watanabe (Kyoto Prefectural University)
- Elucidating the structure and functions of fatty acid desaturase genes in oilseed and its application to the production of useful oils
  Eiji Sakuradani (Kyoto University)
- Enzymes related to D-amino acid metabolism: structure, function and application
  Toshio Yoshimura (Nagoya University)
- Analysis and functional modification of non-ribosomal peptide synthase
  Masaki Morikawa (Hokkaido University)
- Construction of artificial enzyme with organometallic complex by supramolecular assemblies of protein and metal complex catalyst
  Takafumi Ueno (Nagoya University)

**The 9th Symposium**
June 17, 2008

[Special Lecture] Current situation and future prospects of enzymatic saccharification of cellulotic biomass
Yasushi Morikawa (Nagasaki University of Technology)

**Award Lecture**
- Structural analysis of oxidative modification protein - the molecular mechanisms of oxidative stress -
  Sohei Ito (University of Shizuoka)
- Cell-free synthesis and functional analysis of cytotoxic enzyme of bacteriophage
  Nobutaka Hirano (Niigata University)
- Regulation of formaldehyde-fixing enzyme gene expression and development of application of its catalytic function
  Hiroya Yurimoto (Kyoto University)
- Development of heat-tolerant yeast producing thermostable cellulase
  Hisanori Tamaki (Kagoshima University)
- Development of enzymatic biofuel cells
  Seiya Tsujimura (Kyoto University)

[Reporting Lecture] Moving Japanese Enzymes to the US Dietary Supplement Market - Importance of New Clinical Research and Scientific Data -
Setsuko Omaeda Jolly (Amano Enzyme USA Co., Ltd.)
Symposium

Amano’s 15th Symposium on Enzyme Applications
On Holding the Amano’s 15th Symposium on Enzyme Applications

Congratulations

Sixteen years ago, President Motoyuki Amano of Amano Enzyme Inc. told me about his plan to start a symposium focusing on applied research on enzymes. I expressed my support and asked him to continue the symposium, once it had begun, for a long time, even though it had to be on a small scale. Recalling this exchange and now seeing the symposium reaching its 15th year, I feel very happy and would like to offer my congratulations to Amano Enzyme Inc. on reaching this milestone. I would also like to express my gratitude to the company for its generous support for the research community. Research and development concerning the basics and application of enzymes is now entering a new phase. I sincerely hope that the Symposium will continue making progress in the future as an expression of our will to lead the world in this field.

Tetsuhiko Beppu, Professor Emeritus, The University of Tokyo

The 10th Symposium
June 2, 2009

[Special Lecture] Jokichi Takamine, Father of Biotechnology
Yutaka Yamamoto, (The Jokichi Takamine Research Foundation)

[Special Lecture] Lively and freely, Nagoya culture
Bunkichi Yasuda (Nanzan University)

[Special Lecture] Production of useful proteins using koji-mold
- fluorescent bio-imaging analysis to development of production hosts
Katsuhiko Kitamoto (The University of Tokyo)

Award lecture

» Sophisticated control of methanol metabolism by alcohol oxidase (AOD) isozymes and its application to mass-production systems of useful enzyme
Tomoyuki Nakagawa (Gifu University)

» Elucidation of the molecular structure of flavin enzyme involved in biosynthesis of lipid in archaea membrane and its application
Hisashi Hemmi (Nagoya University)

» Functional modification of phospholipase D from actinomycete
Yugo Iwasaki (Nagoya University)

» Strain improvement of filamentous fungus \( \text{Trichoderma reesei} \) toward the creation of bio-refinery industry
Watana Ogasawara (Nagoya University of Technology)

» Characteristics of chimeric enzyme of hemicelulose side chain-degrading enzyme and arabinose bonding module from koji-mold
Takuya Koseki (Yamagata University)

The 11th Symposium
June 11, 2010

[Special Lecture] Biodiversity Convention COP 10 AICHE-NAGOYA
Toshio Kojima (Aoyama Gakuin University/Institute for Global Environmental Strategies)

[Special Lecture] Applied glycocience and its related industry
Keiji Kainuma (Kyushu University)

Award lecture

» Functional regulation of plant polyketide synthase and development of new supranatural biocatalyst
Hiroyuki Morita (The University of Tokyo)

» Functional analysis of aminglycoside antibiotic biosynthesys and its application
Fumita Kudo (Tokyo Institute of Technology)

» Functional modification of sphingolipid for its advanced use
Nozomu Okino (Kyushu University)

» Elucidation of highly reactive peptide sequence of transglutaminase (protein cross-linking enzyme) and its utilization
Kiyotaka Hitomi (Nagoya University)

» Fundamental and applied research for the structure, function, and activity regulation of amino acid biosynthesis
Makoto Nishiyama (The University of Tokyo)

[Reporting Lecture] Development of microbial beta-amylose
Masamichi Okada (Amano Enzyme Inc.)

The 12th Symposium
June 10, 2011

[Special Lecture] Enzymes in the theories of food functions and taste perception
Keiko Abe (The University of Tokyo)

[Special Lecture] Current situation and future prospects of enzyme Industry in China
Chen Jian (Jiangnan University, China)

Award lecture

» Elucidation of the substrate specificity of arabinoalactan protein degrading enzyme
Satoshi Kaneko (National Agriculture and Food Research Organization)

» Development of highly versatile dipeptide synthesis method using peptidase containing aminolysis catalytic activity
Jiro Arima (Tottori University)

» Construction of fatty acid conversion technology using novel microbial enzymes
Shigenobu Kishino (Kyoto University)

» Genomic data-based explorative research on polyketide synthase and its application to material production
Nobutaka Funabiki (University of Shizuoka)

» Re-design of redox metabolism in amino acid-producing bacterium by using unique glycolysis enzyme of Streptococcus mutans
Masato Ikeda (Shinshu University)

The 13th Symposium
June 9, 2012

[Special Lecture] A novel application world by enzymes – health maintenance with oligosaccharide producing enzymes –
Makoto Sasaki (Aichi Medical University)

[Special Lecture] Exploration of microorganisms as resources in Asia and its utilization
Part I : Utilization of overseas bio-resources and the Convention on Biological Diversity
Katsuhiko Ando (National Institute of Technology and Evaluation)

Part II : Before and after the International Collaboration in Inventory and Sustainable Use of Microbes in Indonesia
Puspita Lisdianti (Biotechnology, Indonesian Institute of Science (LP3I))

Part III : Exploring microorganisms from fermented milk in Mongolia, and the action toward its utilization
Gentaro Yasuda (Calpis Co., Ltd.)

Part IV : Panel discussion
Moderator : Katsuhiko Ando

Award lecture

» Functional analysis of unique oxidizing enzymes from Mycobacterium and its application
Toshiki Furuya (Waseda University)

» Construction of a functional oligosaccharide library using novel phospholipase
Hirokuni Nakai (Niigata University)

» Analysis of novel enzymes involved in coenzyme biosynthesis and its application
Tohru Dairi (Hokkaido University)

» Dynamic analysis of crystalline cellulose degrading enzyme and improvement in efficiency of cellulose biomass conversion
Kiyohiko Igarashi (The University of Tokyo)

» Construction of a microbial biosynthesis system for biodegradable plastic using untapped resources in combination with exploration of novel enzyme
Miwa Yamada (Iwate University)
I would like to offer Amino Enzyme Inc. my sincere congratulations on the holding of the 15th Amano’s Symposium on Enzyme Applications. I am very grateful for the Symposium and the great encouragement it has given me for my research: an award for my research at its second symposium and again with a special commendation at its 10th symposium. The Amano’s Symposium on Enzyme Applications is highly significant for researchers, not only for commendation based on achievements, but also for the opportunity to obtain research funding. I hope that the Symposium will continue for many years to come.

Michiko Kataoka
Professor, Graduate School of Life and Environmental Sciences, Osaka Prefecture University

The Symposium on Enzyme Applications, which we of Amano Enzyme Inc. inaugurated in 2000 to commemorate the company’s centennial, has reached its 15th year. I would like to take this opportunity to express my deepest gratitude to all who have participated in the Symposiums over the years, for their generous support, which has made these Symposiums possible.

In 2000, the inaugural year of the Symposium, Japan’s economy was about to enter the low-growth phase following the long period of prosperity that had continued since the post-war rapid economic development. Worldwide problems of food supply, energy depletion and environmental destruction also began to draw serious attention, and human society has since embarked on a quest for more sustainable and recycling-oriented development. Under such circumstances, expectations for biotechnology continue to grow, year after year.

Since old times, Japan has had the fortunate tradition of using koji mold for making sake, soy sauce and miso (soy bean paste), and of using diverse microbe resources, thanks to the country’s climate of high temperature and humidity, and seasonal changes.

For this year’s Symposium, we have received many reports of outstanding research achievements. Following fair and impartial selection, five scientists have been chosen, whose authors will receive awards and deliver their lectures at the Symposium.

To commemorate the 15th Symposium, a milestone, we are also presenting an award to a researcher from the medical field. For this selection, we have received cooperation from Dr. Tadashi Takeuchi, Professor Emeritus of Tokyo Women’s Medical University. As you know, in the medical field, enzyme replacement therapy is being used to promote digestion and absorption in patients with pancreatic diseases. We sincerely hope that enzymological research will make further progress in this field as well.

It has been over 60 years now, that Amano Enzyme Inc. has been in the enzyme business. During this period, as we have pursued our enzyme-related activities, we have cherished, and been enriched by, the Japanese cultural tradition of living in harmony with nature. We sincerely hope that the Symposium will greatly help spread the use of enzymes and eventually contribute to finding solutions to some of the common problems confronting human society.

Motoyuki Amano, President, Amano Enzyme Inc.