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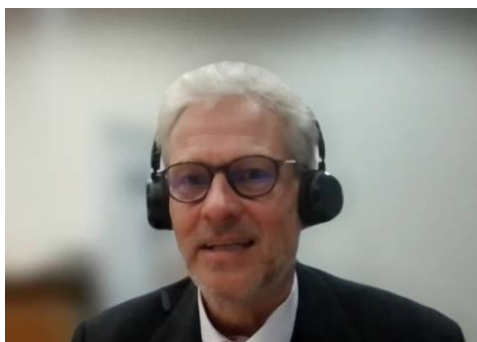
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日本国際医学協会誌

**INTERNATIONAL MEDICAL NEWS**

**International Medical Society of Japan**

**Since 1925**



**第 62 回 国際治療談話会総会  
がんと糖尿病のゲノム医学の進歩**



**No. 515**  
**2023. January**



# The 62nd International Congress on Therapy

## Advances in Genomic Medicine for Cancer and Diabetes

Opening remarks: **Koichi Ito, MD, PhD** (Managing director, IMSJ)

Congratulatory remarks:

**Kichiro Matsumoto, MD** (President, Japan Medical Association)

Discourse Chair : **Georg K. Löer** (Advisory Board Member, IMSJ)

**Discourse: Outlook G7: Japanese-German-partnership in terms of Global Health**

**Timotheus Felder-Roussety** (Counsellor for Labour and Health Affairs, Embassy of the Federal Republic of Germany Tokyo)

**Advances in Genomic Medicine for Cancer and Diabetes**

Medical Lectures Chair : **Koichi Ito, MD, PhD** (Managing director, IMSJ)

**Taro Kondo, MD, PhD** (Managing director, IMSJ)

**Lecture I: Future perspectives on cancer genomic medicine**

**Hitoshi Nakagama M.D.,D.M.Sc**

(President, National Cancer Center Japan)

**Lecture II: Progress in Genome Medicine in Diabetes**

**Takashi Kadowaki MD,PhD**

(President, Federation of National Public Service Personnel Mutual Aid Associations TORANOMON HOSPITAL)

Closing remarks: **Kenichi Ishibashi, MD, PhD** (Chairman, Board of Directors, IMSJ)



# INTERNATIONAL MEDICAL NEWS

**International Medical Society of Japan  
Since 1925**

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## Opening Remarks

Koichi Ito MD, PhD  
Managing director, IMSJ

## Congratulatory message

Kichiro Matsumoto, MD  
President,  
Japan Medical Association

I would like to make a few remarks to congratulate the opening of the 62nd International Congress on Therapy on behalf of the Japan Medical Association.

The COVID-19 that began about three years ago has spread throughout the world, and the situation still remains unpredictable. However, countries are beginning to relax movement restrictions, and society is gradually moving toward living with COVID.

Factors behind these changes include not only the thoroughness of infection prevention measures taken by the public and the strenuous efforts of healthcare workers in the medical practice, but also the development, transportation, and administration of vaccines on a global scale as well as the development and spreading of treatment methods and therapeutic drugs. In other words, we are slowly regaining our daily lives because countries of the world combined efforts in the face of the COVID disaster.

The Japan Medical Association keeps international contribution of medicine in mind, and works to promote global health as the main axis of international activities by enhancing collaboration with the World Medical Association (WMA), the Confederation of Medical Associations in Asia and Oceania (CMAAO), and national medical associations as well as relevant ministries and agencies and international organizations.

In August of this year, we co-hosted the COVID-19 Symposium on Holistic Health Care in a New Era online with the Korean Medical Association, the Indian Medical Association, and the Taiwan Medical Association. In September, CMAAO held its general assembly as a hybrid meeting of both local and online, in which the Takemi Memorial Oration on Healthcare in COVID-19 Pandemic was presented and the CMAAO Karachi Statement on Health Care in COVID-19 Pandemic was adopted. In addition, in October, WMA held the general assembly in Berlin, where the WMA International Code of Medical Ethics (Revised) was adopted.

The Japan Medical Association will continue to cooperate with other national medical associations and healthcare professionals including physicians and work on global health activities including the COVID-19 response.

I believe that, by combining the wisdom of mankind, the day will come when we overcome pathogens including COVID-19 as well as diseases such as cancer and diabetes that are the theme of today's lectures. To realize it, research on new medicine such as genome medicine is essential. The opportunity today to access the latest research outcomes on medicine, medical practice, and public health will greatly contribute to the improvement and development of medical practice, healthcare, and welfare in Japan and overseas, and I hope such activities will continue for years to come.

Last but not least, I would like to express my sincere wishes for the success of this congress, for continuing growth of the International Medical Society of Japan, and for the good health of all attendees. Thank you.

## **Grußbotschaft**



Jürgen Kessing  
Oberbürgermeister der Stadt Bietigheim-Bissingen

Sehr geehrte Damen und Herren,

dem 62. Internationalen Therapiekongress der Internationalen Medizinischen Gesellschaft sende ich im Namen der Stadt Bietigheim-Bissingen, ihrer Bürgerschaft wie auch persönlich die besten Grüße. Die Vorträge werden auch in diesem Jahr wieder zu wegweisenden Erkenntnissen der Medizin und Wissenschaft in Praxis und Lehre der japanischen Heilkunst beitragen und für einen erfolgreichen Erfahrungsaustausch sorgen.

Als Partnerstadt von Kusatsu in Japan sind wir der Internationalen Medizinischen Gesellschaft Japans über ihren ehemaligen Präsidenten, Professor Dr. Choei Ishibashi, wie auch über Ihren heutigen Vorsitzenden, Dr. Kenichi Ishibashi, sehr herzlich verbunden. Die Partnerschaft geht zurück auf Dr. Erwin von Bälz, der sich als Arzt, Kunstfreund und Liebhaber der japanischen Kultur im ausgehenden 19. Jahrhundert und zu Beginn des 20. Jahrhunderts in Japan wie in Deutschland einen großen Namen gemacht hat. Die freundschaftlichen Beziehungen wurden maßgeblich angeregt und in ihren Anfangsjahren getragen von Professor Dr. Choei Ishibashi, der für seine Verdienste im Jahre 1962 zum geehrten Bürger unserer Stadt Bietigheim-Bissingen ernannt wurde. Die Partnerschaft besteht seit nunmehr 60 Jahren und leistet auch heute noch einen wichtigen Beitrag zur Vermittlung der Kulturen unserer beiden Nationen an die Jugend sowie zum Aufbau beiderseitiger Freundschaften und zur Stärkung des Verständnisses für die japanischdeutschen Interessen. Bis heute fühlen sich die Partnerstädte Kusatsu und Bietigheim-Bissingen dem Erbe von Dr. Erwin von Bälz verpflichtet, dem es vor allem am Herzen lag, die Menschen, unabhängig von ihrem Stand, ihrer Herkunft, ihrer Religion oder Nationalität zu verstehen, zu helfen und zu stärken. Erwin von Bälz hat vor allem auf dem Gebiet der Medizin Brücken geschlagen zwischen Japan und Deutschland, aber auch zwischen der Kunst und Kultur beider Völker.

Heute gibt es enge Kooperationen zwischen unseren Ländern, sowohl im wissenschaftlichen Austausch wie auch auf der Ebene von Studenten und natürlich im wirtschaftlichen Bereich.

Unser großer Sohn, Erwin von Bälz, hat uns gezeigt, welcher Fortschritt mit einem offenen Blick auf die Menschen und die Verhältnisse, in denen sie leben, erzielt werden kann. Wir können ähnliches erreichen, wenn wir weiterhin offen an die Dinge herangehen, wenn wir uns damit auseinandersetzen, wie der Alltag in anderen Ländern bewältigt wird. Deshalb ist es auch wichtig, dass wir die Begegnungen zwischen den Bürgern unserer Stadt fördern, der jungen Generation die Aufgabe der Völkerverständigung vermitteln und damit einen Beitrag für den Frieden in der Welt leisten.

In diesem Sinne wünsche ich der Internationalen Medizinischen Gesellschaft Japans weiterhin erfolgreiches Wirken und einen guten Verlauf der diesjährigen Tagung. Die Stadt Bietigheim-Bissingen wird ihren Freunden in Japan stets eng verbunden bleiben.

Mit freundlichen Grüßen



Jürgen Kessing

Oberbürgermeister

## Grußbotschaft



Markus Baier  
Bürgermeister der Alten Hansestadt Lemgo

Sehr geehrter Herr Dr. Kenichi Ishibashi,  
sehr geehrte Damen und Herren der Internationalen  
Medizinischen Gesellschaft Japans,

dem 62. Internationalen Therapiekongress der Internationalen Medizinischen Gesellschaft Japans sende ich auch im Namen von Rat und Verwaltung der Alten Hansestadt Lemgo meine herzlichsten Grüße. Außerdem wünsche ich dem Kongress "Fortschritte der Genommedizin für Krebs und Diabetes" im Online-Format einen guten Verlauf.

Die Verbundenheit mit Japan ist uns sehr wichtig! Engelbert Kaempfer hat einst die Länder zusammengeführt und mit Stolz kann ich berichten, dass in einem Ortsteil von Lemgo ein Gedenkstein eingeweiht worden ist, der an den Geburtsort von Engelbert Kaempfer erinnert. Weiterhin hatte ich die große Ehre den japanischen Generalkonsul, Herrn Kiminori Iwama im Rathaus der Alten Hansestadt Lemgo begrüßen zu dürfen.

Unsere Länder vereint ein großer kultureller Reichtum aber vor allem gemeinsame demokratische Werte. In einer von Krisen geplagten Welt sind diese sehr bedeutend. Die Freiheit der Wissenschaft und die Völkerverständigung gehören besonders dazu.

Es wäre uns daher eine große Freude, Sie Herr Dr. Ishibashi und eine Delegation der Internationalen Medizinischen Gesellschaft Japans in naher Zukunft in unserer schönen Stadt begrüßen zu dürfen.

**Mit freundlichen Grüßen**  
**Ihr**

A handwritten signature in blue ink that reads "M. Baier". The signature is written in a cursive, flowing style.

Markus Baier  
Bürgermeister der Alten Hansestadt Lemgo

## Grußbotschaft



Dr. Frank Mentrup  
Oberbürgermeister der Stadt Karlsruhe

Der Internationalen Medizinischen Gesellschaft Japans übermittle ich zu ihrem 62. Internationalen Therapiekongress im Namen der Stadt Karlsruhe, ihres Gemeinderats und ihrer Bürgerinnen und Bürger und auch ganz persönlich die besten Wünsche. Ein weiteres Mal wird in diesem Jahr der Kongress als reine Onlineveranstaltung mit Web-Vorträgen aus Japan und Deutschland stattfinden. Das Thema des Therapiekongresses in diesem Jahr lautet „Fortschritte der Genommedizin für Krebs und Diabetes“ – widmet sich also der Bekämpfung der verbreitetsten Krankheiten auf unserer Welt.

Ihre intensiven Beziehungen zur Stadt Karlsruhe freuen mich ebenso wie die engen Bande, die es zwischen der deutschen und der japanischen Medizin seit langem gibt. Dafür stehen namhafte Ärzte wie Dr. Erwin von Bälz und Dr. Engelbert Kämpfer. Der ehemalige Präsident der Internationalen Medizinischen Gesellschaft Japans, Professor Dr. Choei Ishibashi, hat sich, ebenso wie später sein Sohn Chosei und heute sein Enkel Dr. Kenichi Ishibashi, stets aktiv für die guten Beziehungen zwischen den Medizinerinnen und Medizinern Japans und denen der Fächerstadt eingesetzt. Ich wünsche mir daher sehr, dass diese Tradition wieder fortgesetzt werden kann.

Denn hier bei uns in Karlsruhe sind japanische Lebensart und Kultur in vielfacher Weise präsent. Dies ist vor allem das Verdienst der sehr engagierten Deutsch-Japanischen Gesellschaft in der Fächerstadt, die sich mit großem Erfolg für Verständnis und Freundschaft zwischen Deutschland und Japan sowie für die Förderung kultureller und wissenschaftlicher Beziehungen einsetzt. Seit 1994 ist die Deutsch-Japanische Gesellschaft Patin des Japangartens im Karlsruher Zoologischen Stadtgarten, dessen Geschichte auf das Jahr 1914 zurückgeht, als ein Karlsruher Arzt eine Steinleuchte und verschiedene Samen aus Japan mitgebracht hatte. Mit seiner Pagode, seinem Steinlöwen, dem Shinto-Schrein und vor allem dem im Jahr 2018 neu erbauten Teehaus verströmt der Garten das Flair des - für uns – „Exotischen“. Der Gang durch das rote „Torii“ führt mit einem Schritt in eine andere Welt. Gleichzeitig ist der Japanische Garten für die Karlsruherinnen und Karlsruher – fast wie selbstverständlich – ein Stück Ur-Karlsruhe. Dieser unaufgeregte Umgang mit dem Anderen, diese harmonische Integration des vermeintlich Fremden spiegeln die weltoffene Atmosphäre wider und die Neugier auf Neues, die unsere Stadt seit jeher auszeichnet.

Ich wünsche der Internationalen Medizinischen Gesellschaft Japans für die Zukunft viel Erfolg und dem 62. Internationalen Therapiekongress einen erfolgreichen Verlauf und gute Ergebnisse.

A handwritten signature in black ink that reads "Frank Mentrup". The signature is written in a cursive, slightly stylized script.

Dr. Frank Mentrup  
Oberbürgermeister

## **Congratulatory Telegram**

Kenro Hori MD  
President, Japan Dentist Association

Please accept our sincere congratulations on the success of the 62nd International Congress on Therapy. We truly wish further development of your Society and the health of your members.

Nobuo Yamamoto MD  
President, Japan Pharmaceutical Association

I'm delighted that the 62nd International Congress on Therapy is such a grand event.

Through events and lectures such as these, your association contributes to both the improvement of health care in Japan and the development of international medical exchange as well. I truly respect everything you do.

I hope your association will continue to prosper and grow.

## **Introduction of speaker of discourse**

Georg K. Löer  
Advisory Board Member, IMSJ

## **Discourse**

### **Outlook G7: Japanese-German-partnership in terms of Global Health**

Timotheus Felder-Roussety  
Counsellor for Labour and Health Affairs  
Embassy of the Federal Republic of Germany Tokyo

## **Global health from the perspective of the German Federal Government**

The right of every human being to the highest attainable standard of physical and mental health is a core human right. Health is one of the greatest goods of all people and an essential prerequisite for individual, social, economic and political development and stability.

In a globally networked world, the effects of health – both positive and negative – are amplified even more. Health must therefore be thought of globally and can only be ensured and improved through joint global action.



The topic of global health has become increasingly important both in Germany and internationally in recent years. Global health and its security are part of the global order. The COVID-19 pandemic has once again highlighted the many ramifications associated with a global health crisis.

The health and resulting humanitarian and socio-economic consequences affect all areas of life. Health is not only a prerequisite for prosperity, social cohesion and participation in society, but also the result and indicator of the social, economic and ecological dimensions of sustainable development.

Almost all of the agreed sustainability goals of the 2030 Agenda have an important connection to health. Global health is an example of the need for multi-stakeholder and multi-sectoral approaches, as well as international and multilateral collaboration.

Promoting and protecting the health of the population are central tasks for governments, both in their own country and as part of their international commitments.

The Global Health Strategy is a commitment by the Federal Government to global health policy and to achieving the health-related sustainability goals and in particular SDG 3: "To ensure a healthy life for all people of all ages and to promote their well-being". On the 7<sup>th</sup> of October 2020, the German Federal Government adopted the German Strategy for Global Health. Under the leadership of the Federal Ministry of Health, the strategy was developed in consultation with all federal ministries and in dialogue with non-governmental actors. "Responsibility - Innovation - Partnership: Shaping Global Health Together" is the motto of the strategy as the challenges of global health require political leadership, new approaches and cooperation at all levels. The strategy is not about repositioning Germany in global health policy. It is about focusing our long-standing commitment against the backdrop of new challenges. The implementation of this strategy will fit into the budgetary and financial policy guidelines of the federal government.

The federal government's priorities in terms of global health include:

- Promote health and prevention
- mitigate the health impacts of climate change
- Strengthen health systems and enable universal health coverage with non-discriminatory access for all
- Ensure health protection, including protection against epidemics and pandemics, and continued engagement in humanitarian health assistance
- Advance research and innovation for global health

Acting in partnership and strengthening alliances and forums at national, international and multilateral level is essential.

The aim here is to strengthen multilateralism and further develop the global health architecture with the WHO playing a central leading and coordinating role

Developing regional partnerships plays an important role. The global health architecture Germany envisions should be

- o better coordinated,
- o based on clear mandates of global actors,
- o avoiding duplication,
- o based on a strengthened coordination through an enabled WHO,
- o ensuring efficiency, transparency, inclusivity, coherence and equity,

As an influential member of the European Union and the G-formats, Germany can help shape global processes for the benefit of global health and the global health architecture. Health is a central theme of the German G7 Presidency this year. In the health track, the focus is on protecting people from future pandemics, antibiotic resistance and climate change.

The guiding principles of people, planet, prosperity, peace and partnership (People, Planet, Prosperity, Peace, Partnership – “5 Ps”) and the premise “Leave no one behind” precede the goals of the 2030 Agenda.

Global protection and promotion of human rights is the guiding idea and these, including the right to the highest attainable standard of health, must be protected. And the aim of the Federal Government's work in the field of global health is to ensure that the human right to the highest possible level of health can be realized more and more effectively. As with all other economic, social and cultural rights, states are obliged to promote the full realization of the law (principle of progression). This should also be done through international aid and cooperation.

-Particular attention is paid to promoting gender equality, supporting women and girls, protecting sexual and reproductive health and rights and combating physical, psychological and sexualized violence, as well as reducing stigma, moral judgments or even criminalization affecting the safe Making protection against diseases more difficult for particularly vulnerable groups. The Federal Government is also committed to an approach based on human rights when it comes to global health protection.

This includes a commitment to protecting humanitarian workers and healthcare workers. Because of the indivisibility and interdependence of human rights, a holistic approach must be taken. Health, social and economic development, security and stability are inextricably linked. The interactions between different policy areas and sectors need to be actively addressed and managed across the board with a “Health in All Policies” approach. Care is taken to ensure that no unwanted side effects arise (“do no harm”) and that structures are created and maintained that are resilient and can withstand the demands of the future.

The "One Health" approach is the appropriate approach here, as it pursues a cross-sectoral, integrative management of health risks. The focus here is on the complex relationships between the health of humans and animals and the protection of the environment, which are viewed from an interdisciplinary perspective.

Considering the human-animal-environment interface is particularly important to understand the causes of health risks and the health impacts of climate change and to take effective measures to prevent pandemics, prevent antimicrobial resistance (AMR), contain neglected and poverty-related tropical diseases and improve food safety develop.

## Introductory Message from the Chair

Taro Kondo MD, PhD  
Managing director, IMSJ

ectures on Medicine

### Lecture I

#### Future Perspectives for Cancer Genomic Medicine in Japan

Hitoshi Nakagama M.D.,D.M.Sc  
President  
National Cancer Center Japan

Cancer is now considered a national disease, and currently 65.0% of men and 50.2% of women of the Japanese people will develop cancer in their lifetime. The 5-year relative survival rate for cancer has been improving year by year, and the latest data show that the 5-year survival rate for all cancers is 64.1%. However, some types of cancer such as pancreato-biliary tract cancer, still have insufficient survival rate. To solve this problem, it is important to develop effective and efficient therapies based on an understanding of the biological nature of cancer.

Cancer is considered to develop by the multistep accumulation of multiple genomic mutations. In the 2000s, the development of cancer drugs has been driven by the development of molecular-targeted drugs that suppress the function of proteins encoded by such mutated genes. The National Cancer Center has conducted two projects since 2013 toward the realization of cancer genomic medicine. The SCRUM-Japan project was launched to accelerate clinical trials in collaboration with pharmaceutical companies and more than 200 medical institutions, and the TOP-GEAR project to prove the feasibility of cancer genomic medicine at the hospital levels. The TOP-GEAR project developed the first approved cancer gene panel (CGP) test in Japan and the CGP test was decided to be covered by the national health insurance in June, 2019.

Currently, three CGP tests are approved and covered by national health insurance in Japan, and more than 40,000 cases of genomic data have already been accumulated at the C-CAT (Center for Cancer Genomics and Advanced Therapeutics) along with clinical data, and more than 30 research groups, including pharmaceutical companies, have started using the data for the purpose of academic research and development of drugs, medical equipment and so forth. The activation of the use of C-CAT data is expected to further deepen basic research and develop variety of medical seeds. In addition, an attempt to expand this genome medical system to an international collaborative framework has recently been initiated with Southeast Asian countries. With the support of the AMED, our Center has launched the Asian Clinical Trials Network for Cancer (ATLAS) project since September, 2000.

Finally, I would like to mention the future development of whole genome cancer medicine. By promoting whole genome sequence analysis for cancer cases, a high-quality and versatile genome information database will be constructed. The further development of cancer genomic medicine will lead to the development of a new medical platform for cancer treatment. We look forward to the establishment of a new medical care delivery system in Japan through the further development of cancer genomic medicine.

## Lecture II

### A Review of Advances in Genomic Medicine for Diabetes

Takashi Kadowaki MD  
TORANOMON HOSPITAL

Type 2 diabetes is a disease characterized by chronic persistent hyperglycemia, which is not only likely to lead to the onset of specific complications, i.e., retinopathy, nephropathy, and neuropathy, but to promote atherosclerosis accounting for sequelae such as stroke and myocardial infarction. In this regard, a better understanding of the genetic factors involved in type 2 diabetes is thought likely to lead to an elucidation of its mechanisms of onset thereby contributing to the development of its preventive or therapeutic modalities.

#### 1. Etiology of type 2 diabetes—characteristics of type 2 diabetes in Japanese and Asians

Genetic factors are assumed to be responsible for the onset of diabetes in 50% of the cases, and environmental factors are also assumed to be responsible for its onset in another 50%, with the main thing being obesity associated with overeating, high-fat diet, and lack of exercise. On the other hand, type 2 diabetes is shown to develop only in Westerners with marked obesity but to develop in Japanese or Asians with mild obesity. While the disease onset in the latter has thus been explained in terms of a genetic disposition among these populations toward lower pancreatic  $\beta$ -cell insulin secretion, the genetic factors involved had remained largely unclear until recently.

#### 2. Identification of type 2 diabetes susceptibility gene loci in Japanese and Asians

Since the human genome sequencing in 2001, genome-wide association studies (GWAS) in type 2 diabetes have led to numerous type 2 diabetes susceptibility gene loci being identified not only in Westerners but in Japanese and Asians. However, many of these loci were found to be common across various ethnic groups, the reason being that, of the close to 30 million human single nucleotide polymorphisms (SNPs), those made available for analysis then remained limited to those common to diverse ethnic groups. Against a background of rapid advances in genome research, however, the author and colleagues successfully identified a total of 20 type 2 susceptibility gene loci specific to the Japanese population in 2019 by analyzing the 12 million SNPs made available, including many specific to Japanese and Asians, in a study of 36,614 patients with type 2 diabetes and 155,150 control subjects, in collaboration with researchers from BioBank Japan, Tohoku Medical MegaBank Organization, and the JPHC and J-MICC studies. The 20 gene loci thus identified included those involved in pancreatic  $\beta$ -cell gene expression as well as in the regulation of insulin secretion (1). In 2020, as part of an international study, the author and colleagues conducted a meta-analysis of pooled data from 23 GWASs conducted to date in East Asian populations including Japanese, accounting for a total of 77,418 type 2 diabetic patients and 356,122 control subjects. Of note, this led to a total of 61 novel gene loci associated with diabetes being identified as being common to East Asians (2), including fibroblast growth factor receptor 2 (FGFR2) and nidogen 2 (NID2) associated with lipodystrophy and body fat distribution, among those found correlated with type 2 diabetes in East Asians but not in Westerners, suggesting that they may be associated, via visceral fat accumulation, with increased risk of type 2 diabetes in East Asians. Additionally, aldehyde dehydrogenase 2 (ALDH2) was shown in this study to be a major locus strongly associated with the onset of type 2 diabetes in men alone.

#### 3. Identification of individuals at high risk of type 2 diabetes and prevention of type 2 diabetes in these individuals

Thus, efforts are currently underway to identify individuals at high risk of type 2 diabetes and thereby provide

an impetus for the development of effective and efficient preventive measures for these individuals, based on the information available from the type 2 diabetes susceptibility gene loci thus far identified. Of these, a polygenic risk score (PRS) is drawing the greatest attention as a viable approach based on calculation of a sum of genome-wide genotypes weighted by corresponding genotype effect sizes for numerous SNPs derived from GWAS data ranging from hundreds to millions. Of note, this approach is bringing within reach the promise of predicting the risks for multifactorial diseases, including type 2 diabetes, with similar precision to diseases determined by a single gene. Indeed, using some 80,000 SNPs from GWAS data in Japanese, thus far the author and colleagues have been able to construct an RPS that helps predict the risk for type 2 diabetes in the Japanese population, in contrast to its Western counterpart, which is shown to have failed to predict the risk for type 2 diabetes in the Japanese population.

In the coming years, the focus will be placed on investigating the preventive effects of risk-stratified lifestyle intervention against type 2 diabetes. Following this will be efforts focused on further increasing the predictive ability of the PRS, predicting the differing pathophysiology of type 2 diabetes, thereby helping establish efficient, effective preventive measures against onset of type 2 diabetes. In the event that a highly predictive PRS has become established and available for clinical use, however, care needs to be given to ensuring ethical and legal provisions against the unreasonable discrimination or detrimental treatment of individuals undergoing PRS evaluations.

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1. Suzuki K, et al. Identification of 28 new susceptibility loci for type 2 diabetes in the Japanese population. *Nature Genet.* 2019;51:379-286.
2. Spracklen CN, et al. Identification of type 2 diabetes loci in 433,540 East Asian individuals. *Nature.* 2020;582:240-245.

## Closing Remarks

Kenichi Ishibashi, MD, PhD  
Chairman, Board of Directors, IMS