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Brain Science Week 2022 in Mongolia

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ABSTRACT: The Brain and Mind Research Institute (BMRI), affiliated with the Mongolian Academy of Sciences (MAS), in collaboration with the International Brain Research Organization (IBRO) and the Mongolian Neuroscience Society (MNS), organized the Brain Science Week 2022 from August 8 to 13, 2022, in Ulaanbaatar. The Brain Science Week 2022 included three main events: a 6-day training school for neuroscientists, the IBRO-APRC Ulaanbaatar Associate School on Brain-Related Disorders, a roundtable meeting with stakeholders and advisors themed "Perspectives of Brain Science in Mongolia", and the 9th Annual Meeting of MNS, Multidisciplinary Brain Science 2022. In addition, a press conference and an art contest, Brain Have No Limit, were organized to raise brain awareness in public. The IBRO-APRC Ulaanbaatar Associate School on Brain-Related Disorders was aimed to train 20 students on current advances in brain science by seven international faculties and 14 local faculties in six consecutive days. As a satellite event to the school, a 2-day training program for school psychologists, Basic Concepts of Psychology, was held in conjunction with the Mongolian Psychologists Association. The 9th Annual Meeting of MNS brought together 31 speakers and more than 100 participants who attended 14 invited lectures by world-leading neuroscientists in Ulaanbaatar. The support of MAS, the Mongolian National University of Medical Sciences, and the Ministry of Education and Science of Mongolia also contributed to the success of the events. The events made clear what we have achieved so far and what we have to do next for the development of brain science in Mongolia for all participants and the general population.

Keywords: Brain science week; Brain science; Multidisciplinary; Mongolia

1.0 BACKGROUND

This report aims to capture the main activities, achievements, and outputs of Brain Science Week 2022 in Mongolia. It's been nine years since brain science started to develop in Mongolia, as the Mongolian Neuroscience Society (MNS) was established in 2013 in Ulaanbaatar. As a next step, the society organized jointly with the Mongolian National University of Medical Sciences (MNUMS) the Honored Public Lectures supported by the International Brain Research Organization (IBRO) in 2018 in Ulaanbaatar, under the Auspice of the President of Mongolia. The honored speakers were world-renowned neuroscientists, including the President of IBRO, Pierre Magistretti; the

Chief-in-Editor of Neuroscience, Juan Lerma; and the Nobel Laureate, Edvard Moser. As a result, the Brain Science Institute was established at the MNUMS on April 24, 2019.

Moreover, as a national institute for neuroscience and psychology, the Brain and Mind Research Institute (BMRI) was founded on September 29, 2021, at the Mongolian Academy of Sciences (MAS) by the Government of Mongolia. Despite the achievements, we face numerous challenges in developing brain science in Mongolia, including but not limited to limited research funding, a non-transparent funding system, poor academic governance due to political polarization, the lack of human resources, high cost of research facility maintenance, and limited public awareness about brain science and mental health (Lkhagvasuren & Jamiyansuren, 2021).

The brain science week aimed to address the current challenges, determine future plans and increase public awareness about brain science. The events we organized benefited our goals by delivering our messages to the public at the press conference; training young generations in research techniques at the IBRO school; providing up-to-date information on recent advances in brain science by world-leading neuroscientists at the annual meeting; building collaborations between local scientists at the annual meeting; determining the best practice and future plans to develop brain science at the panel discussion meeting; opening officially the national institute for brain science, BMRI. It was the first on-site event after a long break due to the pandemic. We thank all the participants, volunteer students, and sponsors for their great support that made these events possible.

1.1 Press conference and media

To announce the start of Brain Science Week 2022, we held a press conference on August 8, 2022, at the National Information Center of the Press Institution – "Zuunii medee" (**Figure 1**). Please see details at Oyu (2022).

The press conference provided information on the planned events, including the IBRO-APRC Ulaanbaatar Associate School on Brain-Related Disorders, the 9th Annual Meeting of MNS, Multidisciplinary Brain Science 2022, a roundtable meeting themed "Perspectives of Brain Science in Mongolia", and the Opening ceremony of BMRI at the Mongolian Academy of Sciences. During the question and answer session, the organizing committee members responded to more than 20 journalists from public and private media companies about the development of brain science in the country, recent advances in brain science, and the importance of brain science for the public. The main goal of the event was to raise public awareness and motivate young students to study brain science. After the official press conference, many TVs, newspapers, and public journals, including the National Broadcasting Television (CCchannel, 2022) and Radio, the largest media channel in Mongolia, the MonTsaMe (Montsame, 2022), the national news agency, and the Daily News, the most popular daily news in Mongolia, contacted us to take interviews and write columns about brain science. There were 17 interviews and columns published in newspapers, broadcast television, and media websites about Brain Science Week during the Brain Awareness Week 2022. In addition, the videos and photos posted on our Facebook pages during the events reached 2.5 thousand viewers.

Figure 1: Press conference on the Brain Science Week 2022 at the National Press Center. (From left to right) Organizing committee members: Chimeddulam Erdenebaatar – Mongolian Neuroscience Society; Battuvshin Lkhagvasuren – president, Mongolian Neuroscience Society; Tsolmon Jadamba – Director, Brain and Mind Research Institute; Batsukh Shairii – President, Mongolian Psychologists Association; Otgon Zambal – Head, Translation and Innovation Center, BMRI.

1.2 The IBRO-APRC Ulaanbaatar Associate School on Brain-Related Disorders

The IBRO-APRC Ulaanbaatar Associate School on Brain-Related Disorders, a 6-day school, was successfully organized from August 8 to 13, 2022, in Ulaanbaatar, Mongolia. This school was designed for young researchers interested in neuroscience research from the Asia-Pacific region. Among the selected 20

Figure 2: Opening ceremony of the IBRO-APRC Ulaanbaatar Associate School on Brain-Related Disorders. (a) A memorial photo of the ceremony. **(b)** An introduction. **(c)** A hands-on session.

participants, seven students were men, and 13 were women, consisting of a doctoral student, 11 master students, six medical doctors, and two research scientists. **Figure 2** presents a memorial photo of the IBRO-APRC Ulaanbaatar Associate School on Brain-Related Disorders in 2022.

The school provided five theoretical lectures, eight tech talks, seven hands-on laboratory sessions, and 4 group discussions by invited international and local faculties. In the first four days, participants were provided with theoretical knowledge of recent advances in pathological mechanisms, diagnostics, and treatment of brain-related disorders covering neurological, neurosurgical, and neuropsychiatric diseases. In addition to theoretical knowledge, the program also covered essential techniques in systems and clinical neuroscience. Participants learned laboratory skills such as neuronal cell culture, perfusion and staining, brain dissection and histology, behavioral testing in experimental animals, polysomnography, heart rate variability analysis, and neuropsychiatric testing. In group discussions, students learned about neuroethical issues and were encouraged to give poster and oral presentations about their current studies. They were also asked to prepare for a journal club by using a computer to search for relevant articles on a given topic. On the fifth day, students joined the lectures and symposia at the 9th Annual Meeting of the MNS. The organizing committee invited seven internationally renowned scientists from Japan, Kyrgyzstan, Malaysia, Russia, and the USA. **Figure 3** depicts the invited speakers at the IBRO-APRC Ulaanbaatar Associate School on Brain-Related Disorders.

The 7 invited international faculties included Anton Varlamov (Russian Academy of Sciences, Russia), Cheah Pike See (IBRO–Asia Pacific Regional Committee Head, Malaysia), Elena Molchanova (American University of Central Asia, Kyrgyz Republic), Michael King Hwa Ling (Universiti Putra Malaysia, Malaysia), Nobuyuki Hamajima (Nagoya University, Japan), Tetsuya Hiramoto (Fukuoka National Hospital, Japan), and Zhiping Pang (Rutgers University, USA). We also invited 14 local faculties (http://neuroscience.mn/ibroschool2022/).

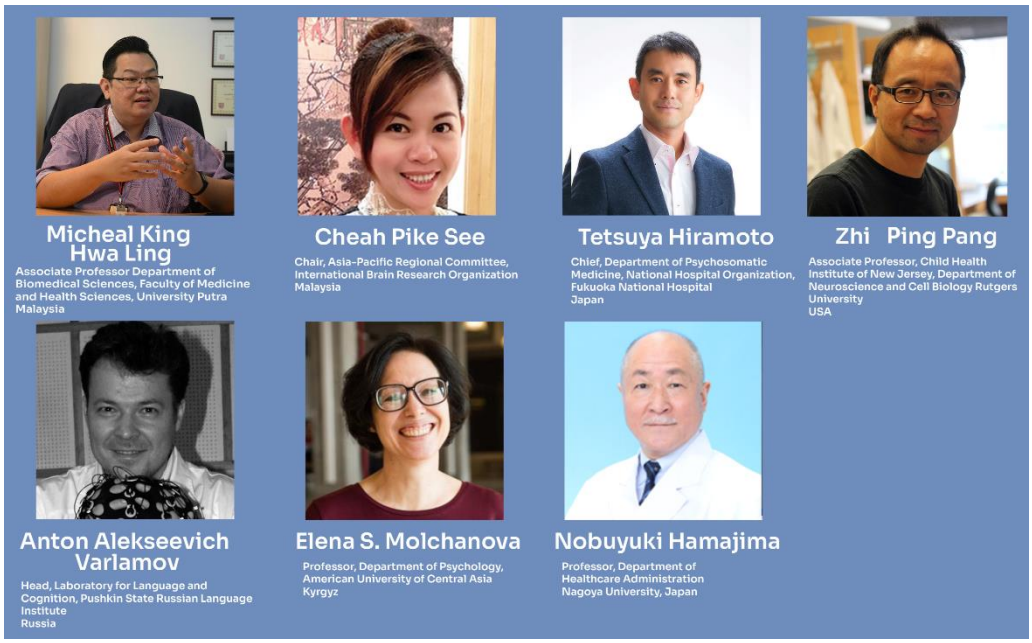

Figure 3: The invited international speakers of the IBRO-APRC Ulaanbaatar Associate School on Brain-Related Disorders.

1.3 The 9th Annual Meeting of the MNS, Multidisciplinary Brain Science 2022

The 9th Annual Meeting of the MNS, Multidisciplinary Brain Science-2022, took place in Ulaanbaatar (Venue: Conference Hall, MAS) from August 12 to 13, 2022. This annual meeting was conducted in a hybrid mode involving both virtual and in-person presence of scientists, academics, medical doctors, students, policy experts, journalists, and the public across the country. Compared to the 8th Annual Meeting of the MNS, which was held virtually in 2021 due to the Covid-19 pandemic, more than a hundred participants joined the annual meeting on-site during the two days (Munkhbaatar et al., 2021). The annual meeting featured keynote lectures, plenary lectures, the Central Asian Symposium for Neuroscience, oral sessions, and poster sessions on various neuroscience subjects. At the annual meeting, we invited 14 international speakers from China, Japan, Kazakhstan, Kyrgyzstan, Malaysia, Russia, South Korea, and USA. **Figure 4** depicts a memorial photo taken at the 9th Annual Meeting of the MNS.

Figure 4: A memorial photo of The 9th Annual Meeting of MNS themed "Multidisciplinary Brain Science-2022".

On the first day, the program started with a keynote lecture by Pann-Ghill Suh (President, Korean Brain Research Institute, Korea), titled "Strategies for Promotion of Brain Research in Korea" followed by Mu-Ming Poo (Director, the Institute of Neuroscience, Chinese Academy of Sciences, China) titled "History and Perspectives of Brain Science in China", which enlightened the audience of the meeting. After the keynote lectures session, the first part of the Central Asian Symposium for Neuroscience was started by Tsolmon Jadamba (Director, Brain and Mind Research Institute, Mongolia), followed by Michael King Hwa Ling (Universiti Putra Malaysia, Malaysia / Editor-in-Chief, Neuroscience Research Notes), Pike See Cheah (IBRO Asia-Pacific Regional Committee Head, Malaysia), Elena Molchanova (American University of Central Asia, Kyrgyz Republic).

The second day of the annual meeting begins with a plenary lecture by Tadashi Isa (Vice Dean, Department of Neuroscience, Kyoto University, Japan) titled "Roles of midbrain dopamine-related systems on motivation, decision and recovery after neuronal injuries" and by Zhiping Pang (Department of Neuroscience, Rutgers University, USA) titled "Synaptic Regulation by Neuropeptides in health and disease". After the plenary lectures, the second part of the Central Asian Symposium for Neuroscience was started by Anton Varlamov (Pushkin State Russian Language Institute, Russia) and followed by Bayarmaa Vanchindorj (National Center for Mental Health, Mongolia), Jijun Wang (Shanghai Mental Health Center, China), Marilyn Kaff (Kansas State University, USA), Tetsuya Hiramoto, (Fukuoka National Hospital, Japan), and Zholdassova Zhibek (Universal Brain Center, Kazakhstan).

The oral session included five presentations, and the poster session consisted of 34 presentations. The best oral and poster presenter awards were given to a study entitled "AUDIT test to assess alcohol consumption" by Enkh-Uchral Perenleisambuu (National Center for Mental Health, Mongolia) and "Two-factor model of the Mongolian version of GAD-7 in students" by Oyunsuren Jargalsaikhan (University of the Humanities, Mongolia), respectively (http://neuroscience.mn/MNS2022).

1.4 Opening ceremony of BMRI

The opening ceremony of BMRI was another noteworthy event during Brain Science Week 2022, which was witnessed by many distinguished professors and invited international guests. **Figure 5** depicts the cutting of the red ribbon ceremony for the opening of BMRI.

Figure 5: The ribbon cutting ceremony of the Brain and Mind Research Institute. From left to right: Battuvshin Lkhagvasuren – President, Mongolian Neuroscience Society; Pike See Cheah – Head, Asia-Pacific Regional Committee, International Brain Research Organization; Pann Ghill Suh – President, Korean Brain Research Institute; Tsolmon Jadamba – Director, Brain and Mind Research Institute; Battogtokh Dorjgotov – Head, Department of Science and Innovation Policy, Ministry of Education and Science; Chuluunbaatar Gelegpil – Vice President, Mongolian Academy of Sciences.

During the ceremony, the BMRI organized its first Memorandum of Understanding with the KBRI to facilitate mutual relations in academic exchange. Furthermore, Pann Ghill Suh, the President of the KBRI, Korea, has become the first Advisory Professor of the BMRI for his continued support for the development of brain science in Mongolia. His dedication was also awarded the Honorary Certificate from the MAS. **Figure 6** depicts a memorial photo of awarding ceremony.

Tetsuya Hiramoto, the Head of the Department of Psychosomatic Medicine, National Hospital Organization, Japan, was awarded the title of "Honorary Professor" in recognition of his invaluable support and advice for neuroscientists since 2012.

Figure 6: Advisory Professorship Award Ceremony. From left to right: Tsolmon Jadamba – Director, Brain and Mind Research Institute and Pann Ghill Suh – President, Korean Brain Research Institute.

1.5 A Panel Discussion Meeting – Perspectives of Brain Science in Mongolia

To determine and facilitate the development of brain science in Mongolia, we organized a panel discussion as a roundtable meeting entitled "Perspectives of Brain Science in Mongolia" on August 12, 2022. The meeting took place in the meeting room at BMRI from 2 p.m. until 5 p.m.

The meeting included 14 panelists and 16 on-site attendants representing the Ministry of Education and Science, research institutions, universities, and non-profit organizations from the Mongolian side and representing international experts, including scientists and policymakers with excellent leadership and experience on the other side. As the meeting moderator, Battuvshin Lkhagvasuren (President, MNS) introduced all the panelists, provided brief information on the past and current state of brain science in Mongolia, and addressed the challenges we face now. Professor Mu-Ming Poo (Institute of Neuroscience, Chinese Academy of Sciences, China) was invited to share his experience and comments as the first panelist, followed by Professor Pann-Ghill Suh (Korea Brain Research Institute, Korea), Xu Xun (Beijing Genomics Institute, China), Tadashi Isa (Kyoto University, Japan), Zhiping Pang (Rutgers University, USA), Cheah Pike See (IBRO–Asia Pacific Region), Anton Varlamov (Russian Academy of Sciences, Russia), Michael King Hwa Ling (Universiti Putra Malaysia, Malaysia), Elena Molchanova (American University of Central Asia, Kyrgyz Republic), Tsolmon Jadamba (BMRI, MAS, Mongolia), Battogtokh Dorjgotov (Ministry of Education and Sciences, Mongolia) Batsukh Shairii (Mongolian Psychologists Association, Mongolia), Gantulga Gankhuyag (Institute of Biology, MAS, Mongolia), and Gantulga Lkhagva (Mongolian Libraries Consortium, Mongolia). **Figure 7** depicts a memorial photo taken during the panel discussion.

Figure 7: Panel Discussion Forum – Perspectives of Brain Science in Mongolia. (a) A panelist – Professor Mu Ming Poo, Chinese Academy of Sciences, China. **(b)** A panelist – Professor Zhiping Pang, Rutgers University, USA. **(c)** A panelist – Professor Tadashi Isa, Kyoto University, Japan.

The impediments to the progress of neuroscience in the country were predominantly due to factors such as insufficient knowledge and public backing for neuroscience research, limited access to advanced education and training opportunities, inadequate resources for fundamental research, the absence of multidisciplinary partnerships, insufficient governmental support, and the emigration of skilled professionals or the shortage of human resources (Lkhagvasuren & Jamiyansuren, 2021). The panelists suggested that in the framework for developing neuroscience in Mongolia, we should integrate neuroscience as a discipline in the national education system, train national experts at the graduate level, develop a national program for brain science, facilitate multidisciplinary projects, incubate high-tech clusters, and increase the public awareness of brain science.

1.6 Other activities

As a satellite event, BMRI and the Mongolian Psychologists Association jointly organized a 2-day training themed "Basic Concepts of Psychology" for psychologists from August 8 to 9, 2022. This training was attended by around 70 participants who joined abroad online and 60 participants on-site. Nine local faculties, including psychologists and psychiatrists, presented their expertise and advice.

Moreover, the "Neuroscience student club" at the MNUMS and BMRI organized an art contest themed "Brain Have No Limit" in 4 categories: photos, video content, memes, and free art, to motivate young generations to study brain science. Among 24 innovative applications, Khaliun Munkhzaya, the 3rd year student at MNUMS, won in the drawing category; the NEBULA team won in the video content category; Narangerel Mendsanaa, the 1st year student at MNUMS, won in the meme category; and Munkhchimeg Batmunkh, the 3rd year student at MNUMS, won in the free art category of the competition.

At the end of the event day, we held a closing ceremony and gala dinner to foster close relationships between society members and enable them to discuss freely. During this ceremony, we presented certificates of appreciation to distinguished guests and successful training certifications to participants. **Figure 8** depicts a memorial photo of the volunteer students of the Neuroscience student club who helped the organizing committee.

Figure 8: Volunteers from the Neuroscience Student Club. A memorial photo of the Organizing Committee members with volunteer students.

1.7 Future perspectives

Over the years, the annual academic conference on brain science has become increasingly popular among the general public and young researchers interested in the field. All the progress and events we have achieved were made possible thanks to the generous support of numerous international experts and organizations who have kindly aided us and continued supporting our

endeavors. As a result, the Mongolian government, including the Ministry of Education and Science and the Mongolian Academy of Sciences, has started to show more support for this area, funding research projects and developing human resources.

Furthermore, the Brain and Mind Research Institute has made significant strides in advancing Mongolia's brain science by partnering with international organizations like the Mongolian Neuroscience Society, the Institute of Neuroscience of the Chinese Academy of Sciences, the Korea Brain Research Institute, and the IBRO-APRC. Although significant progress has been made, there is still a need for further efforts to establish a state-of-the-art laboratory and provide the next generation of researchers with access to the latest training and educational opportunities. Collaborating with international partners on projects and research will be crucial to support the development of neuroscience research in Mongolia.

To ensure the long-term sustainability of neuroscience research, it is imperative to integrate the discipline into graduate and postgraduate curricula at the university level. Additionally, it is essential to involve high school students in studying brain science techniques and encourage their participation in the International Brain Bee. By inspiring young students to pursue careers in neuroscience, these initiatives have the potential to foster growth in the field and establish a strong foundation for future research endeavors.

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