Original Article

A report of the 17th congress of the Japanese Society for Regenerative Medicine

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A B S T R A C T

The 17th Congress of the Japanese Society for Regenerative Medicine was held on March 21–23, 2018 at PACIFICO Yokohama (Kanagawa Prefecture) with 3860 participants. The theme of the congress was ‘The Integration of Wisdom from All Sectors.’ With this theme, this congress aimed to provide people from all sectors (including individuals from various industries, regulatory authorities, academia, and citizens) with opportunities for exchanging views on regenerative medicine under one roof. A broad spectrum of topics related to regenerative medicine was covered by one presidential lecture, one keynote lecture, one collaborative lecture by the Congress Chair and the Governor of Kanagawa Prefecture, three special lectures (six topics), four award lectures, 43 symposia (235 talks), 337 oral presentations (59 sessions), 358 poster presentations (43 sessions), 25 co-organized seminars (35 talks), two sessions for junior high school and high school students (basic and advanced), and the state-of-the-art technology showcase (158 organizations).

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1. Objectives

The theme of the 17th Congress of the Japanese Society for Regenerative Medicine was ‘The Integration of Wisdom from All Sectors.’ This congress aimed to provide individuals from all relevant sectors — including industry representatives, regulatory authorities, academics, and citizens — with opportunities for exchanging views on regenerative medicine under one roof.

In general, there are various obstacles to applying new technologies to medicine, and the applications of more innovative technologies encounter larger and more numerous obstacles. Here is an example of conventional research and development (R&D): A patient with an intractable disease, longing for new strategies that can cure the disease, anticipates the development of such therapeutic strategies. A researcher who has developed a new technology believes that the (seed) technology can answer that patient’s need and hopes that some companies will soon apply the technology to clinical settings. In contrast, companies are reluctant to work on clinical implementations of new technology because of its risk; regulatory authorities are even more reluctant to review new products, when no evaluation criteria have been set.

Thus, the conventional R&D lacks the concrete cooperation of all the stakeholders including patients, doctors, researchers, industries, regulatory authorities, and more. This results, in a sense, in ‘relay-type’ collaborations between academia and industries. After one sector hands over the baton to another sector, the former sector often does not care about what the latter subsequently does; the batons are often dropped. To avoid this situation, we need a platform for ‘concurrent-type’ collaborations, where all of the sectors (stakeholders) are involved from the early stage of the R&D. Such a platform would diminish discrepancies between needs and seeds, generate a strong synergy between all of the sectors, and even turn one sector’s difficulties into another sector’s opportunities, and thereby reduce the cost and time for the industrialization of the products.

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We definitely need such an ‘open innovation platform’ to realize the industrialization of regenerative medicine, which is the most challenging medical technology. The Japanese Society for Regenerative Medicine is expected to take a lead in creating such a platform now more than ever; it will connect and involve people with various interests from all of the sectors in a transparent manner, and help them move forward hand-in-hand. The 17th Congress of the Japanese Society for Regenerative Medicine was designed to provide opportunities to contribute to an open innovation platform through lectures, symposia, scientific presentations, seminars, showcases, and personal interactions among stakeholders.

2. Participants

There were 3860 participants in total. The congress had 3624 participants in the scientific sessions. The breakdown of the participants are as follows: 1796 general members, 258 graduate student members, 1324 non-members (1192 general and 132 graduate students), 142 junior-high-school, high-school, and undergraduate students, and 104 invitees. In addition, 236 students, teachers, and guardians joined the sessions for junior-high-school and high-school students (basic course, 107 students; advanced course, 34 students).

3. Lectures

The congress offered one presidential lecture, one keynote lecture, one collaborative lecture by the Congress Chair and the Governor of Kanagawa Prefecture, and three special lectures.

As the president of the Japanese Society for Regenerative Medicine (JSRM), Dr. Yoshiki Sawa (Osaka University) delivered the presidential lecture entitled ‘Developing Regenerative Medicine Universally’ (Chairperson: Dr. Tsuyoshi Takato, JR Tokyo General Hospital). The lecture reviewed the efforts that the JSRM has made over the last five years in bringing domestic legislation on regenerative medicine to fruition. Dr. Sawa also provided an overview of the on-going project commissioned by the Japan Academy for Medical Research and Development (AMED), ‘Formulation of Regenerative Medicine National Consortium Which Renders Nation-wide Assistance to Clinical Researches.’ The project consists of the following three pillars, which will contribute to ‘Developing Regenerative Medicine Universally’: (1) technical support for regenerative medicine clinical researches, (2) the development of human resources for regenerative medicine, and (3) the management and operation of regenerative medicine clinical research data systems.

The keynote lecture was delivered by Dr. Toshiharu Furukawa, a member of the House of Councilors, Professor of Keio University, and Attorney-at-law at TMI Associates (Chairperson: Dr. Yoshiki Sawa, JSRM President, Osaka University). Dr. Furukawa’s lecture, entitled ‘Future of the Regenerative Medicine in Difficult Japanese Economic Situation’ summarized the perspectives on the future of regenerative medicine, given the current status and future prediction of the economy and medical care cost, the progressive aging of the population, and legislation enacted or improved for regenerative medicine in Japan.

The Congress Chair Dr. Ung-il Chung/Yuichi Tei (The University of Tokyo) and the Governor of Kanagawa Prefecture Mr. Yuji Kuroiwa delivered a collaborative lecture. Dr. Tei first gave a lecture entitled ‘The Integration of Wisdom from All Sectors: The Construction of an Open-innovation Platform.’ He pointed out the drawbacks of conventional ‘relay-type’ collaborations in the development and application of medical technology, proposing ‘concurrent-type’ collaborations based on open-innovation platforms, on which people with various interests from all of the sectors are connected and involved in a transparent manner, acting together hand-in-hand. In his lecture entitled ‘Kanagawa Vision for Industrialization on the Regenerative Medicine Field,’ Governor Kuroiwa then overviewed ‘Healthcare New Frontier Policy’ that the Kanagawa Prefectural Government has been developing in order to extend its citizens’ healthy life expectancy and create new markets and industries. The policy integrates two approaches: (1) improvement of ME-BYO, a new concept that the individuals’ mental and physical conditions change continuously between healthy and sick states, and (2) the promotion of the social implementations of advanced medical technologies.

Three special lectures included ‘Toward Social Implementation of Regenerative Medicine: Activities of Supporting Organizations’ chaired by Dr. Yoshiki Sawa (JSRM President, Osaka University), ‘KSSCR Presidential Session’ chaired by Dr. Yoshiki Sawa, and ‘Joint Session with TERMIS: Overview of TERMIS and TERMIS-AP Activities’ chaired by Dr. Yasuhiko Tabata (Kyoto University). ‘Toward Social Implementation of Regenerative Medicine: Activities of Supporting Organizations’ provided the following four topics: ‘State of the Industry’ from Dr. Robert Preti (Alliance for Regenerative Medicine; Hitachi Chemical Advanced Therapeutics Solutions; Himahi Chemical Regenerative Medicine Business, Hitachi Chemical, Japan); ‘Academic Nation-wide Platform Which Delivers Regenerative Medicine to Bedside’ from Dr. Yoshiki Sawa, ‘UK Cell and Gene Therapy toward Commercialization’ from Dr. Hidetoshi Hosoya (Cell and Gene Therapy Catapult, UK), and ‘CCRM: A Collaborative Public/private Partnership Driving Commercialization in Regenerative Medicine’ from Dr. Mitchel Sivilotti (Centre for Commercialization of Regenerative Medicine, Canada). In the ‘KSSCR Presidential Session,’ Dr. Youngsook Son (President of the Korean Society for Stem Cell Research; Department of Genetic Engineering and Graduate School of Biotechnology, Kyung Hee University; Institute of Regenerative Medicine, Kyung Hee University Hospital, Seoul, Korea) delivered the lecture entitled ‘Trafficking of Endogenous Stem Cells for Tissue Repair.’ In the ‘Joint Session with TERMIS: Overview of TERMIS and TERMIS-AP Activities,’ Dr. Gilson Khang (TERMIS Global Chair-Elect) summarized the history of the Tissue Engineering and Regenerative Medicine International Society (TERMIS) and the activities of TERMIS-AP (Asia-Pacific Chapter).

4. The award lectures

The winners of the two JSRM Research Awards (clinical field and basic field), the JSRM Achievement Award, and the JSRM Johnson Innovation Award gave short lectures about their achievements. The JSRM Research Awards were presented to Dr. Makoto Ikeda (Kyoto University) and Dr. Jun Takahashi (Kyoto University). The JSRM Achievement Award was presented to Dr. Mitsuo Ochi (Hirosima University). The JSRM Johnson & Johnson Innovation Award was presented to Dr. Ryuji Kato (Nagoya University).

5. The symposia

The Congress offered 43 concurrent symposia (235 talks in total) including two joint symposia with the Consortium for the Advancement of Animal Regenerative Medicine and the Japan Research Association for Immunotherapeutics. The titles, organizers, and members of the symposia are listed in Table 1. The symposia covered a broad spectrum of topics related to regenerative medicine: cutting-edge findings in stem cell biology, biotechnology, bioinformatics, and medicine; regenerative therapies and medical devices currently under development; the results and perspectives of clinically available products; regenerative therapies...
| No. | Title                                                                 | Organizer #1                                      | Organizer #2                                      |
|-----|----------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| 1   | Application of regenerative therapy in musculoskeletal system        | Norimasa Nakamura (Osaka Health Science University) | Ichiro Sekiya (Tokyo Medical and Dental University) |
| 2   | Regeneration of liver: from mechanism analysis to therapy development| Goshi Shiota (Tottori University)                 | Yutaka Inagaki (Tokai University)                 |
| 3   | New way for the construction of human 3D tissue                      | Koichi Nakayama (Saga University)                 | Shin Enosawa (Keio University)                    |
| 4   | Perspective on regenerative medicine based on the core system for organismeal homostasis | Hayato Kaneda (Shiga University of Medical Science) | Yo Mabuchi (Tokyo Medical and Dental University) |
| 5   | Progress and future perspective in cardiac regeneration             | Keiichi Fukuda (Keio University)                 | Yuiu Shiba (Shinshu University)                  |
| 6   | The forefront of periodontal regeneration therapy                    | Masahiro Saito (Tohoku University)               | Shinya Murakami (Osaka University)                |
| 7   | Cutting Edge in in-Body Tissue Architecture (iBTA) 2018             | Yasuhide Nakayama (National Cerebral and Cardiovascular Center) | Ryuji Higashita (Yokohama General Hospital) |
| 8   | Biomaterial-Based Tissue Engineering                                 | Takamasa Sakai (University of Tokyo)             | Taichi Ito (University of Tokyo)                 |
| 9   | Application of data science to regenerative medicine                 | Kohji Nishida (Osaka University)                 | Tosio Inaba (Osaka Prefecture University)        |
| 10  | Joint Symposium with Consortium for Advancement of Animal Regenerative Medicine: Current situation and future prospects in collaboration of industry, government and academia for development of animal regenerative medicine | Takafumi Hamaoka (Research Institute for Animal Science in Biochemistry and Toxicology) | |
| 11  | Regenerative medical application of genomic editing technology       | Akitsu Hotta (Kyoto University)                  | Erika Sasaki (Central Institute for Experimental Animals/Keio University) |
| 12  | Regenerative medical application of genomic editing technology       | Kazumi Kawahara (Laboratory of Repetitive facilitating exercise) | Louis Yuge (Hiroshima University)                 |
| 13  | Impact of mechanical stimuli in regenerative medicine: Mechanobiology and mechanotherapy | Rei Ogawa (Nippon Medical School)                | Masahiro Sokabe (Nagoya University)              |
| 14  | Elucidation of the mechanism of homoeostasis and regeneration of skeletal muscle toward establishment of regenerative therapy for muscular dystrophies | Hidetoshi Sakurai (Kyoto University)              | Yoko Miyagoe-Suzuki (National Center of Neurology and Psychiatry) |
| 15  | How do we operate cell processing facility in academia and in industry? -Current status and an issue to be resolved- | Tomohiro Morio (Tokyo Medical and Dental University) | Katsunori Tsuichiya (Dai Nippon Printing Co., Ltd.) |
| 16  | Update summary of the analysis for the effect of mesenchymal stem cell. | Shuji Terai (Niigata University)                 | Shigeru Miyagawa (Osaka University)               |
| 17  | Contribution of ceramic biomaterials in tissue engineering field     | Kunio Ishikawa (Kyushu University)                | Osamu Suzuki (Tohoku University)                 |
| 18  | Efficient process for stem cell culture                              | Yasuuki Sakai (University of Tokyo)              | Masahiro Kono-oka (Osaka University)             |
| 19  | Regenerative therapy based on biomimetics; endogenous stem cells and exosomes | Takahiro Ochiya (National Cancer Center Research Institute) | Mari Dezawa (Tohoku University)                  |
| 20  | Regenerative therapy in plastic and reconstructive surgery           | Takashi Nakatsu (Saitama Medical University)     | Kazuo Kishi (Keio University)                     |
| 21  | Preservation and banking of the products (human iP-S, a stem cell, a cell sheet, and a living body tissue, etc) for regenerative medicine | Shokyu Gen (Suong-Hyu Hyon) (Kyoto Institute of Technology) | Hiroshi Nagashima (Meiji University)             |
| 22  | Japan-Korea Young Joint Symposium: Fusion of Biomaterials and Tissue Engineering for Regenerative Medicine | Michiya Matsusaki (Osaka University)            | Takuya Matsumoto (Okayama University)            |
| 23  | Basic and Clinic Researches in Veterinary Regenerative Medicine - Application for Small and Large Animal Practice, Stockbreeding, and Animal Protection | Ryohei Nishimura (University of Tokyo)           | Shingo Hatoya (Osaka Prefecture University)      |
| 24  | Next generation Informatics for regenerative medicine                | Jun Sese (National Institute of Advanced Industrial Science and Technology) | Masaru Koido (Yokohama City University)          |
| 25  | Innovation towards Gene and Cell Therapy                            | Takashi Oka (Nippon Medical School)              | Hiroyuki Mizuguchi (Osaka University)            |
| 26  | Issues observed during the development of regenerative medicine products by the developers with Sakigake Designation Scheme | Ken-ichiro Hata (Japan Tissue Engineering Co., Ltd./Fujifilm Corporation) | Tadashi Sameshima (Terumo Corporation)          |
| 27  | ISO standardization – Novel driving force for regenerative medicine, orchestrating knowledge of industry, academia and government | Yutaka Yanagita (Astellas Pharma Inc.)           | Tatsuo Heki (Fujifilm Corporation)               |
| 28  | Forefront of iP cells and Clinical Research                         | Jun Takahashi (Kyoto University)                 | Masayo Takahashi (RIKEN)                        |
| 29  | Cell Therapy in Office-based Physicians: Present and Future Challenges | Yosuke Wada (Aichi Gakuin University)            | Hiroshi Mizuno (Juntendo University)             |
| 30  | Cutting edge of the regenerative medicine in the musculoskeletal system | Masaya Nakamura (Keio University)                 | Noriyuki Tsumaki (Kyoto University)              |
| 31  | Symposium held by Networking Conference for Promoting Regenerative Medicine in Dentistry Vol.2: Efforts for practical application and generalization of regenerative medicine in dentistry | Masaki Honda (Aichi Gakuin University)           | Hayato Ohshima (Niigata University)              |
| 32  | Public-private partnership for research on standardization and validation of methods for tumorigenicity assessment of regenerative medical products (MEASURE) | Satoshi Yasuda (National Institute of Health Sciences) | Keiji Yamamoto (Takeda Pharmaceutical Co., Ltd./FIRM-CoNCePT) |
| 33  | Regenerative Therapy Clinically Applied in Patients                   | Yashikiko Tabata (Kyoto University)              | Noritaka Isogai (Kindai University)              |
| 34  | Industry-government-academic alliance on regulatory science of regenerative medicinal products | Kazuhiro Takekita (Osaka University)             | Akihiro Umeyama (National Research Institute for Child Health and Development) |
| 35  | "To build communication between regenerative medicine and society" produced by “the Program for Developing Models of Risk Communication in Science and Technology (MEXT)” | Masayo Takahashi (RIKEN)                        | Yoshimi Yashiro (Kyoto University)               |
in veterinary medicine; regulatory science; the standardization and industrialization of regenerative medicine, and more. In addition, an evening session entitled ‘The 1st Technology Auction in an Industry-Academia Collaboration for Regenerative Medicine’ was a novel attempt to create innovations that will lead to social implementations of technologies by providing opportunities for collaborations between academia and industries.

6. The regular presentations (oral presentations and poster presentations)

The regular presentations included 337 oral presentations and 358 poster presentations. The regular presentations were reviewed and selected by the program committee, based on their evaluation of the submitted abstracts. The oral presentations were classified into 59 sessions, each of which had four to seven presentations, depending on their topics as follows: pluripotent stem cells, somatic stem cells, cancer stem cells, mesenchymal cells, nervous system, heart, blood vessels, blood and bone marrow, respiratory system, digestive system, liver and pancreas, musculoskeletal system, urinary system, vision and hearing, oral tissues, skin, and tissue engineering.

The poster presentations were delivered in 43 sessions concerning the following topics: embryonic stem cells, induced pluripotent stem cells, somatic stem cells, cancer stem cells, mesenchymal cells, nervous system, heart, blood vessels, blood and bone marrow, respiratory system, digestive system, liver and pancreas, musculoskeletal system, vision and hearing, oral tissues, skin, tissue engineering, cell culture systems, and regulatory science. In both the oral and poster presentation sessions, moderators ensured that the sessions started and ended on time and facilitated questions and answers between the audience and the presenters.

7. Co-organized seminars

The Congress provided 24 co-organized luncheon seminars and one morning seminar (35 talks in total). The seminars also covered a broad spectrum of topics related to regenerative medicine.

8. Sessions for junior high school and high school students

Two courses, basic and advanced, were offered. Students were registered before the Congress. In the basic course, Dr. Kohji Nishida (Osaka University) delivered a special lecture to the students. Students then made poster presentations on their findings obtained in their research activities at schools and discussed their findings with executive board members of the JSRM. Fourteen groups, including three groups of junior-high-school students, made presentations. The board members evaluated the presentations in terms of visibility of the poster, conciseness of the presentation, the originality and logic flow of the research, and the quality of the discussion. Based on the evaluation, two presentations were awarded a Gold medal, four were awarded a Silver medal, and eight were awarded a Bronze medal. Lastly, the students toured the ‘State-of-the-Art Technology Showcase’ to learn about various companies that work on regenerative medicine and their products. In addition to the students who joined the poster presentations, more than 60 students participated in the tour. The basic course was supervised by Dr. Kenji Ishihara (Ibaraki University) and Dr. Masahiro Kawakami (Nara Institute of Science and Technology).

In the advanced course, junior-high-school and high-school students were supposed to give oral presentations on a given theme: ‘Current researches for stem cell and/or regenerative medicine + xxx = yyyy. Create anything ‘yyyy’ that your group wants to realize for a new idea in the future by adding ‘xxxx’ to the current research.’ The purpose of this theme was to give students the opportunity to learn current research and to expand the imagination for future research and career. Abstracts of the presentations were reviewed, and six groups were selected as participants. The oral presentations were evaluated by reviewers, and the groups that made distinguished presentations were awarded a Gold medal (one group), a Silver medal (two groups), and a Bronze medal (three groups). The presentation from the group that won a Gold medal was a proposal to regenerate hair that was lost in a side effect of medical treatment for childhood leukemia. In addition to the students’ presentations, three lectures were given by Dr. Masato Nakagawa (Kyoto University), Dr. Masayo Takahashi (RIKEN), and Dr. Takashi Yamamoto (Hiroshima University). The students also attended the collaborative lecture by the Congress Chair and the Governor of Kanagawa Prefecture. The advanced course was planned and executed by Dr. Kenji Ishihara (Ibaraki University) and Dr. Masahiro Kawakami (Nara Institute of Science and Technology).

These sessions were supported by the Japan Science and Technology Agency and General Incorporated Association ‘Girl Power.’

9. The state-of-the-art technology showcase

One hundred and fifty-eight organizations showcased their available products and technologies related to regenerative medicine at the State-of-the-Art Technology Showcase. They include laboratory equipment, chemicals, reagents, and systems used in clinical settings and research for regenerative medicine.

10. The Public program

The public program was held on March 25th, 2018, with the theme ‘How to Create a New Era.’ The program, which was
moderated by the Congress Chair Dr. Yuichi Tei, consisted of two sessions. In the first session, Dr. Atsuo Kishimoto (Osaka University) and Dr. Yoshimi Yashiro (Kyoto University) gave lectures. In the second session, three lectures were given by Dr. Takanori Takebe (Tokyo Medical and Dental University, Yokohama City University, Cincinnati Children’s Hospital), Dr. Kaori Kuribayashi-Shigetomi (Hokkaido University), and Dr. Akira Watanabe (Kyoto University).

11. The organizers and program committee

Prof. Yuichi Tei served as the Congress Chair. Associate Prof. Shinsuke Ohba served as the secretary general and the chair of the program committee; Assistant Prof. Hironori Hojo served as the secretariat and the vice chair of the program committee. The members of the program committee were as follows (titles dispensed): Taichi Ito (The University of Tokyo), Hiroshi Egusa (Tohoku University), Susumu Eguchi (Nagasaki University), Hitoshi Okochi (Research Institute National Center for Global Health and Medicine), Shinsuke Ohba (The University of Tokyo), Koichi Omori (Kyoto University), Hideyuki Okano (Keio University), Kenji Osafune (Kyoto University), Hideaki Kagami (Matsumoto Dental University), Masahiro Kinooka (Osaka University), Taku Saito (The University of Tokyo), Masaharu Seno (Okayama University), Tsuyoshi Takato (JR Tokyo General Hospital), Jun Takahashi (Kyoto University), Mari Dezawa (Tohoku University), Norimasa Nakamura (Osaka Health Science University), Masaya Nakamura (Keio University), Keiichi Hishikawa (Keio University), Hironori Hojo (The University of Tokyo), Katsuhisa Matsuura (Tokyo Women’s Medical University), Akifumi Matsuyama (National Institute of Biomedical Innovation), Atsushi Miyajima (The University of Tokyo), Tomohiro Morio (Tokyo Medical and Dental University), Tetsuji Yamaoka (National Cerebral and Cardiovascular Center), Seiichi Yokoo (Kyoto Prefectural University of Medicine), Kotaro Yoshimura (Jichi Medical University), and Shigeyuki Wakitani (Mukogawa Women’s University).

12. Concluding remarks

The 17th Congress of the Japanese Society for Regenerative Medicine had 3860 participants, and offered lectures and sessions with diverse but cutting-edge topics regarding the present state and future prospects of regenerative medicine. The organizers of the Congress hope that the participants from different sectors not only learned about the latest progress in regenerative medicine, but also took advantage of the opportunities to exchange views on this field. We also believe that synergy emerging from the congress will contribute to future social implementations of regenerative therapies that will cure diseases that have been treatment-resistant. We thank all of the participants, supporting organizations, and members of the program committee for their substantial contributions to this event.

Declaration of interest

The authors declare that they have no competing interests.

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