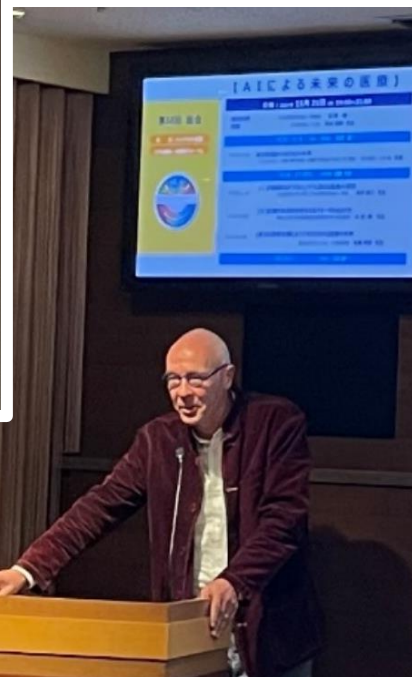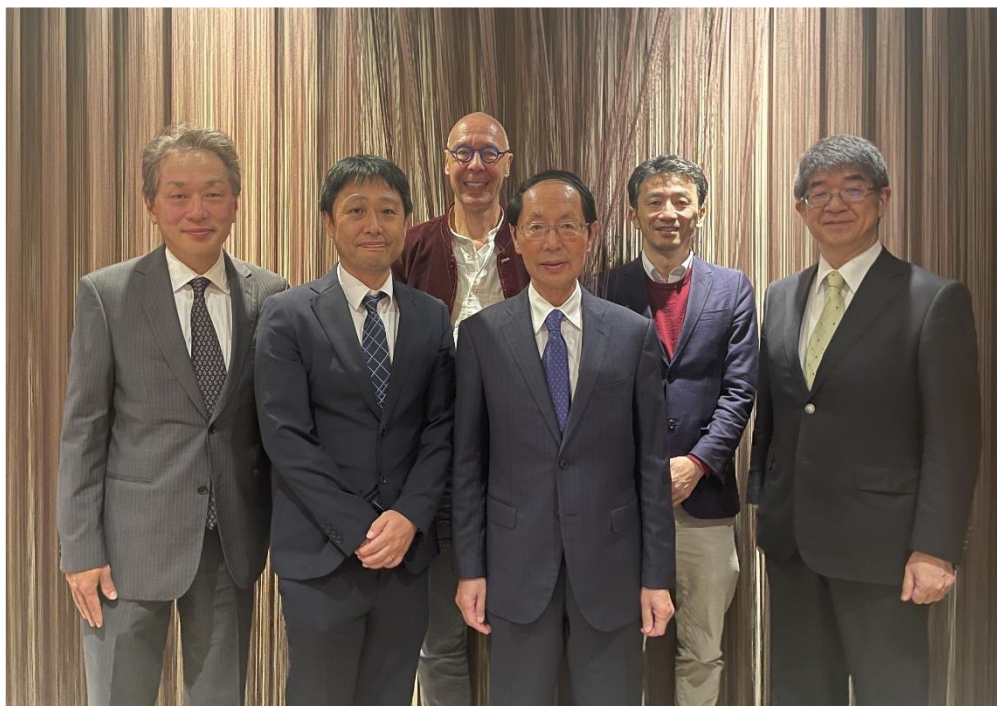公益財団法人
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INTERNATIONAL MEDICAL NEWS
International Medical Society of Japan
Since 1925

第 64 回 国際治療談話会総会
AI による未来の医療

The 64th International Congress on Therapy

Future medical care with AI

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

Congratulatory remarks: **Kichiro Matsumoto, MD** (President, Japan Medical Association)

Discourse Chair ： **Kenichi Ishibashi, MD, PhD** (Chairman, Board of Directors, IMSJ)

Discourse:

The future of AI from the perspective of the stock market

Jesper Koll

(Board of Governors, Okinawa Institute of Science and Technology)

Future medical care with AI

Medical Lectures Chair ： **Taro Kondo, MD** (Managing director, IMSJ)

Lecture I:

Medical AI Research in the Cabinet Office's SIP Project

Ryozo Nagai, MD, PhD

(President, Jichi Medical University)

Lecture II:

The Power of Multimodal AI in Shaping the Future of Medicine

Satoshi Kotera

(Lecturer, Department of Cardiovascular Medicine, The University of Tokyo Hospital)

Lecture Ⅲ:

The Future of Healthcare Enabled by AI Clinical Decision Support

Hisahiko Sato, MD, MBA, MSC, Ph.D.

(Representative director, Precision., Ltd.)

Closing remarks ： **Taro Kondo, MD** (Managing director, IMSJ)

Opening Remarks

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

Congratulatory message

Kichiro Matsumoto, MD
President, Japan Medical Association

On behalf of the Japan Medical Association (JMA), I am honored to extend my heartfelt congratulations on the occasion of the 64th International Congress on Therapy.

The JMA is deeply committed to advancing global health and contributing to the medical field worldwide. To achieve this, we continuously strive to strengthen partnerships with the World Medical Association (WMA), the Confederation of

Medical Associations in Asia and Oceania (CMAAO), and other national medical associations, as well as with relevant ministries, agencies, and international organizations.

In response to the Noto Peninsula Earthquake in January, the Taiwan Medical Association generously contributed 10 million yen in relief funds. Later, following the earthquake in Eastern Taiwan this April, the JMA mobilized its members and the public for support, resulting in over 85 million yen in donations for the Taiwan Medical Association. This spirit of cross-border mutual support is essential, particularly in times of crisis.

During the WMA Seoul Council meeting in April, a series of emergency resolutions were adopted, addressing urgent issues. These included the WMA Council Resolution on the Protection of Healthcare in Israel and Gaza, which calls for a bilateral, negotiated and sustainable ceasefire to enable humanitarian aid for all those in need; the resolution on proposed legislation in the UK concerning the treatment of migrants; the resolution calling for the withdrawal of the bill concerning female genital mutilation in Gambia; and the resolution addressing anti-LGBTQ legislation in Uganda.

In August, the CMAAO Manila General Assembly adopted the "CMAAO Manila Declaration on Strengthening the Role of Women in the Healthcare Workforce."

Furthermore, the WMA Helsinki General Assembly in October adopted the revised Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Participants, and the WMA Resolution on Plastics and Health as an urgent matter.

This year's congress theme, "The Future of Medicine with AI," underscores the challenges involved in integrating AI into medical practice. Physicians have a social duty to engage in discussions on how best to advance AI technology and utilize it effectively.

The JMA Journal, our English-language online journal published in collaboration with the Japanese Association of Medical Sciences, achieved its first journal impact factor this year. As a comprehensive general medical journal covering all fields of medicine and healthcare, including clinical and basic medicine as well as public health, we are dedicated to continually enhancing its quality. We aim for it to be

an invaluable source of information for healthcare professionals and researchers worldwide, including those gathered here today.

In closing, I extend my best wishes for the success of this congress, the continued growth of the International Medical Society of Japan, and the health and professional achievements of all attendees.

Congratulatory Telegram

Hideto Takahashi MD
President, Japan Dentist Association

Susumu Iwatsuki
President, Japan Pharmaceutical Association

Introductory Message from the Chair

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

</div>

Discourse

The future of AI from the perspective of the stock market

<div align="right">

Jesper Koll
Board of Governors,
Okinawa Institute of Science and Technology)

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Lecture I

Medical AI Research in the Cabinet Office's SIP Project

Ryozo Nagai, MD, PhD
President, Jichi Medical University

The third SIP project, "Building an Integrated Healthcare System," began research and development activities in 2023, focusing on five sub-projects. The primary goal is to create a cyclical system that seamlessly integrates medical knowledge discovery and healthcare provision, leveraging the potential of healthcare digital twins. SIP employs a mission-based methodology, encompassing everything from research and development to societal implementation, ensuring practical and impactful results.

The advent of generative AI technologies like ChatGPT in late 2022 has been hailed as a transformative innovation with societal impacts comparable to the Industrial Revolution. This breakthrough has triggered a global race to develop and deploy such technologies. While large-scale language models (LLMs) primarily process text, significant advancements are also being made in large-scale multimodal models (LMMs), capable of handling diverse data types, such as images and audio. For Japan, accelerating the development and adoption of generative AI is crucial to strengthening its international industrial competitiveness and enhancing the quality of life of its citizens.

In the realm of healthcare, generative AI holds immense promise. Its capabilities can revolutionize the medical data cycle, including data collection, standardization, processing, analysis, and application of results in clinical practice. These tools can drive efficiency, support innovation, and address diverse applications such as medical treatment support, health administration, and clinical research. The technology's potential to

reshape Japan's healthcare landscape makes it a key focus for national innovation.

Japan is well-positioned to lead in this area due to its comprehensive medical data collection infrastructure supported by the national health insurance system. Efforts to standardize medical information as part of digital transformation initiatives provide a strong foundation for developing high-precision generative AI models tailored to the healthcare sector. However, despite these advantages, Japan's generative AI research, development, and commercialization efforts in the medical domain remain nascent. To maximize the potential of generative AI, it is essential to align these technologies with Japan's unique healthcare systems and practices.

The "Building an Integrated Healthcare System" project has already made strides in standardizing medical data collection and linking numerical data with unstructured data, such as medical terminology. Significant progress has been achieved in developing AI systems for creating structured medical documents, including standardizing medical terminology and structuring clinical documents. These advancements lay a critical foundation for the next phase of medical AI development.

Despite these achievements, there is a pressing need for more advanced research and systems to fully utilize generative AI's capabilities. For example, specialized LLMs could assist in writing medical records and examination reports, while LMMs could be used to draft radiology reports and predict treatment plans or patient prognoses. Relying on foreign generative AI systems for such sensitive applications raises concerns about data security, industrial competitiveness, and sustainability. To ensure long-term public value and maintain control over its healthcare innovations, Japan must develop its own generative AI solutions tailored to its specific needs.

To address these challenges, the SIP project is advancing the

development of medical-specific LLMs and LMMs. The objective is to implement generative AI across various fields, such as medical treatment support, health administration, and clinical research. This includes converting medical information into standardized formats and streamlining medical operations as part of Japan's broader digital transformation in healthcare. Additionally, the project aims to establish solutions that facilitate research, application, and deployment of medical LLMs and LMMs while building a medical data infrastructure to ensure the continuous availability of high-quality data for sustainable AI development. Another key goal is nurturing young professionals who can drive innovation in the field of medical AI.

The project is structured around four key themes:

1.   Theme 1: Research, development, and implementation of medical LLM infrastructure.
2.   Theme 2: Research, development, and implementation of medical LMM infrastructure.
3.   Theme 3: Development of solutions and applications using LLMs and LMMs.
4.   Theme 4: Building a robust medical data infrastructure and defining operational methods. In theme 4, efforts include standardizing the collection, processing, and storage of data for training AI models and creating a sustainable framework for using domestic medical data. These activities are critical for fostering Japan's technological independence in the healthcare sector.

Following project selection in spring 2023, research and development commenced in summer 2023. Through these initiatives, the SIP project aims to transform Japan's healthcare landscape by integrating generative AI, promoting technological innovation, and improving the quality and efficiency of medical services.

Lecture Ⅱ

The Power of Multimodal AI in Shaping the Future of Medicine

Satoshi Kotera
Lecturer,
Department of Cardiovascular Medicine,
The University of Tokyo Hospital

The rapid evolution of AI technology has revolutionized the medical field. Deep learning, which gained prominence during the third AI boom, has showcased exceptional capabilities in processing unstructured data such as images and audio. This breakthrough has driven remarkable improvements in diagnostic support and data analysis. Now, in the fourth AI boom, versatile foundational models are accelerating the practical implementation of medical AI. This lecture covered the core principles of AI, the latest trends, and the innovative efforts at the Department of Cardiovascular Medicine, the University of Tokyo.

The emergence of deep learning marked a pivotal point in AI's evolution. By employing neural networks to process vast datasets and extract key features, deep learning has addressed challenges previously deemed insurmountable. For instance, AI applied to chest X-ray interpretation can now accurately distinguish between normal and abnormal findings. These models, built with multilayered neural networks, automatically identify features in abnormal regions, significantly enhancing diagnostic accuracy and reinforcing AI's utility in clinical settings. This lecture delved into the underlying mechanisms of these technologies and their applications in healthcare.

In the current fourth AI boom, foundational models are at the forefront. Trained on massive datasets, these models are highly adaptable to diverse tasks. For example, Google's medical language models, Med-PaLM and Med-Gemini, excel in diagnostics and information retrieval and

are expected to assist physicians in various clinical scenarios. In Japan, under the leadership of Dr. Nagai and the Cabinet Office's SIP research program, development has begun on large-scale multimodal models (LMMs) tailored for medical use. These models integrate diverse data types, including ECGs, chest X-rays, and blood tests, to achieve superior diagnostic and predictive accuracy. This lecture examined both global and domestic advancements in this cutting-edge field.

The Department of Cardiovascular Medicine at the University of Tokyo is actively pursuing diverse AI applications to harness their full potential in healthcare. One prominent example is an ECG-based model for detecting reduced left ventricular systolic function, which employs Masked Autoencoder (MAE) technology for efficient and accurate learning. Additionally, a multimodal AI combining ECG, chest X-ray, and blood test data has significantly improved the diagnostic accuracy for pulmonary hypertension. The department has also developed advanced chest X-ray models using evolutionary algorithms to integrate multiple models efficiently, resulting in high-performance diagnostic tools. These initiatives position the department as a leader in diagnostic support and predictive analytics through AI. This lecture highlighted these accomplishments and their technological foundations.

Advances in AI are enhancing diagnostic and predictive capabilities in medicine. The rise of foundational models and multimodal AI during the fourth AI boom presents critical solutions to challenges in clinical practice. This lecture explored the evolution of medical AI, from the basics of deep learning to cutting-edge innovations and research at the University of Tokyo, illustrating its transformative impact on healthcare efficiency and quality. Future progress in this field holds immense promise.
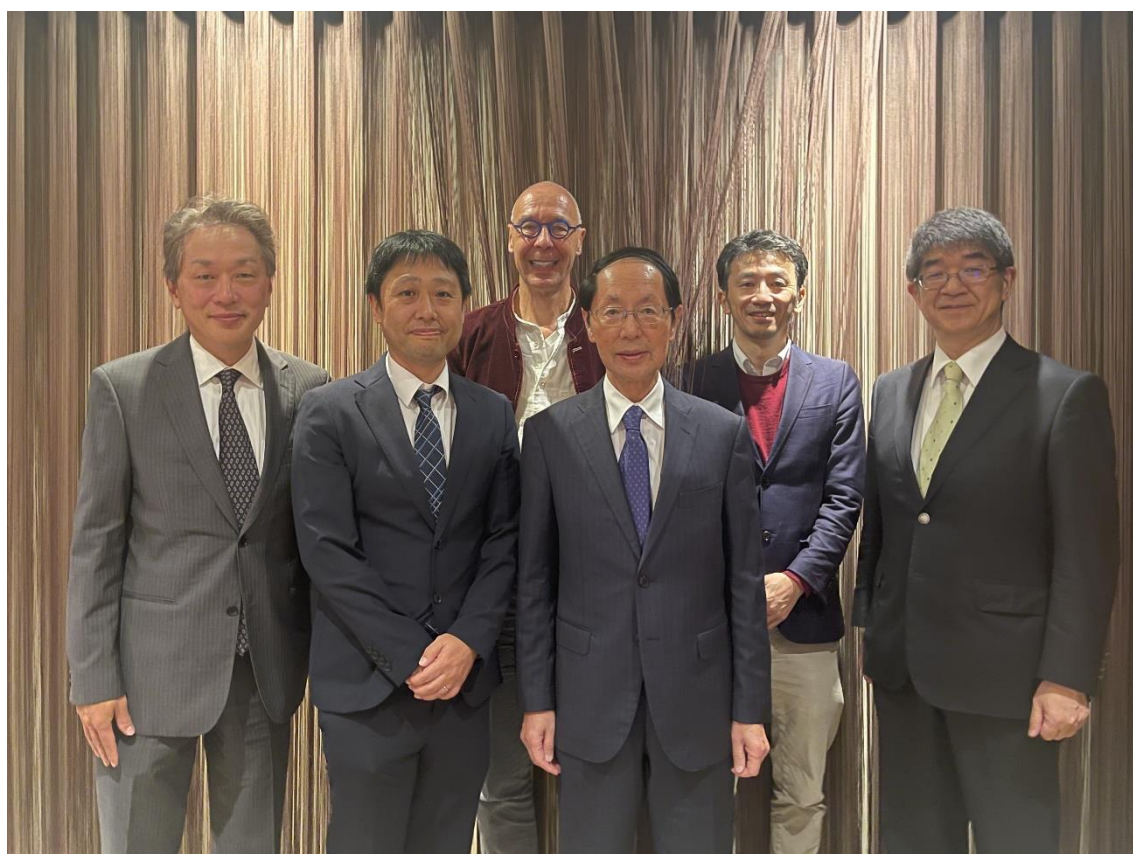
Lecture Ⅲ

The Future of Healthcare Enabled by AI Clinical Decision Support

Hisahiko Sato, MD, MBA, MSC, Ph.D.
Representative Director, Precision., Ltd.

Closing Remarks

Taro Kondo, MD
Managing director, IMSJ

第６４回総会開催にあたりまして多大なご寄付を賜りました。
ご関係各位に改めて御礼申しあげます。

法人（２４社）

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