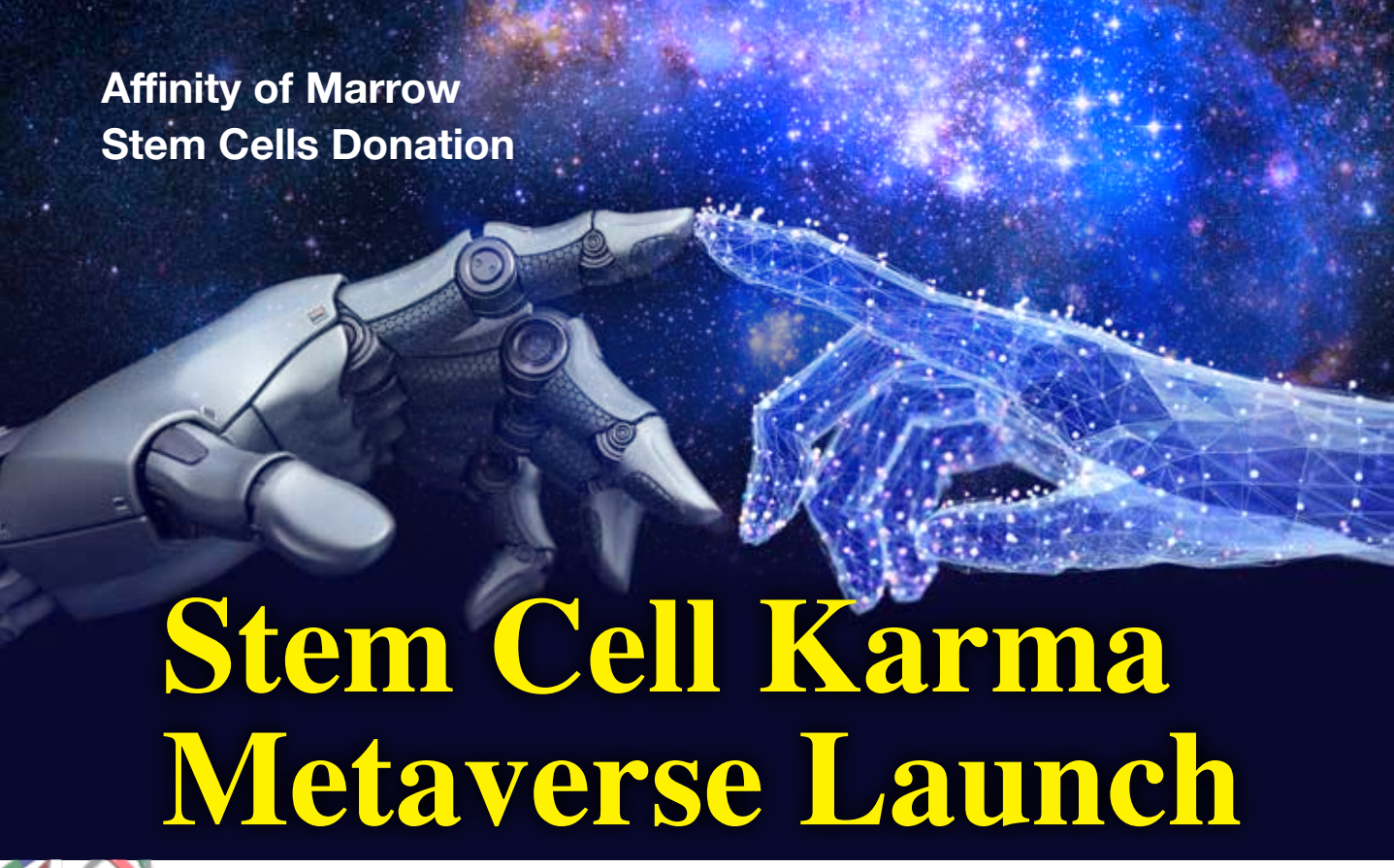

Stem Cell Karma Metaverse Launch

30th Anniversary of Buddhist Tzu Chi Stem Cells Center

By Liu Chen-Chen, You Hsiou-Hua, Chiang Chia-Yu

In October 2023, the Tzu Chi Stem Cells Center celebrated its 30th anniversary and paid homage to all voluntary donors and caring volunteers. Simultaneously, the Center pioneered its “Stem Cell Metaverse” to transcend temporal and spatial limitations and disseminate medical knowledge. The public can gain a better understanding of hematopoietic stem cell donation processes and their significance for patients suffering from hematologic disease through AR-based Smart Guides and the cross-platform system titled “Hematopoietic Stem Cell Donation Metaverse” by relying on their electronic devices. They can also participate in various simulation tasks and thereby become qualified volunteer guides.

Thirty years have passed since the establishment of the bone marrow database on October 20, 1993. Illustrious guests

including Ms. Lin Ching-Hsien, Vice President of Tzu Chi Foundation, Dr. Lin Chin-Lon, CEO of Buddhist Tzu Chi Medical Foundation, Dr. Lin Shinn-Zong, Superintendent of Hualien Tzu Chi Hospital, Dr. Wu Pin-An, Deputy Superintendent of Hualien Tzu Chi Hospital, Dr. Yang Kuo-Liang, Director of Tzu Chi Stem Cells Center, Ms. Lin Hsueh-Chu, Senior Tzu Chi Volunteer, Professor Chang Hua-Cheng of the Department of Multimedia & Computer Entertainment Science, Southern Taiwan University of Science and Technology, Professor Chang Wan-Jung, Director of Medical and Intelligent Technology Research Center, Assistant Professor Chen Ming-Che, Director of AIoT Technology Research Center, and Mr. Wang Hsien-Chang, President of Jorjin Technology attended the 30th anniversary celebration of the Tzu Chi Stem Cells Center to witness a new chapter in the history of hematopoietic stem cell donation in Taiwan.

30 years ago, Dharma Master Cheng Yen personally travelled through Taiwan to advocate the importance of

The Buddhist Tzu Chi Stem Cells Center celebrates its 30th anniversary and pioneers its "Stem Cell Metaverse" to transcend temporal and spatial limitations and disseminate medical knowledge. From left to right: Assistant Professor Chen Ming-Che, Professor Chang Hua-Cheng, and Director Chang Wan-Jung from the Southern Taiwan University of Science and Technology, Mr. Wang Hsien-Chang, President of Jorjin Technology, Tzu Chi Volunteer Lin A-Chun, Ms. Lin Ching-Hsien, Vice President of Tzu Chi Foundation, Dr. Lin Chin-Lon, CEO of Buddhist Tzu Chi Medical Foundation, Dr. Lin Shinn-Zong, Superintendent of Hualien Tzu Chi Hospital, Dr. Wu Pin-An, Deputy Superintendent of Hualien Tzu Chi Hospital, Dr. Yang Kuo-Liang, Director of Tzu Chi Stem Cells Center, and Tzu Chi Volunteer Lin Hsueh-Chu.

bone marrow donations. When Tzu Chi volunteers heard the Master utter the wish to establish a bone marrow database during her first stop in Taitung, they launched a campaign on October 12, 1993, which was echoed by Tzu Chi Members all the way from Taitung, Pingtung, Kaohsiung to northern Taiwan based on an unwavering belief that the Master would never sacrifice a person's health to save another person.

As a result of the mobilization of Tzu-Chi volunteers all over Taiwan, data of over 468,000 voluntary donors has been accumulated with the goal of offering a chance of a new lease of life to over 6,500 individuals and families in 31 countries and regions worldwide.

Superintendent Lin Shinn-Zong wears AR glasses to experience the AR-based Smart Guide which is capable of propagating the importance of the good deed of donating hematopoietic stem cells to the general public as well as answering relevant questions and clarifying potential concerns.

Spreading Love Without Respite Over Three Decades

In the first decade, serology experts and physicians learned new techniques and pursued perfection in laboratory and clinical practices. Back then, bone marrow had to be extracted from the ilium bones of fully anesthetized donors in operating rooms. Numerous circulating rumors sparked fear in a large number of citizens, resulting in their unwillingness to serve as donors. Even registered voluntary donors faced insurmountable difficulties due to opposition by family members. This stage can be characterized as the period of "literary creativity" of volunteers. They engaged in autonomous learning and creation of illustrations for pervasive and ubiquitous advocacy in local communities.

The second decade was marked by the activation of new technologies. In 2002, peripheral blood hematopoietic stem cell collection was adopted. The first transplantation of cells collected from the peripheral blood of a non-relative donor was carried out in 2003. These new technologies significantly increased the willingness of registered donors. The number of successful matches grew steadily at a rate of 3000

per year. In addition, numerous donors joined the ranks of Tzu Chi volunteers to share their personal experiences

In the third decade, the Stem Cells Center joined the World Marrow Donor Association (WMDA) to get in sync with global trends. The goal is to offer a globalized matching platform with uniform standards and consistent donation regulations. These efforts have been paired with the creation of a volunteer training and certification system. The optimal use of social media such as Facebook, Instagram, and Youtube to reach younger audiences with the advocacy campaign represents

Crisis as Opportunity – Database Youthification

The third decade was the most challenging period. As a result of a misinformation campaign on the Internet, only one vial of blood was collected in a blood test drive and our volunteers had to endure insults and humiliation. Subsequently, all large-scale blood test and registration activities had to be suspended and bone marrow extraction and delivery were affected by border restrictions mandated by the COVID-19 pandemic. Fortunately, the Center was able to

Despite the aforementioned accumulation of data for over 460,000 donors, the Center has not been able to compensate for the gradual removal of donors aged 55 and above due to the impact of population aging and low birth rates. It is therefore a pressing task of the Tzu Chi Stem Cells Center to enlist more young donors aged 18 and above and thereby foster the "Youthification" of the database and ensure the availability of high-quality hematopoietic stem cells for hematologic disease patients requiring a transplantation.

Synchronized Launch of the Stem Cell Metaverse

With a view to transcending temporal and spatial limitations, Tzu Chi Stem Cells Center has teamed up with Southern Taiwan University of Science and Technology and Jorjin Technology in the launch of Stem Cell Metaverse, thereby turning Tzu Chi Stem Cells Center into the first medical center in Taiwan that harnesses VR (Virtual Reality) Metaverse for the dissemination of medical knowledge and the first bone marrow database worldwide that relies on AR (Augmented Reality) paired with AI-based virtual guides for the promotion of hematopoietic stem cell donations. Superintendent Lin Shinn-Zong and Deputy Superintendent Wu Pin-An got a hands-on experience of

Deputy Superintendent Wu Pin-An (right) experiences the cross-platform system titled "Hematopoietic Stem Cell Donation Metaverse"

AR and VR technology. Dr. Lin Chin-Lon, CEO of Buddhist Tzu Chi Medical Foundation, expresses his gratitude to Southern Taiwan University of Science and Technology and Jorjin Technology for their cooperation in ushering in a new era of promoting hematopoietic stem cell donations by tapping into the potential of information and communications technology and the Metaverse.

The Stem Cells Center utilizes AR-based Smart Guides, which is a software system operated on AR glasses. This system allows users to view virtual, AI-based guides explain relevant issues. Superintendent Lin Shinn-Zong points out based on his experience with the AR-based Smart Guide that it is capable of propagating the importance of the good deed of donating hematopoietic stem cells to the general public as well as answering relevant questions and clarifying potential concerns. These AR-based guides give the public, and younger audiences in particular, an accessible understanding of hematopoietic stem cell donation processes through multimedia interactions (animations and videos) without temporal and spatial limitations. The ultimate goal is to enlist a rising number of citizens as voluntary donors.

"Hematopoietic Stem Cell Donation Metaverse" can offer education and training courses for volunteers through various simulation tasks.

In addition, the "Hematopoietic Stem Cell Donation Metaverse" is a cross-platform system which can be utilized for the popularization of donations among citizens and education and training of volunteers and hospital staff. Deputy Superintendent Wu Pin-An, who marvels at the potential of this technology after his hands-on experience, stresses that users can connect to the Metaverse with their computers, smartphones, tablets, or VR glasses whenever and wherever they want. This allows them to participate in various activities at virtual locations such as transplantation hospitals or Tzu Chi Hospital with their virtual identity to gain a clear understanding of donation processes and the significance of such cell donations for patients suffering from hematologic disease.

Finally, the "Hematopoietic Stem Cell Donation Metaverse" can offer education and training courses for volunteers through various simulation tasks. It not only breaks down temporal and spatial limitations and barriers but also creates and realizes imaginary, virtual worlds with the ultimate goal of maximizing the promotional effects in the field of hematopoietic stem cell donations through the power of technology.